



FINAL REPORT

Impact of the State Infrastructure Strategy 2018

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Infrastructure NSW
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Executive Summary

The *State Infrastructure Strategy 2018* (SIS 2018) makes recommendations for each of NSW's key infrastructure sectors — transport, energy, water, health, education, justice, social housing, culture, sport and tourism. These recommendations cover policy and process recommendations, as well as new infrastructure. The CIE has been asked to assess the economic impact of implementation of INSW's recommendations.

Previous State Infrastructure Strategies have focussed on infrastructure to address the backlog of investment (2012) and large-scale capital spending on new infrastructure funded by asset sales (2014). The SIS 2018 is about more than big projects. The largest economic impacts from its implementation will arise from better use of existing infrastructure, better processes for making decisions about infrastructure, providing services more efficiently and pricing services efficiently.

In this report we have modelled the impact of the recommendations from the SIS and spending on priority projects, if accepted by government.¹ Key recommendations driving economic and liveability outcomes include:

- the recommended transport pricing road map, if it proceeds to implementation, and other policies to improve utilisation of transport infrastructure.
- public transport capital expenditure that generates additional housing, combined with recommendations that ensure infrastructure is put in place to support localities that have growing populations and employment.
- capital expenditure on health, education and cultural infrastructure.

The SIS 2018 recommendations have been modelled conservatively. Only 60 per cent of recommendations have been quantified in the modelled outcomes. There are a number of other recommendations which have impacts which are not measurable, such as improvements to quality-of-life from better health, education and cultural services. Separate results are provided including and excluding the impact of the transport pricing development work proceeding further to implementation.

Total state and local government capital spending was approximately \$8.3 billion in 2015-16. In terms of new projects, the SIS recommendations amount to roughly \$72 billion in capital expenditure, which equates to an average additional \$3.6 billion per annum compared to the baseline (or 0.6 per cent of 2018 GSP). There are a number of agency plans where capital expenditure is already committed (but not yet funded) over the first ten years of the planned implementation period of the SIS recommendations that are also modelled with the impact of the additional spending from the SIS.

¹ At the time of the report, the SIS recommendations do not represent the NSW Government's commitment nor fiscal capacity to fund the projects identified in the Strategy.

The impact on the NSW economy will be driven by three factors:

- **productivity** — producing more from the same inputs
- **population** — a larger population will lead to higher levels of employment, and drive greater demand for goods and services
- **participation** — higher levels of people participating in the workforce will lead to more employment.

The CIE has assessed how the INSW recommendations change productivity, labour force participation and population growth (due to changes in transport times and liveability). The size of these impacts is measured based on evidence of the impacts of infrastructure and policies developed over the past five years.

A three-stage approach has been used to measure the impacts of the SIS 2018. This involves understanding the returns from different policies and projects recommended by INSW, tracing the pathway of impact and putting this together using an economic model. The approach uses and builds on extensive evidence of the returns from infrastructure that has been gathered through the Infrastructure Investor Assurance Framework. This includes using evidence drawn from Strategic Business Cases and the NSW Government modelling and evaluation of policies.

The impacts of the Strategy have been reported for the 20 and 40 year periods to 2036 and 2056 because the assessment relies and builds on NSW Treasury's population and economic model for 2016 – 2056. Estimating the impacts of the SIS consistently with this model approach and evaluation period provides the most reliable estimates.

The impacts of the SIS 2018 on the NSW economy

The SIS 2018 will, if fully implemented, have substantial impacts on the NSW economy by increasing productivity, participation and population. A more productive and liveable NSW with more job opportunities attracts more businesses and people into NSW.

If accepted, Infrastructure NSW's recommendations are estimated to increase Gross State Product (GSP) by 1.2 per cent, or \$11 billion, in 2036 and by 3.3 per cent, or \$45 billion, in 2056. If the recommended transport pricing development work also proceeds to implementation, GSP is modelled to increase by \$26 billion (2.9 per cent of GSP) in 2036 and \$66 billion (4.8 per cent of GSP) in 2056.

In cumulative terms, the NSW economy produces \$135 billion more goods and services between 2016 and 2036 as a result of the SIS recommendations. Or, if transport pricing proceeds to implementation, the NSW economy is expected to produce \$284 billion more goods and services over this period.

However, most of the additional economic activity attributable to the SIS occurs between 2036 and 2056 as most of the projects are completed by this point in time. If accepted, the SIS recommendations are expected to result in an additional \$504 billion in goods and services being produced between 2036 and 2056 (or if transport pricing proceeds to implementation, an additional \$870 billion).

1 Economy-wide impacts of the SIS on overall and per capita outcomes

Indicator	Unit	Absolute changes		Per cent changes	
		2036	2056	2036	2056
Impacts of the SIS excluding transport pricing					
Cumulative GSP (20 years)	\$B	135	504	0.9	2.2
Cumulative Consumption (20 years)	\$B	42	320	0.5	2.3
GSP	\$B	10.9	44.6	1.2	3.3
GSP per capita	\$/person	700	800	0.8	0.7
Employment	Jobs	26 000	159 000	0.6	2.9
Household consumption	\$B	4.7	30.8	0.9	3.5
Household consumption per capita	\$ per person	200	700	0.4	0.9
Population	No.	44 000	302 000	0.5	2.6
Impacts of the SIS including transport pricing					
Cumulative GSP (20 years)	\$B	284	870	1.9	3.9
Cumulative Consumption (20 years)	\$B	153	585	1.7	4.1
GSP	\$B	25.6	66.1	2.9	4.8
GSP per capita	\$/person	1 700	1 900	1.8	1.6
Employment	Jobs	65 000	204 000	1.4	3.7
Household consumption	\$B	15.6	46.2	2.8	5.3
Household consumption per capita	\$ per person	1 000	1 600	1.8	2.1
Population	No.	101 000	368 000	1.0	3.2

Note: All dollar values are 2015/16 dollars. Cumulative GSP and consumption refer to the total GSP and total consumption over 20 years from 2016-2036 and 2036-2056.

Source: The CIE.

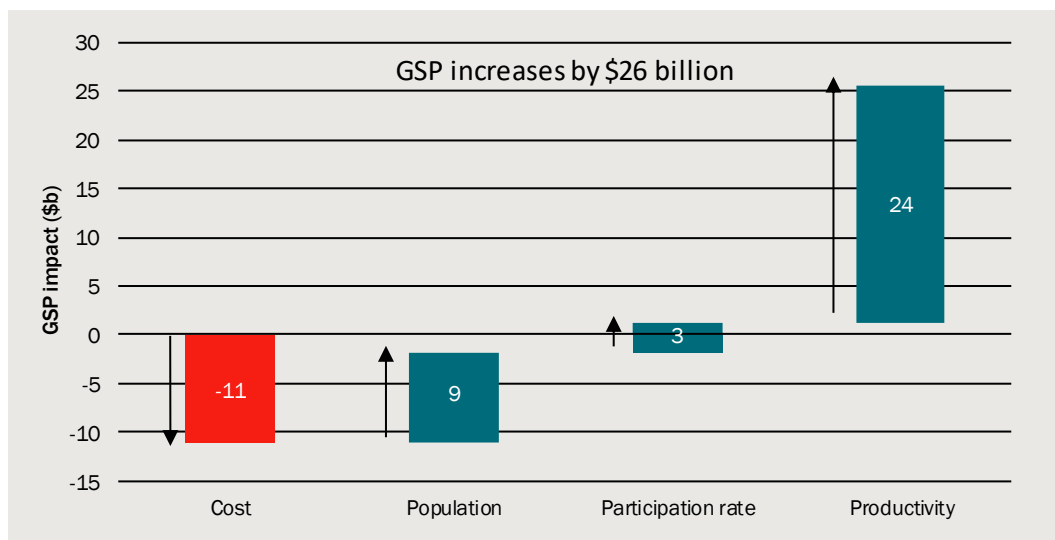
The population of NSW would be more than 44 000 people higher by 2036 and more than 302 000 people higher by 2056 because of the SIS recommendations. If transport pricing development work proceeds to implementation, the population of NSW would be 101 000 people higher by 2036 and 368 000 higher by 2056. The per person GSP is also materially higher with the full implementation of the SIS 2018.

Across NSW, there would be 26 000 more jobs by 2036 and 159 000 more jobs by 2056. If the transport pricing development work proceeds to implementation, the SIS would result in 65 000 more jobs by 2036 and 204 000 more jobs by 2056. These changes reflect the higher population in NSW and a higher level of workforce participation as a result of the SIS recommendations.

The focus of the SIS 2018 is on productivity and growth. If transport pricing development work proceeds to implementation, by 2036 the economy produces \$26 billion more goods and services (chart 2). This improvement consists of the following components

- \$24 billion increase due to productivity improvements,
- \$3 billion increase due to increased workforce participation,
- \$9 billion increase due to increased population growth, and
- \$11 billion decrease due to costs of funding the SIS.

2 Impacts of the SIS on GSP in 2036 if transport pricing proceeds to implementation



Note: Numbers do not add because of rounding.

Data source: The CIE.

Key policy recommendations that improve productivity include:

- transport pricing, which will drive incentives for more efficient travel across the metropolitan area, leading to productivity gains and private travel time savings. The positive impacts of transport pricing are equivalent to the impacts of spending \$100 billion on transport infrastructure, but are achieved at a fraction of the cost
- continuing to find new innovative ways to deliver transport, health, energy and water services, including the use of the private sector, which is estimated to reduce costs of delivering these services by over \$60 billion over the next 40 years.

These and other policies recommended by INSW provide a sufficiently large productivity improvement to pay for capital expenditure, while leaving people in NSW better off financially.

The SIS 2018 includes recommendations that will increase the attractiveness of the NSW as a place to live and work, because of expanded employment opportunities, lower travel times and improved government services. The improvement in the liveability of NSW, over time, would encourage migration into the state. Without new infrastructure investment and services, the NSW Department of Planning and Environment population projections would less likely be achieved.

The SIS includes recommendations that would increase housing supply. Housing supply in regional NSW is expected to be higher because of improved attractiveness of regional cities. In Sydney, housing supply is expected to increase because of large public transport projects and continued support for programs such as the Planned Precincts program that integrate land use and infrastructure. Other actions of the NSW Government will also be essential in addressing population challenges and housing supply.

The impacts of the SIS 2018 on NSW households

The services provided by infrastructure are an important component of people's lives. Transport infrastructure provides accessibility to jobs, family and services, and can increase the time people have for work and leisure, and the most impactful recommendations are targeted at getting better outcomes from existing infrastructure. NSW becomes a more attractive state to live in as a result of better health and education services, and more people choose to migrate to NSW as a result. Energy, water, justice and social housing infrastructure provide essential services. SIS recommendations provide additional investment to support growth in demand for these services. Communications infrastructure provides connectivity between people and businesses driving productivity growth.

The SIS recommendations will have positive impacts for NSW households because they will provide infrastructure more efficiently, which allows for better outcomes for the same cost, and because they expand the amount of infrastructure available for people to use. For the parts of the SIS 2018 that are measurable, we find:

- after accounting for the cost of new infrastructure, people across NSW will be better off and have expanded consumption, with an additional \$200 per person per year by 2036, and \$700 per person per year by 2056. If the transport pricing development work proceeds to implementation, consumption will be higher by \$1 000 per person per year by 2036 and \$1 600 per person per year by 2056 relative to not implementing the SIS recommendations.
- travel times in Greater Sydney will be the equivalent of more than one hour lower per person per week on average, by 2036. This is equivalent to a reduction in average travel times of almost 20 per cent and reverses the trend of worsening travel times.

Labour force participation improves as a result of the SIS, mainly due to reduced transport times. There are also some labour force participation impacts in other areas, such as health infrastructure because sick and injured people return to the labour force more rapidly. Improved quality of education strengthens skills and capacity to work in the longer term. By 2056, labour force participation is expected to be 0.4 percentage points higher than would otherwise be the case, which is significant given the challenges posed by an ageing population.

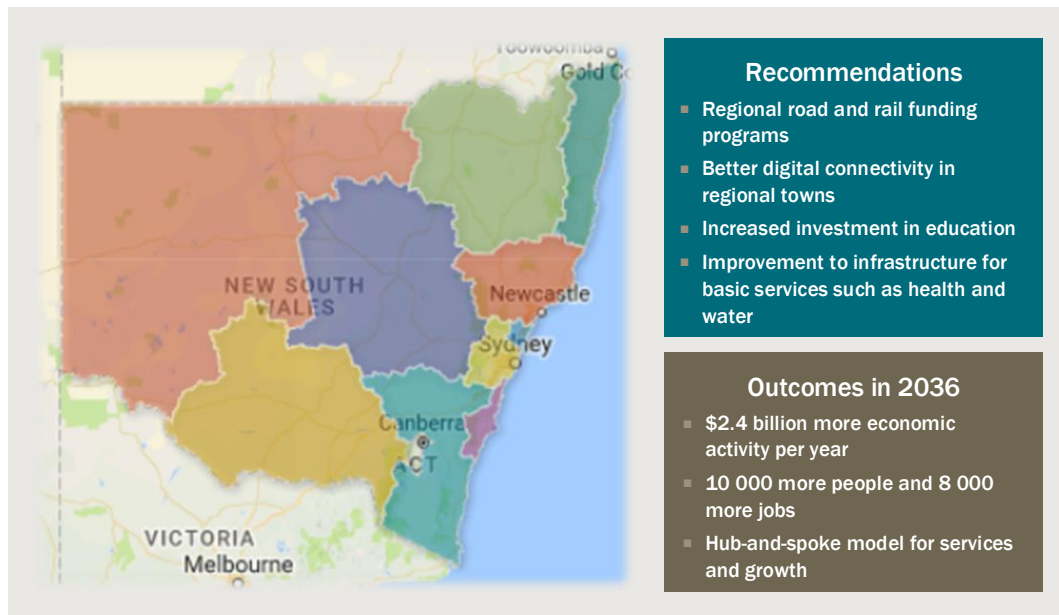
There are many other impacts of the SIS 2018 on people's lives that are not measurable, such as the full value of additional education and health infrastructure, and improved cultural and sporting facilities. Specifically, the improvements to quality-of-life from better health, education and cultural services are not measured except in terms of how they encourage migration to NSW and improve labour force participation.

The SIS 2018 supports the region plans for NSW

The SIS 2018 supports economic development in NSW and the Government's region plans. Geographically, the SIS investments and policies are aligned to the areas of growth expected across NSW.

Regional NSW is expected to grow in population by 25 per cent and jobs by 10 per cent to 2056. Recommendations that target growth in jobs are expected to reverse historical trends and to encourage working-age people to settle in Regional NSW. Additional transport investments are expected to support the ‘hub and spoke’ transport network that better connect smaller townships to regional centres.

3 SIS recommendations and economy-wide impacts in 2036 for Regional NSW

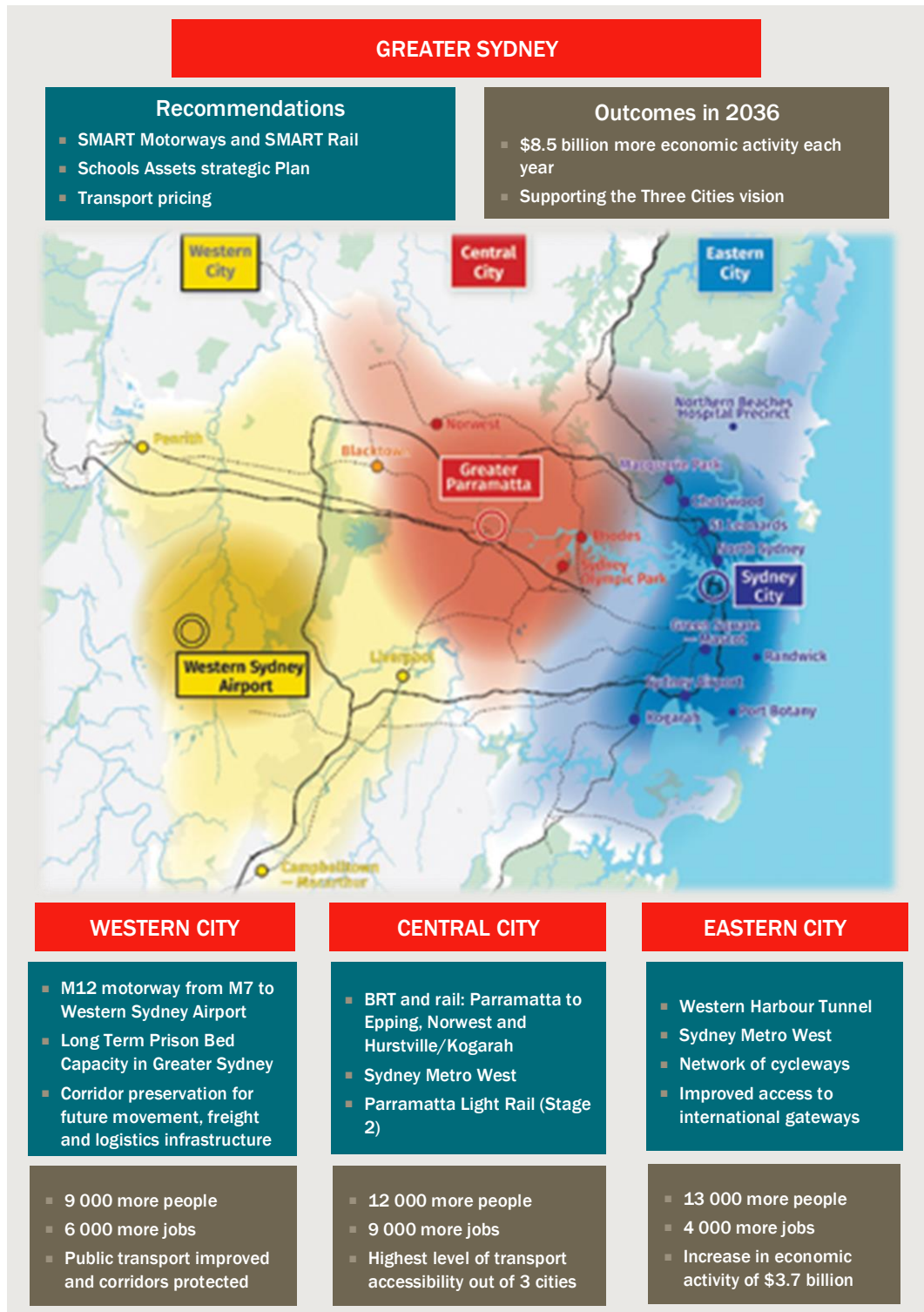


Data source: CIE.

The SIS also supports the spatial strategy for Sydney being developed by the Greater Sydney Commission which proposes three cities — the Eastern Harbour City (existing CBD), Central River City (Parramatta) and Western Parkland City (building off the Badgerys Creek Airport).

The spatial changes within Sydney reflect a movement of jobs westwards relative to current employment patterns. Chart 4 summarises key recommendations for Greater Sydney.

4 SIS recommendations and economy-wide impacts in 2036 for Sydney



Data source: CIE.

1 Introduction

The State Infrastructure Strategy (SIS) is a 20-year infrastructure plan for the NSW Government that places strategic fit and economic merit at the centre of investment decisions. The SIS comprises recommendations for infrastructure projects and policies. However, the SIS recommendations do not represent Government commitments nor fiscal capacity to fund the projects identified in the Strategy. These recommendations lead to a combination of economic and non-economic impacts. The CIE has been asked to assess the economic impacts of the 2018 SIS.

This chapter provides further information regarding the SIS recommendations and the CIE's approach to modelling these impacts.

What is the SIS?

The SIS assesses infrastructure problems and solutions, and provides recommendations to best grow the State's economy, enhance productivity and improve living standards for our NSW community. It is updated every five years.

The SIS recommendations include a variety of different capital projects and policies, that together drive a balance of economic and liveability outcomes. Key recommendations include:

- policy changes that improve productivity including
 - transport pricing
 - more efficient service delivery
- public transport capital expenditure, combined with recommendations to improve the integration of infrastructure with land use planning.
- capital expenditure on health, education and cultural infrastructure
- a raft of smaller policy related improvements.

The recommendations align to six strategic directions across sectors, aiming to maximise the returns from new and existing infrastructure:

- 1 improved integration of land and infrastructure planning
- 2 an infrastructure program that is the best possible investment of public funds
- 3 optimised asset management
- 4 resilience against natural hazards and human-related threats
- 5 improved state-wide connectivity and realisation of the benefits of technology
- 6 high quality consumer-centric services and innovative service delivery models in infrastructure sectors

The SIS supports a place-based approach to infrastructure, which involves resilience, better asset management and new technologies. The need for significant investment in infrastructure is driven by rising demand for public services. As the population of NSW grows, the longer-term plan for jobs and housing prepared by the Greater Sydney Commission and the Department of Planning and Environment needs to be supported by infrastructure.

Costs

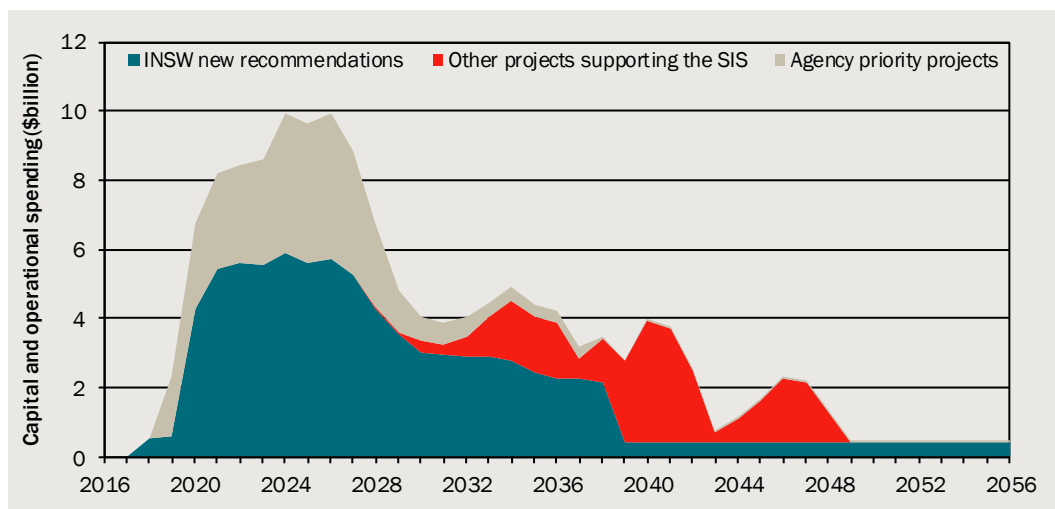
The SIS recommendations generally involve costs to the NSW government such as construction and project planning costs. The total capital costs of all recommendations are estimated to be \$72 billion. The total capital and operating costs of all recommendations are estimated to be \$83 billion over 40 years, as shown in chart 1.1. The majority of spending on SIS recommendations (\$72 billion) is expected to occur within the next 20 years. This spending is in addition to spending on projects in the base line. Costs and timing for projects recommended in the Strategy are determined from three sources:

- estimates provided by INSW
- strategic business cases
- the database of 'Agency priority projects' that have been planned. This database of emerging projects are sourced from an enhanced process for prioritising capital infrastructure.

We have also modelled the impacts of other projects supporting the SIS in years 21 to 40 (2037 to 2056) including mass transit connections from Parramatta to Epping, Norwest and Hurstville/Kogarah. After including Agency Priority projects and additional projects supporting the SIS after 2036, the total capital and operating spending is \$148 billion.

The cost of SIS recommendations, referred to above, is an estimate only and does not represent any implicit Government endorsement to individual projects or groups of projects. Final approval of projects will take into account prevailing Government fiscal policy and other Government policy priorities. Projects must also satisfy a range of assurance and business case reviews to determine if the project is the most appropriate infrastructure solution and also to verify both costs and benefits of projects.

1.1 Capital and operating costs of SIS recommendations



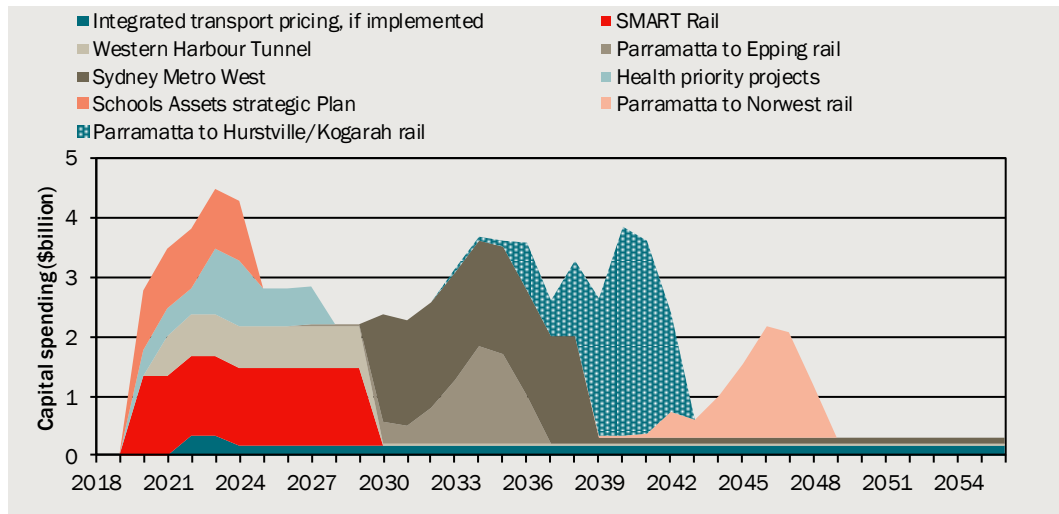
Note: Costs are not discounted and are shown in 2017 prices (that is, in real terms). Capital spending also includes a small amount of incremental operational expenditure for rail and some other projects. Some projects may be fully or partially funded by the federal government. This chart and the economic modelling accounts for the total cost of each recommendation, and is agnostic towards the source of funding.

Data source: CIE.

Some projects may be fully or partially funded by the federal government or the private sector. The economic modelling accounts for the entirety of the cost of each recommendation, and is agnostic towards the source of funding. Delivery models have not been assumed in the modelling, but economic impacts would be the same whether delivered by the private or public sector if costs are the same. Private sector delivery may provide cost savings, innovation or better implementation. However, the Government's capacity to finance major infrastructure can also be constrained by the objective of maintaining the State's triple-A credit rating. This means taking on additional government debt to fund infrastructure itself may have wider implications for the economy.

Recommendations related to transport drive the costs of the SIS, with seven of the eight largest projects in this sector (chart 1.2). Three of the major transport projects relate to the mass transit links from Parramatta to the other city centres of Epping, Norwest and Hurstville/Kogarah.

1.2 Largest SIS projects by cost



Note: Costs are not discounted and are shown in 2017 prices (that is, in real terms). Capital spending also includes a small amount of incremental operational expenditure for rail and some other projects. Some projects may be fully or partially funded by the federal government. This chart and the economic modelling accounts for total cost of each recommendation, and is agnostic towards the source of funding. Health priority projects includes hospital projects (e.g. Randwick Hospital Stage 2 and John Hunter Hospital).

Data source: CIE.

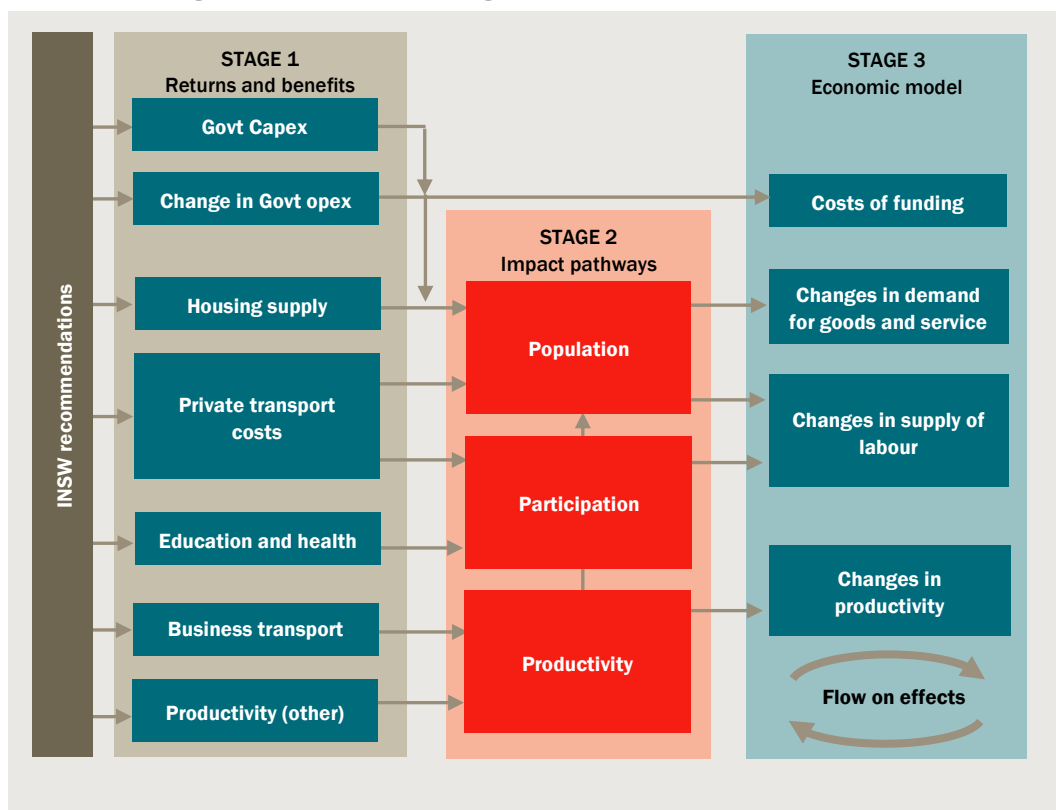
Approach to modelling impacts

Of the 122 SIS recommendations, we have individually assessed 74 recommendations and quantified their economy-wide impacts. The first stage to measuring the impacts of the SIS is to identify the SIS recommendations and their cost. Following this stage, the approach we have used to measure impacts has three stages (chart 1.3):

- assesses the returns from each recommendation and categorises these by type of impact and region
- traces these through to their impacts on population, productivity and participation in the labour force
- models the state of the economy with and without these impacts, accounting for the costs of funding the recommendations.

The approach uses and builds on extensive evidence of the returns from infrastructure that has been put together through the Infrastructure Investment Assurance Framework. This includes using Strategic Business Cases and analysis of policies.

1.3 Modelling approach to measuring the impacts of the SIS

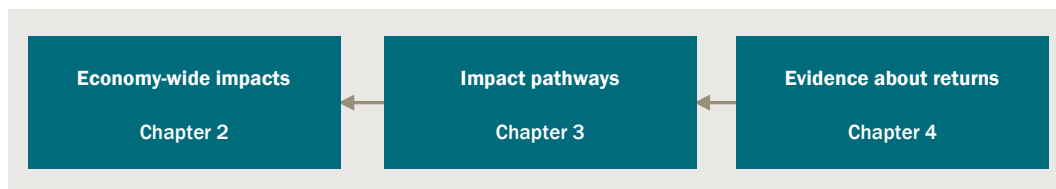


Data source: The CIE.

The impacts of the SIS are presented according to the structure shown in chart 1.4 that follows the approach shown in chart 1.3, with the economy-wide impacts, impact pathways, and returns of recommendations by type. These key chapters are supplemented by chapter 5, which summarises the impacts of the SIS at a spatial level.

The remainder of the report assesses key constraints on the economy under the base line. Technical appendices contain detailed information about the modelling.

1.4 Structure of Part I of the report



Data source: CIE.

The approach used builds on detailed data collected on the direct benefits, both economic and non-economic, and costs of NSW Government investments and policies. This provides a robust link between the economic impacts and the recommendations being made by Infrastructure NSW.

We present estimates of the economywide ‘impacts’ of the SIS. This is different to a Cost-Benefit Analysis (CBA) which is used for project evaluation.

In order to model the economywide impacts we have employed a population model developed by NSW Treasury and a computable general equilibrium model developed by the CIE.

Scope of modelling

Our analysis builds on the modelling done for previous infrastructure strategies by measuring the economic impacts of SIS recommendations that affect liveability outcomes such as travel times.

We have modelled the impacts of projects and policies for which a robust evidence base indicating their benefits is available. For other recommendations, such as those to increase justice and education spending, there is insufficient robust evidence of their benefits to allow for them to be modelled. For example, there is evidence available suggesting that investments in education can yield productivity improvements reflected in an earnings premium for education.² However, this evidence relates to individuals receiving additional years of education, rather than being connected to greater spending in education or, more specifically, the particular investments in education that are recommended by the SIS.

Further, some recommendations (including those related to water infrastructure, asset management, and resilience) aim to identify current problems with the infrastructure assets or spending, which in turn may be used to establish an evidence base for these sectors. Thus, it is unclear what impact these recommendations may have since the degree to which current services are deficient has not been measured. Establishing an evidence base will allow policy-makers to measure outcomes. For example, in the case of asset management, greater evidence about rates of asset failure or underutilisation may provide greater scope to measure the economic impacts of asset management reforms.

SIS impacts are measured relative to a constrained baseline

The approach described above measures the impacts of the SIS relative to the state of the world where the SIS is not implemented. This baseline should account for a particular level of routine or general investment³ (a 'do minimum' option) and account for the constraints on expected growth that would occur without the additional infrastructure recommended by the SIS.

In 2016, new population projections were published by the NSW Government and NSW Treasury updated its Intergenerational Report long term model. The model outcomes, termed the Common Planning Assumptions, include the benefits of 2014 infrastructure recommendations.

² See OECD (2011), which summarises data indicating earnings premiums from education across different countries. Available at: <https://www.oecd.org/edu/skills-beyond-school/48630790.pdf>

³ This includes approved works that are underway.

Our approach to developing the baseline starts with the Common Planning assumptions to develop a set of economic projections for NSW and the regions of NSW.

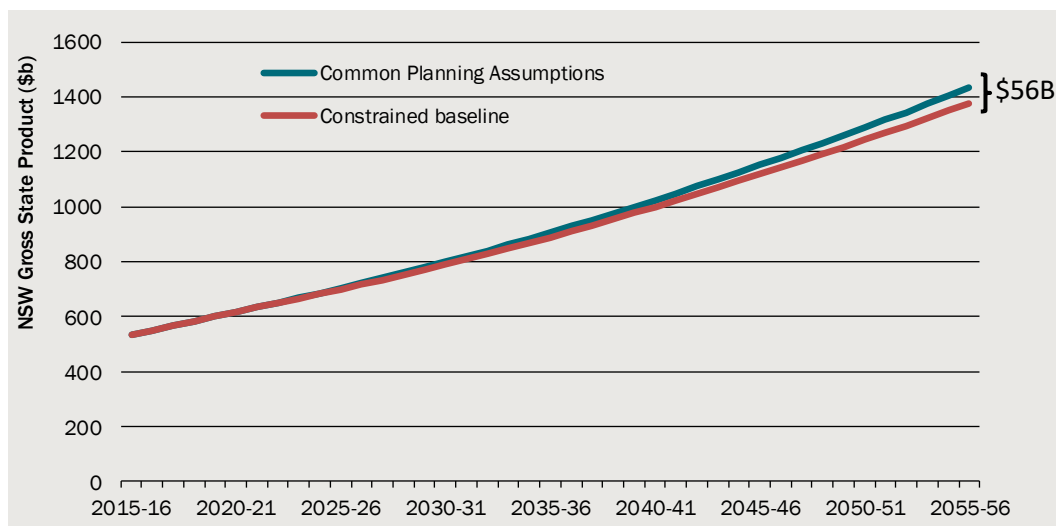
However, we determined that these outcomes were not achievable without the implementation of the SIS. While the NSW economy is currently outperforming other Eastern Seaboard states, with higher wages and lower unemployment, economic growth has and will continue to lead to challenges, such as longer travel times and higher house prices.

These and other challenges are constraints on the key assumptions and inputs that underpin the Common Planning Assumptions. We develop a constrained baseline that reflects the base line without the SIS investments and policies. Developing the constrained baseline relies on defining the set of factors that drive the assumptions:

- for population, we focus on migration and how it is linked to earnings, unemployment, housing prices and transport costs
- for participation, we focus on accessibility to jobs
- for productivity, we focus on transport productivity. Note that the Government capital stock gradually falls as a share of the economy in the baseline. An economywide impact for this has not been factored in.

These factors are then projected forward in the long term model, and used to develop economic projections that reflect a constrained baseline. Overall projections for NSW Gross State Product under the constrained baseline are shown in chart 1.5.

1.5 NSW Gross State Product projections



Data source: CIE.

The impacts of the SIS presented in this report should be interpreted as additional to the constrained baseline, not additional to the Common Planning Assumptions.

The impacts of the SIS have been modelled conservatively

The approach used separates out benefits that are economic (including direct economic benefits, and those that lead to an economic benefit), from those that are not. For example, new health facilities have both economic and non-economic benefits:

- a new facility may reduce government operating costs, which is an economic benefit
- a new facility may enable someone to get back into the workforce more quickly, which leads to an economic benefit
- a new facility may reduce pain and suffering, which is a non-economic benefit.

Non-economic benefits are important for this exercise only where they lead to changes that have economic impacts, such as attracting additional population growth or increasing labour force participation.

The SIS 2018 impacts model does not estimate for recommendations that currently have no evidence base. The most important of these relate to asset management. Improvements in asset management could drive substantial cost reductions, particularly for agencies where current asset management is poor. These impacts have not been included because of the lack of robust evidence on impacts, but would add further to the overall impacts of the SIS.

INSW has made recommendations that would improve the evidence base available in critical areas such as asset management and resilience, which could be used for future analysis. INSW has also made recommendations that are part of facilitating broader changes in the provision of infrastructure, such as better use of data. To be conservative, we have not included these in the modelling because we cannot clearly attribute impacts to the INSW recommendations.

Building the evidence base around key areas such as asset management is an important next step to allowing for improved understanding of the impacts of these policies. Further, understanding the factors that drive business location decisions and employment levels in regional NSW would enable more efficient investment in regional areas targeting improved economic outcomes.

There are some SIS recommendations that overlap with programs or actions of other government agencies, or support actions taken elsewhere. Isolating the impact attributable to the SIS recommendation is difficult in this case and we have generally erred on the side of caution. For example, the SIS includes a range of recommendations aimed at housing supply impacts through better integration of infrastructure and land use planning, and to provide infrastructure to support growth areas and planned precincts. We have allocated a small impact only to housing supply from these recommendations.

2 *NSW-wide economic impacts*

The NSW-wide impacts are estimated using the CIE NSW model (see Appendix A). The purpose of the economic model is to:

- show how the different impacts identified above add together to impact on the NSW economy
- identify the economic responses to the first-round impacts. The most important of these is how private investment changes in response to economic growth in NSW, further increasing the size of the NSW economy.

A substantial part of the economic changes induced by the SIS reflects higher population growth. Because of this, we present per capita changes and overall changes.

We report the impact of the SIS on:

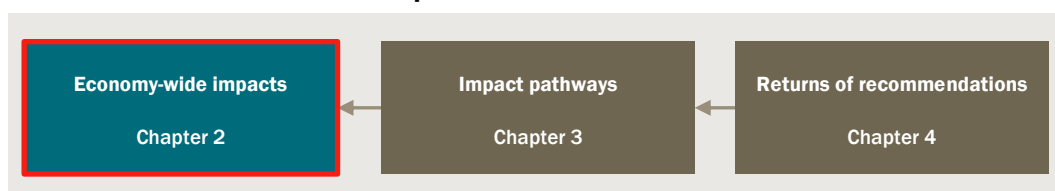
- Gross State Product (GSP), which is a measure of the overall size of the NSW economy
- household consumption, which is a measure of the economic wellbeing of people in NSW.

These measures differ because additional investment may add to GSP but at the expense of household consumption in the short or longer term. We also report outcomes for employment.

We use two key years for reporting impacts (2036 and 2056) given the long-term nature of infrastructure investment and the resultant time it takes for benefits to be realised. While a range of recommendations are implemented in the first 20 years, most of the beneficial impacts of these investments continue for more than 40 years.

The economy-wide impacts of the SIS recommendations are the result of the earlier stages of our analysis presented in chapters 3 and 4 (chart 2.1).

2.1 Structure of Part I of the report



Data source: CIE.

Impacts of the SIS excluding transport pricing

One of the key SIS recommendations driving economic growth is to undertake transport pricing development work prior to implementation of an integrated transport pricing system. The results presented in this section exclude the impacts of implementing transport pricing.

The cumulative impact of the SIS excluding transport pricing is significant smaller than the impact of the SIS including transport pricing, especially in the 20 years from 2016 to 2036 (table 2.2). The SIS excluding transport pricing results in \$135 billion additional goods and services being produced by the NSW economy over the period from 2016 to 2036. The change in consumption over the period is much smaller (\$42 billion). Over the entire 2016-2056 period, the cumulative impact of the SIS excluding transport pricing is \$639 billion.

2.2 Cumulative impacts of the SIS excluding transport pricing

Outcome	2016-2036	2036-2056	2016-2056
	\$ billion	\$ billion	\$ billion
GSP	135	504	639
Consumption	42	320	362

Note: All dollar values are 2015/16 dollars.

Source: The CIE.

The economic impacts of the SIS excluding transport pricing are still positive, with increases in GSP, employment and GSP per capita by 2036 and 2056. A summary of the impacts of the SIS excluding transport pricing (percentage changes and values) is shown in tables 2.3 and 2.4. The difference between the GSP impact with transport pricing (\$25.6 billion) and without transport pricing (\$10.9 billion) is \$14.7 billion.

2.3 Impacts of the SIS (percentage changes)

	2036	2056
	Per cent	Per cent
GSP	1.2	3.3
GSP per capita	0.8	0.7
Employment	0.6	2.9
Employment rate (jobs per person)	0.1	0.3
Household consumption	0.9	3.5
Household consumption per capita	0.4	0.9
Population	0.5	2.6

Note: Percentage changes are measured relative to the baseline without the SIS (the 'constrained baseline'), not the Common Planning Assumptions.

Source: The CIE.

2.4 Impacts of the SIS on overall and per capita outcomes

	Unit	2036	2056
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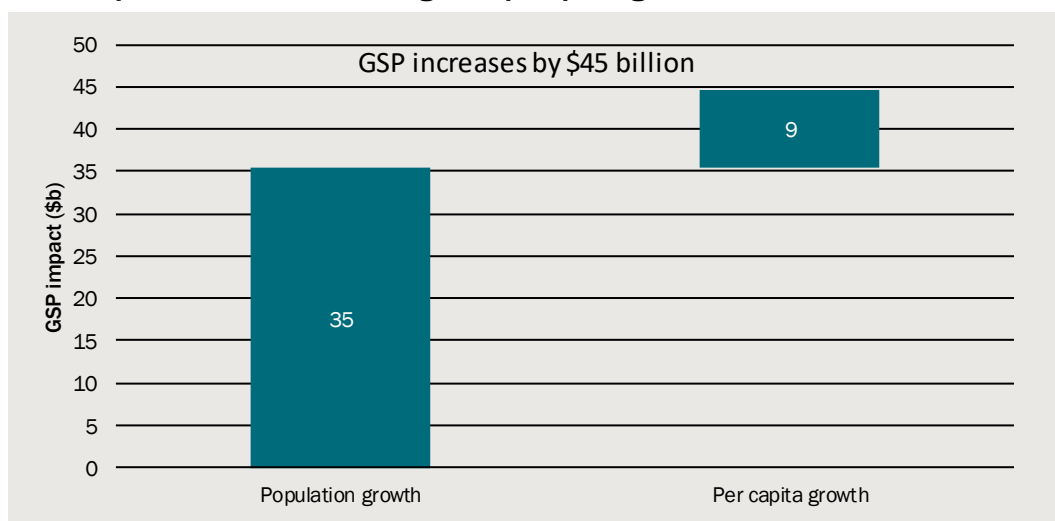
GSP	\$B	10.9	44.6
GSP per capita	\$/person	700	800
Employment	Jobs	26 000	159 000
Household consumption	\$B	4.7	30.8
Household consumption per capita	\$ per person	200	700
Population	No.	44 000	302 000

Note: All dollar values are 2015/16 dollars.

Source: The CIE.

The exclusion of transport pricing results in a smaller increase in GSP by 2056. Most of this growth is due to population growth rather than per capita growth (chart 2.14), since transport pricing is a key driver of per capita growth.

2.5 Impacts of the SIS excluding transport pricing on NSW GSP in 2056



Note: Numbers do not add because of rounding.

Data source: The CIE.

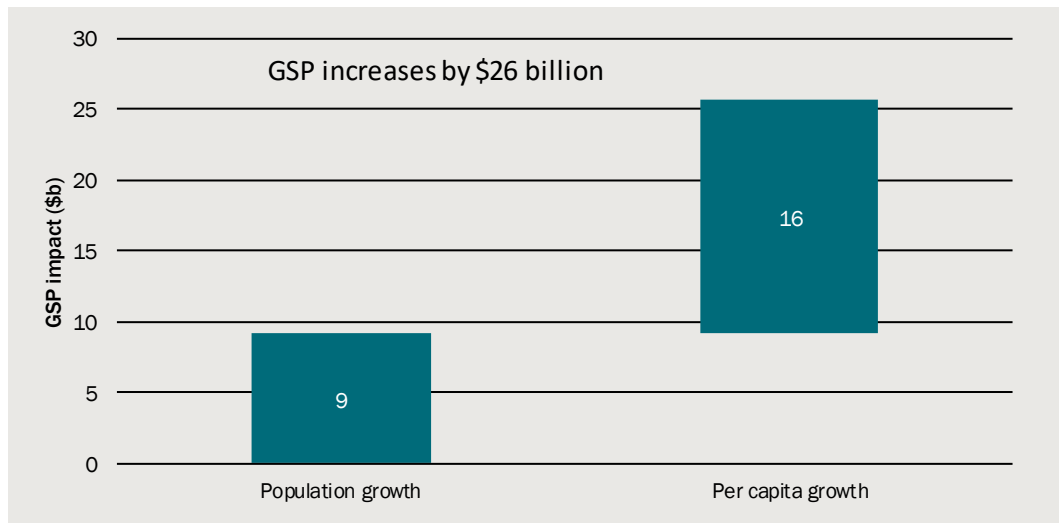
Impacts of the SIS including transport pricing on the NSW economy

This section presents the model outcomes including if the transport pricing roadmap proceeds to implementation. Project and policy recommendations are modelled together.

The State Infrastructure Strategy is expected to increase the size of the NSW economy by \$26 billion by 2036 and \$67 billion by 2056. This would bring GSP and employment to levels slightly higher than the Common Planning Assumptions by 2056.

In 2036, \$9 billion of increase reflects higher population growth and the remaining \$16 billion reflects per capita growth (chart 2.6). By 2056, population growth adds \$43 billion to the NSW economy and per capita growth a further \$23 billion (chart 2.7).

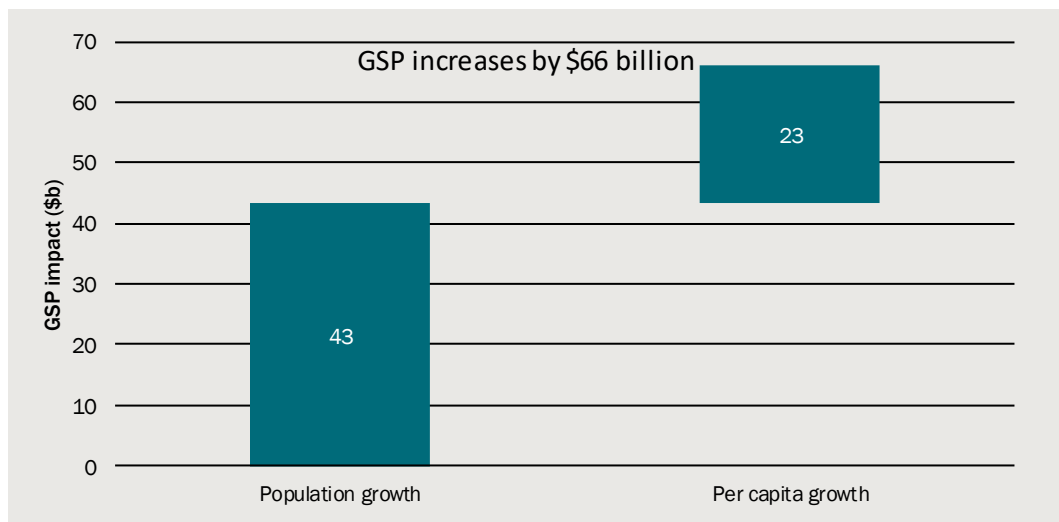
2.6 Impacts of the SIS on NSW GSP in 2036



Note: Numbers do not add because of rounding.

Data source: The CIE.

2.7 Impacts of the SIS on NSW GSP in 2056

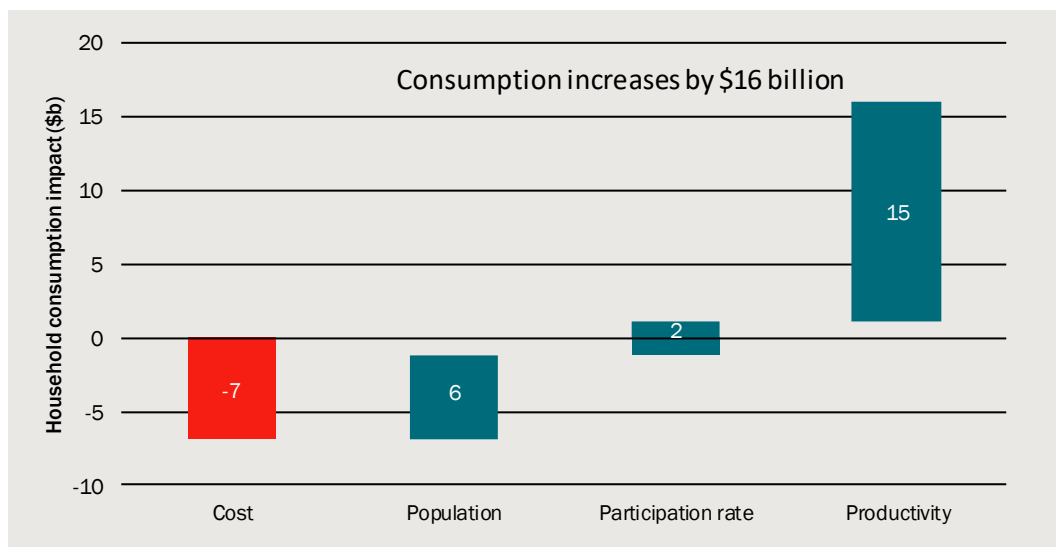


Data source: The CIE.

Impacts of the SIS including transport pricing on household consumption

Households are the key beneficiaries from the growth in GSP, particularly by 2056. The impact is measured by household consumption which reflects financial wellbeing. Household consumption is \$16 billion higher in 2036 because of the SIS. This reflects positive contributions from population, productivity and participation, and a negative contribution from the cost of projects and policies in the SIS (chart 2.8). Per person, consumption is expected to be \$1 000 higher in 2036.

2.8 Impacts of the SIS on household consumption in 2036

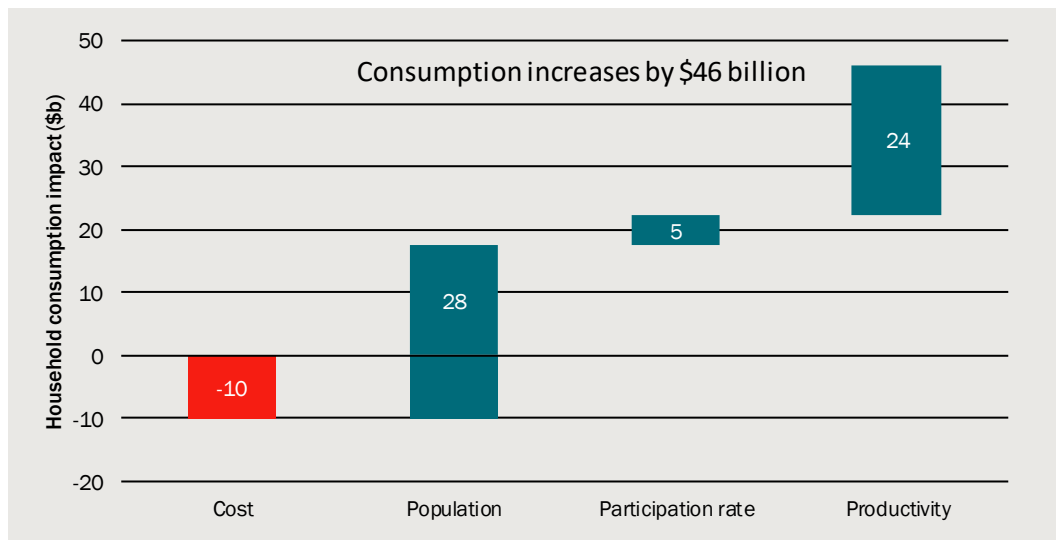


Note: Numbers do not add because of rounding.

Data source: The CIE.

By 2056, the impacts are larger, with household consumption increasing by \$46 billion. On a per person basis, this amounts to \$1 600 per person. A breakdown of the impacts on productivity, participation and population, less the costs, is shown in chart 2.9.

2.9 Impacts of the SIS on household consumption in 2056

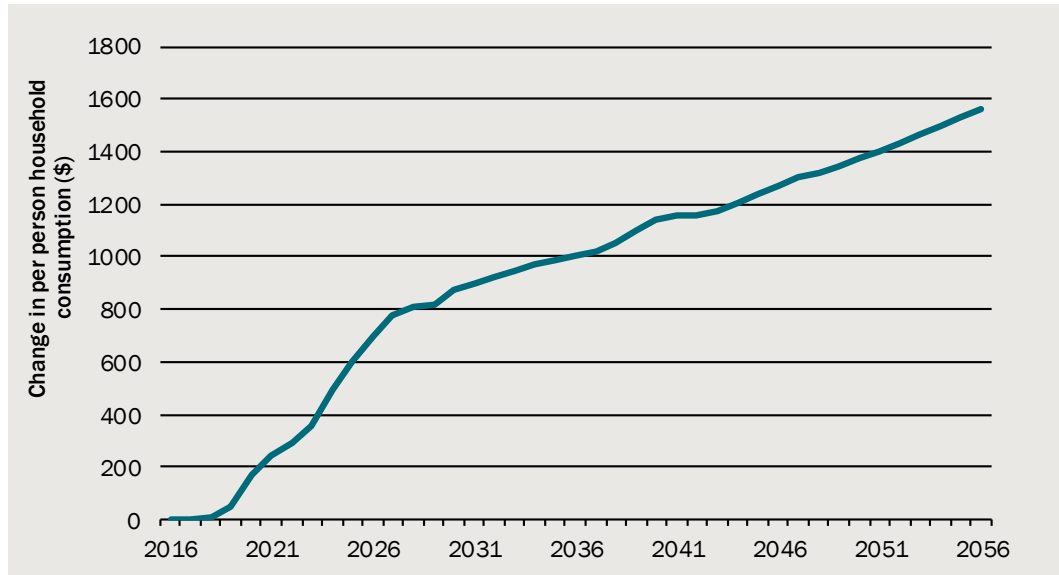


Note: Numbers do not add because of rounding.

Data source: The CIE.

The changes in per person consumption over time are shown in chart 2.10. In order to fund the incremental costs of the SIS, we assume the Government finances expenditure and then obtains this from households (through taxation) in proportion to the benefits that accrue.

2.10 Changes in per person consumption



Data source: The CIE.

Impacts of the SIS including transport pricing on employment

The SIS recommendations are expected to increase employment in NSW because of a larger population and higher participation rate in the workforce:

- by 2036, an additional 65 000 jobs
- by 2056, an additional 204 000 jobs.

Population growth is the key driver for the increase in employment, although labour force participation also results in additional jobs – 17 000 by 2036 and 31 000 by 2056 (table 2.11).

2.11 Changes in employment from the SIS

	2036	2056
	No.	No.
Additional jobs from higher population	49 000	173 000
Additional jobs from higher participation	17 000	31 000
Total additional jobs	65 000	204 000

Note: Changes are shown to the nearest 1000 jobs, and do not add because of this rounding.

Source: The CIE.

Summary of impacts of the SIS including transport pricing

A summary of the impacts of the SIS (percentage changes and values) is shown in tables 2.12 and 2.13.

2.12 Impacts of the SIS (percentage changes)

	2036	2056
	Per cent	Per cent
GSP	2.9	4.8
GSP per capita	1.8	1.6
Employment	1.4	3.7
Employment rate (jobs per person)	0.4	0.5
Household consumption	2.8	5.3
Household consumption per capita	1.8	2.1
Population	1.0	3.2

Note: Percentage changes are measured relative to the baseline without the SIS (the 'constrained baseline'), not the Common Planning Assumptions.

Source: The CIE.

2.13 Impacts of the SIS on overall and per capita outcomes

	Unit	2036	2056
GSP	\$B	25.6	66.1
GSP per capita	\$/person	1 700	1 900
Employment	Jobs	65 000	204 000
Household consumption	\$B	15.6	46.2
Household consumption per capita	\$ per person	1 000	1 600
Population	No.	101 000	368 000

Note: All dollar values are 2015/16 dollars.

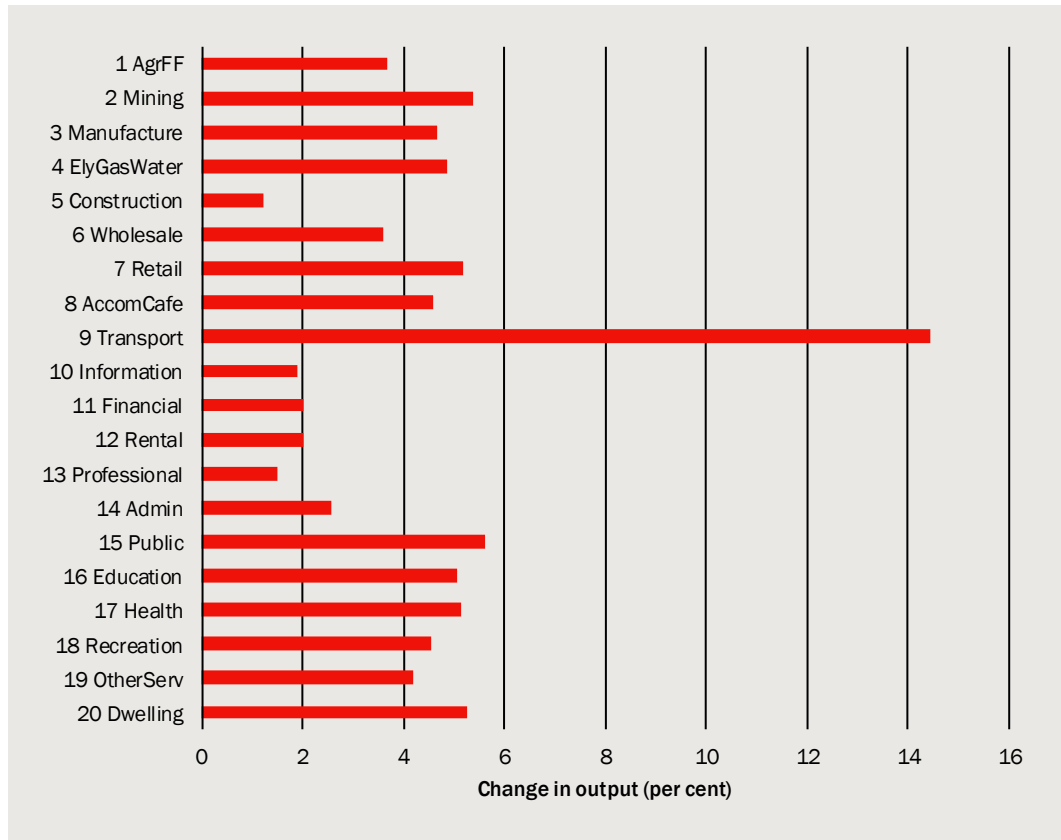
Source: The CIE.

Sectoral impacts of the SIS including transport pricing

The SIS recommendations result in GSP that is 2.9 per cent higher by 2036 and 4.8 per cent higher by 2056 (shown in table 2.12). The impacts of the SIS recommendations on sectoral output are shown in table 2.14.

- The transport, postal and warehousing sector has the largest increase in output, reflecting the reduction in freight costs and prices. The SIS recommendations address transport outcomes, which are a major constraint on competitiveness.
- The rest of the sectors have positive impacts of a fairly similar level

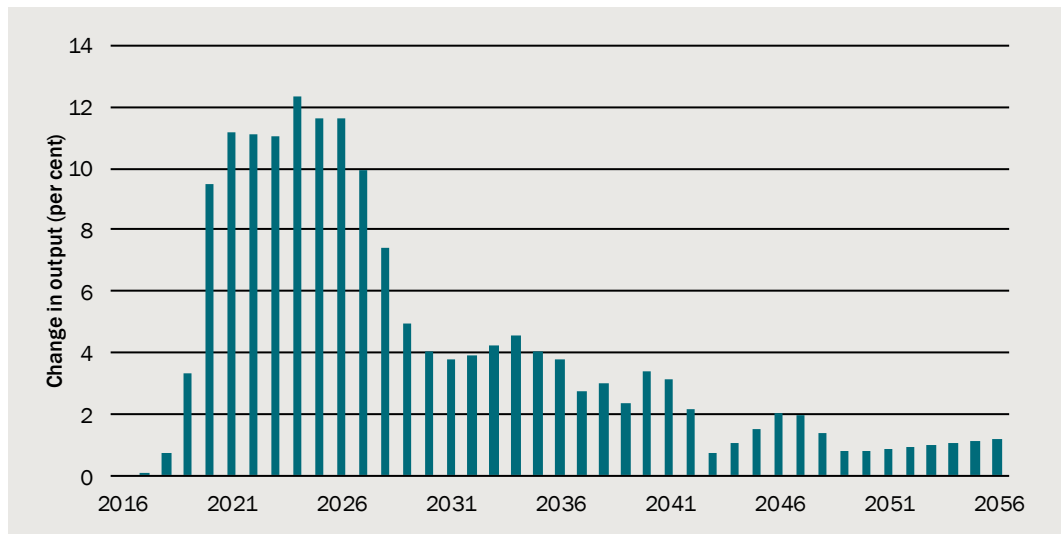
2.14 Impacts of the SIS on sectoral output in 2056



Data source: The CIE.

The output of the construction sector is impacted substantially during the construction period of the SIS, but by the end of the period is less than 2 per cent higher than output without the SIS recommendations (chart 2.15). Output of the construction sector is projected to grow with or without the SIS.

2.15 Impacts of the SIS on the construction sector

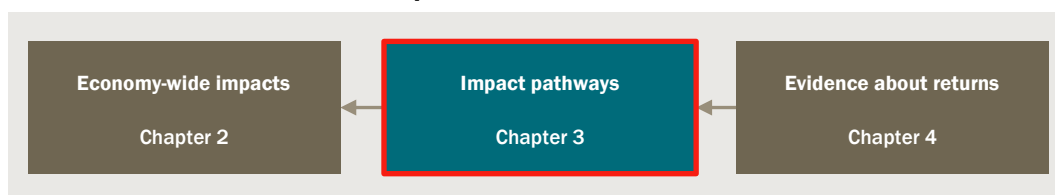


Data source: The CIE.

3 *Impact pathways of the SIS*

This SIS will have impacts on liveability and productivity outcomes. Estimated impacts of the SIS on these outcomes are used as inputs to determine the economy-wide impacts presented in Chapter 3. In this chapter, we trace the SIS recommendations through their impact pathways (population, productivity and participation) to report the outcomes. Chart 3.1 shows how impact pathways fit into the overall structure of our approach. The results presented in this chapter include the impact of transport pricing development work proceeding to implementation, illustrating the significant productivity impacts from transport pricing.

3.1 Structure of Part I of the report



Data source: CIE.

Impact on private transport outcomes

The SIS recommendations are expected to dramatically reduce the cost of private travel, such as commuting. This reflects:

- the recommended integrated system-wide transport pricing roadmap, if it proceeds to implementation, which we have modelled as moving to a pricing system that aligns to the cost of congestion for private vehicles and the marginal costs of additional services for public transport
- expenditure on projects to make better use of existing transport assets, such as SMART Motorways and SMART rail initiatives
- expenditure on capacity increases in the regional highway network, Sydney motorway network and metropolitan public transport services.

The private transport benefits from these programs will include reduced travel time, reduced waiting time, reduced crowding levels and higher levels of safety. An explanation of transport pricing and how it has been modelled is shown in box 3.2.

3.2 Transport pricing

Infrastructure NSW has recommended a pathway to system-wide metropolitan transport pricing that would cover all modes of travel. This would include changes to road and public transport prices. Cost reflective transport pricing including location-specific and time-of-day congestion charges is expected to lead to:

- time and cost savings for road users and environmental benefits
- more efficient use of existing infrastructure and better investment decisions.

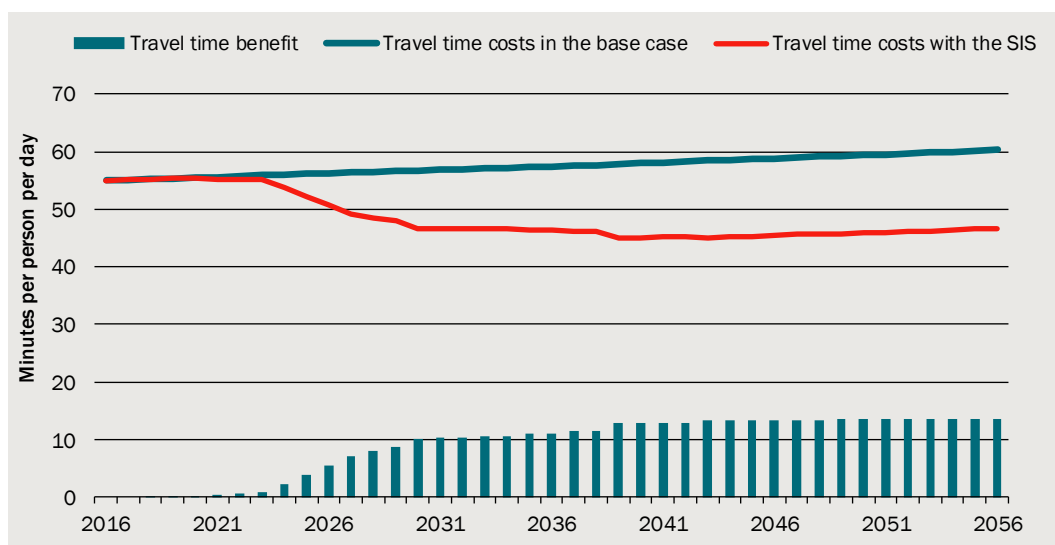
The estimated benefits of transport pricing are based on BTRE's estimates⁴ of the avoidable costs of road congestion, which have been updated to reflect transport demand estimates from TfNSW. The estimates have been increased in line with increases in the value of time since the BTRE study was conducted. We have assumed there are no revenue impacts from transport pricing. The costs of transport pricing include upfront capital costs, costs to fit-out vehicles and ongoing operating costs.

Without the SIS recommendations, transport times in Sydney are projected to worsen. Transport times are a factor considered by potential migrants to NSW and may be a disincentive for businesses and households to relocate to NSW. Thus, improvements to liveability such as travel times may have indirect economic impacts by encouraging businesses and migrants to locate in NSW.

The benefits of transport projects are generally a combination of travel time savings and other benefits (such as reduced crowding). We have converted travel time benefits to minutes equivalent. For example, 1 minute in crowded conditions on a train may cost 2 minutes in uncrowded conditions on a train. The estimated benefits in minutes from the SIS, per person per day, is shown in chart 3.3. Overall, the SIS recommendations are expected to reduce travel time costs, from their current expected upward trajectory. The benefits are more than 10 minutes equivalent per person per day or more than one hour per week by 2036. This is more than a 20 per cent saving relative to what would happen without the SIS.

⁴ BTRE 2007, *Estimating urban traffic and congestion cost trends for Australian cities*, Working Paper 71.

3.3 Travel time benefits from the SIS



Data source: The CIE.

The majority (53 per cent) of private travel time savings are due to the introduction of metropolitan wide transport pricing. The benefits of this have been estimated using work undertaken by the Bureau of Transport and Regional Economics in 2007, which examined the avoidable costs of road congestion — that is, the costs relative to not having an efficient price.⁵ These have been updated for the amount of travel expected to occur and the value of travel time, and we have assumed that a pricing scheme will not remove all the avoidable costs of congestion. The development of a comprehensive transport pricing scheme will involve many decisions and affect existing subsidies and choices as well as future transport choices. Therefore, the range of benefits is very wide. A more detailed examination may find lower benefits from more efficient transport pricing, particularly because public transport fares are already subsidised primarily because of the lack of pricing of roads.

These private transport time savings are not directly economic. However, the indirect effects of making NSW more liveable will be economic, such as the impacts on participation and population set out below.

Impact on productivity

A number of the SIS recommendations would improve productivity, and the SIS recommendations collectively result in productivity improvements of \$318 billion over the next 40 years.

The majority of productivity benefits are associated with transport projects (chart 3.4). The main transport recommendations leading to productivity improvements are:

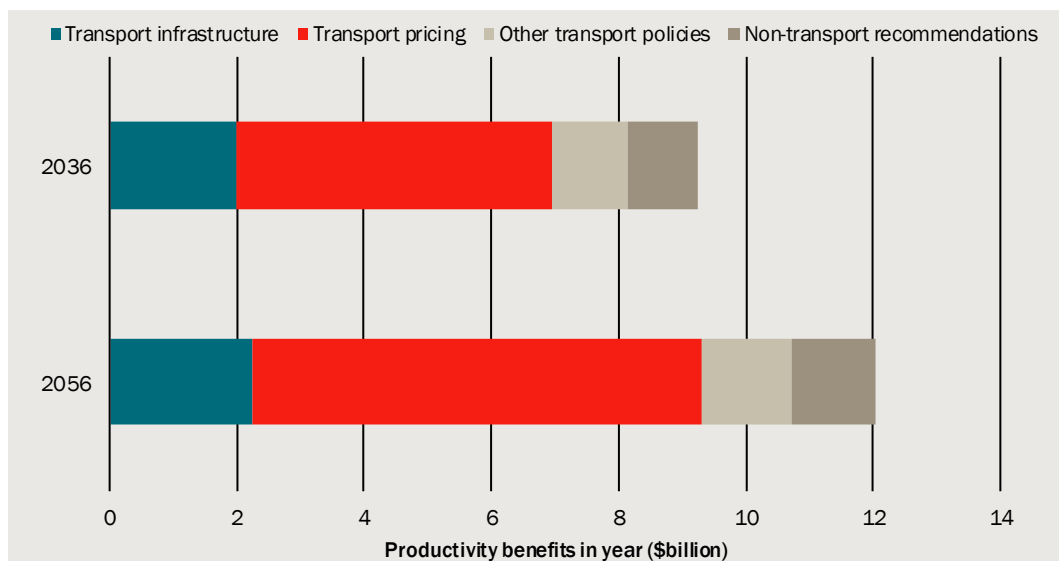
- transport system pricing

⁵ BTRE 2007, *Estimating urban traffic and congestion cost trends for Australian cities*, Working Paper 71.

- road projects such as the Western Harbour Tunnel
- regional road and rail projects such as the Outer Sydney Orbital
- the SMART motorways project.

In general, we have assumed that the benefits of road infrastructure are split evenly between private travel benefits and business transport productivity improvements, which is based on the share of time spent on the road and relative value of time between business travel and private travel.⁶ Public transport projects such as urban rail lines do not have a productivity impact in our approach.

3.4 Annual productivity benefits from recommendations in 2036 and 2056

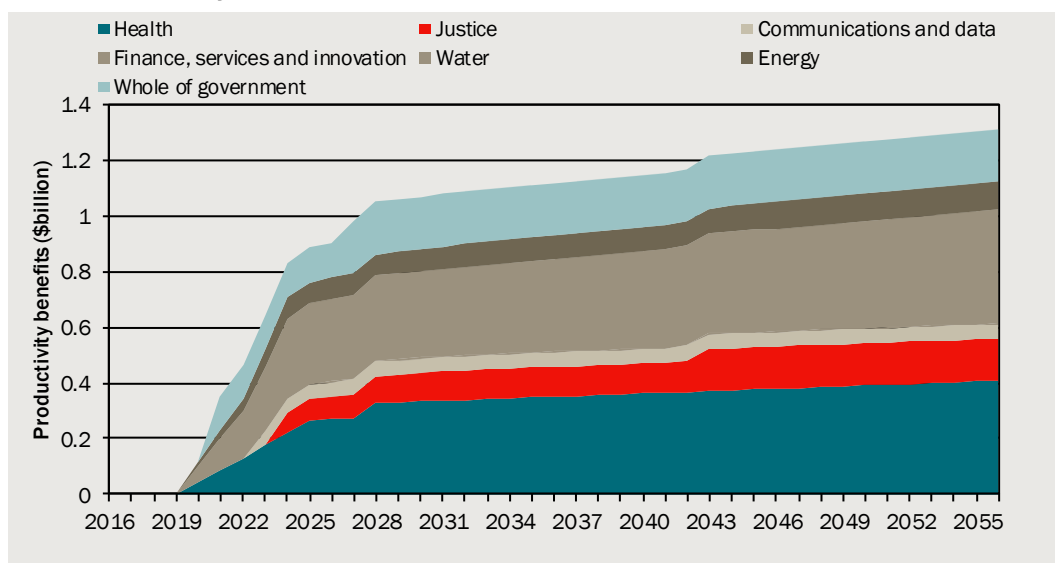


Data source: CIE.

The productivity benefits of non-transport recommendations by sector are broken down in chart 3.5. The productivity impacts of non-transport recommendations are only a fraction of the total impact of those recommendations (chart 6) and are achieved through a greater number of smaller projects. For example, 15 per cent of the benefits of new hospitals are through government cost savings, and there are 13 health recommendations that result in these productivity improvements.

⁶ Business car and commercial car demand is around 31 per cent of demand (measured by driver hours), and after accounting for the higher occupancy rate of private travel cars, and higher value of time for business/commercial travel passengers, the relative weight of benefits between business/commercial travellers and private travellers is approximately even (i.e. 50% each).

3.5 Productivity benefits over time from non-transport recommendations



Data source: CIE.

Box 3.6 summarises the main policy recommendations that impact on productivity.

3.6 Policy impacts driving productivity

The INSW recommendations include major efficiency improvements related to pricing and service delivery:

- transport pricing, which would include road pricing, gives benefits equivalent to spending around \$100 billion on transport infrastructure, at a fraction of the cost. This is because it provides an incentive for users with a low valuation on use of the road network to use another mode, time of day or route, leaving roads less congested and more reliable for users with high valuations
 - pricing of roads has been recommended by the Henry Review, Harper Review, Infrastructure Australia and the Productivity Commission
- efficient service delivery of Government services, for public transport, energy, health and water, could reduce service costs by over \$60 billion by 2056.

Such policy reforms provide the headroom for additional investment by Government in improving services, without having to reduce the financial capacity of NSW households.

Productivity growth may be driven by businesses and Government making better use of data and improving digital connectivity. Box 3.7 summarises the impacts of data and digital connectivity recommendations on productivity.

3.7 Data and digital connectivity

INSW recommendations aim to facilitate productivity growth in the private sector from better connectivity. This includes through:

- leveraging NSW Government assets, such as fibre and sites for mobile towers to allow private businesses to provide better services at lower cost. Examples of this working have already occurred, with the NSW Government providing access to fibre assisting a business location decision in Walla Walla,⁷ and
- the Connecting Country Communities Fund for regional NSW, and
- funding for digital connectivity of schools.

INSW recommendations also aim to facilitate Government efficiency gains from better use of data in supporting work undertaken by the Department of Finance, Services and Innovation.

Continued productivity growth in the NSW economy will reflect businesses and the Government making better use of data.

- PWC in 2014 estimated data contributes \$67 billion to the Australian economy with an additional \$48 billion possible with increased and better use of data.⁸
- Lateral Economics estimates that the benefits of open data to the Australian economy would be conservatively estimated at \$16 billion per year.⁹
- The Productivity Commission estimates that reforms in data could deliver annual benefits of over \$5.5 billion dollars Australia-wide.¹⁰

Digital connectivity is one part of being able to collect and use data. It encompasses mobile and fixed broadband. Mobile broadband connectivity is likely to have made and continue to make the most difference to the productivity of NSW businesses.¹¹ Work undertaken for INSW also suggests productivity gains from higher fixed line broadband speeds.¹²

⁷ The Grex Group 2017, *NSW infrastructure digital connectivity*, prepared for Infrastructure NSW.

⁸ PWC 2014, *Deciding with data How data-driven innovation is fuelling Australia's economic growth*, September, <https://www.pwc.com.au/consulting/assets/publications/data-drive-innovation-sep14.pdf>.

⁹ Lateral Economics 2014, *Open for business: how open data can help achieve the G20 growth target*, commissioned by Omidyar Network, June.

¹⁰ Productivity Commission 2017, *Shifting the dial: 5 year productivity review*, Inquiry Report No.84.

¹¹ The CIE 2014, *The economic impacts of mobile broadband on the Australian economy*, prepared for the Australian Communications and Media Authority.

¹² Data 61 2017, *Digital futures*, prepared for Infrastructure NSW.

Impact on housing supply

The SIS recommendations are expected to increase housing supply, largely in Sydney, by providing additional transport capacity and support for specific actions related to housing supply.

Pathways of impact

A primary concern of urban planners when regulating housing density is accessibility, with the Greater Sydney Commission's 'three cities' plan relying on sequencing infrastructure with development to avoid congestion caused by growth.¹³

By understanding the planner response to transport investment, it will be possible to make broad projections on the supply side level of housing development that will be afforded by the 2018 State Infrastructure Strategy proposed by INSW.

Historically, Sydney's planning system has effectively stopped high value development in many cases, largely because the community has concerns over development that reflect transport impacts.¹⁴ A survey by the Productivity Commission in 2011 found:¹⁵

- Sydney residents were the least positive about population growth of any cities covered. 64 per cent of respondents in Sydney indicated that they would not like population growth compared to 52 per cent for all capital cities. 9 per cent would like population growth compared to 11 per cent for all capital cities.
- Sydney residents who were concerned about population increases cited transport issues more than any other city. 89 per cent of respondents that did not want a population increase cited increased traffic congestion and 46 per cent cited more crowded public transport.

Adequate transport capacity and services are critical in response to community views over development, and ultimately the operation of the planning system and amount of housing supply. The rezoning occurring in relation to the Sydney Metro North West is a practical example of this.

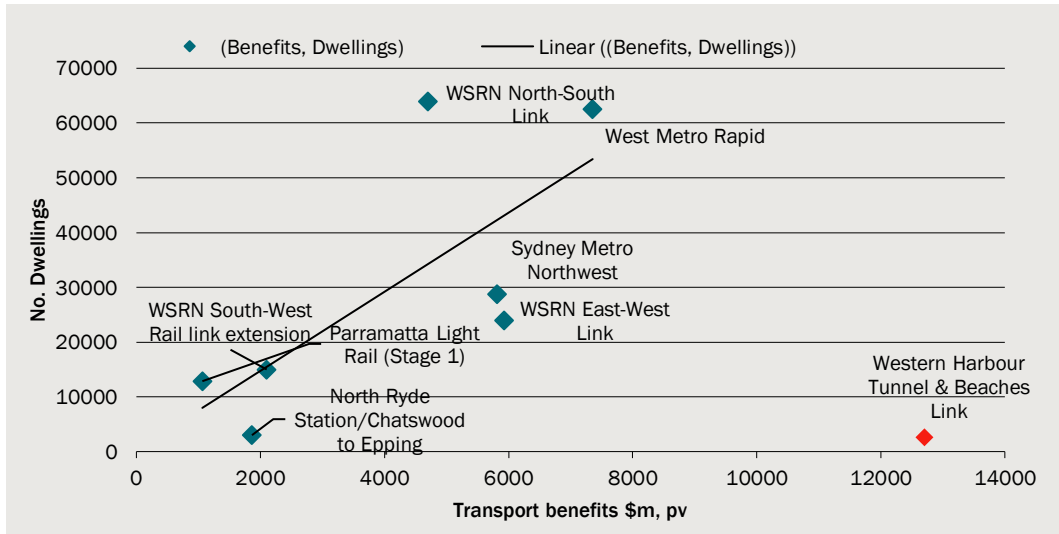
The impact on housing supply as a result of major transport infrastructure projects is becoming more evident. In chart 3.8 we show the estimated number of new dwellings for major transport investments, and the amount of transport benefits expected to be generated by each project. As would be expected, projects that generate more transport benefits are expected to have a larger supply increase.

¹³ See: Greater Sydney Commission, *Our Greater Sydney 2056: A metropolis of three cities – connecting people*, available at: https://gsc-public-1.s3.amazonaws.com/s3fs-public/draft_greater_sydney_region_plan_web.pdf

¹⁴ Although in some cases land use changes have also been stopped where there is new transport infrastructure such as the CBD and South East Light Rail.

¹⁵ Productivity Commission 2011, *Performance benchmarking of Australian business regulation: Planning, zoning and development assessment*, Research Report.

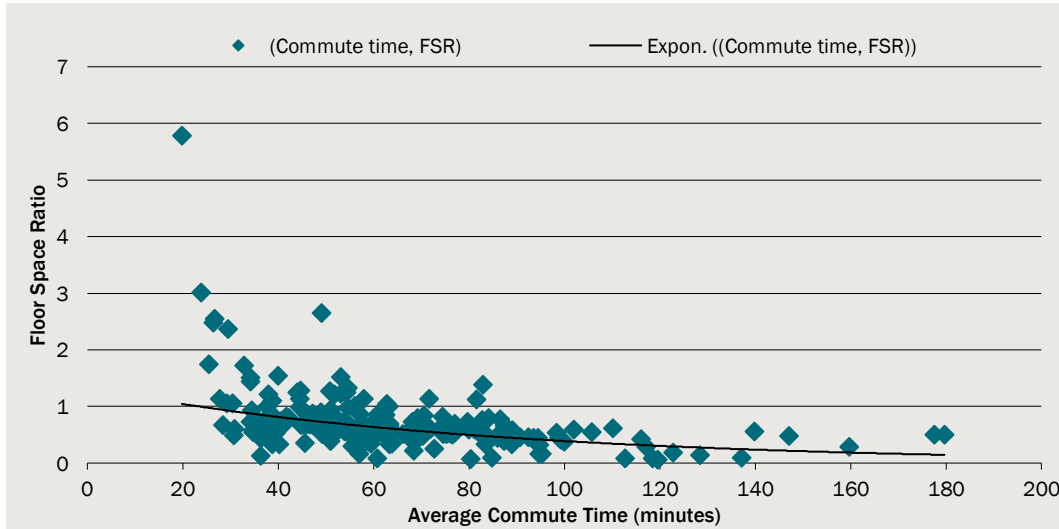
3.8 Major transport investments and housing supply



Data source: The CIE, Western Sydney Rail Needs Study 2017, Sydney Metro West Strategic Business Case 2017, Sydney Gateway and Port Botany Rail Line Duplication Strategic Business Case 2016, Sydney Metro City & Southwest Final Business Case Summary 2016.

The existing pattern of zoning across Sydney is also clearly related to accessibility, with higher floor space ratios (FSRs) where accessibility is higher (chart 3.9).

3.9 Variation of floor space ratio by daily commute time (by SA2)



Data source: The CIE, BTS.

Both of these methods suggest that improved accessibility leads to additional dwellings through the mechanism of a planning response. The amount of the impact is that for each additional \$140 000 of transport benefits, 1 new dwelling is allowed (see Appendix C for further information).

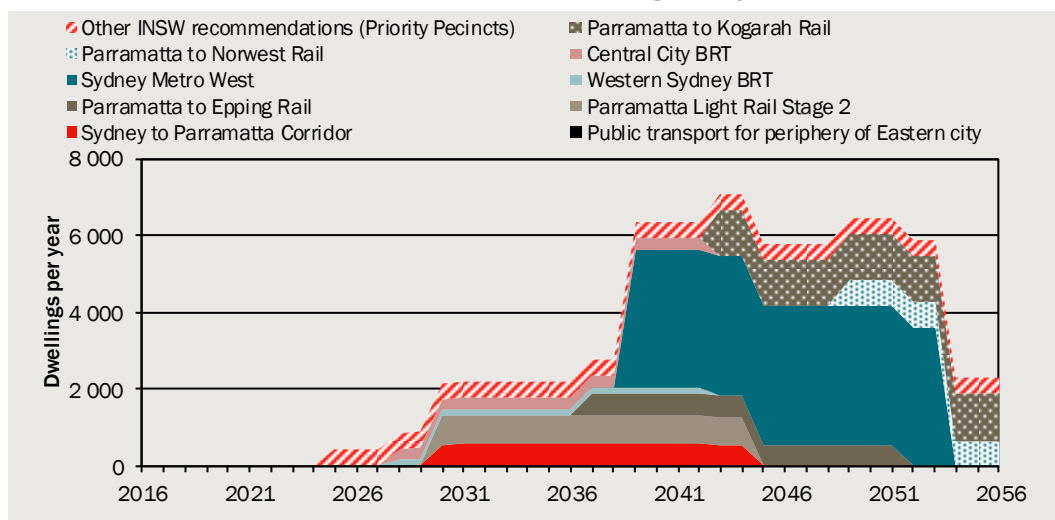
A second pathway for housing supply impacts is INSW’s recommendations around integrating land use with infrastructure planning and delivery. These recommendations are both a mechanism to ensure that dwelling supply is increased as a result of transport investments, but also to increase dwelling supply more generally. The CIE has estimated

that the Planned Precincts and Growth Areas program could generate ~4000 dwellings per year. We have assumed that the INSW recommendations contribute marginally to this continuing, with 400 dwellings per year from 2025 onwards.

Impact of SIS recommendations

The overall impacts on housing supply from the SIS recommendations are shown in chart 3.10. The SIS would make a large contribution to housing supply, particular from the mid-2030s. In total, the recommendations would contribute more than 120 000 dwellings in the next 40 years. To put these estimates into context, NSW Treasury assumed ~45 000 new dwellings in NSW per year as part of its 2016 modelling for the Intergenerational Report. This means the SIS recommendations contribute around 3 years of NSW housing supply.

3.10 Impact of the SIS recommendations on housing supply



Data source: The CIE.

Impact from costs

The economic modelling is structured to be fiscally neutral. The funding profile assumed matches the timing of benefits from the recommendations.

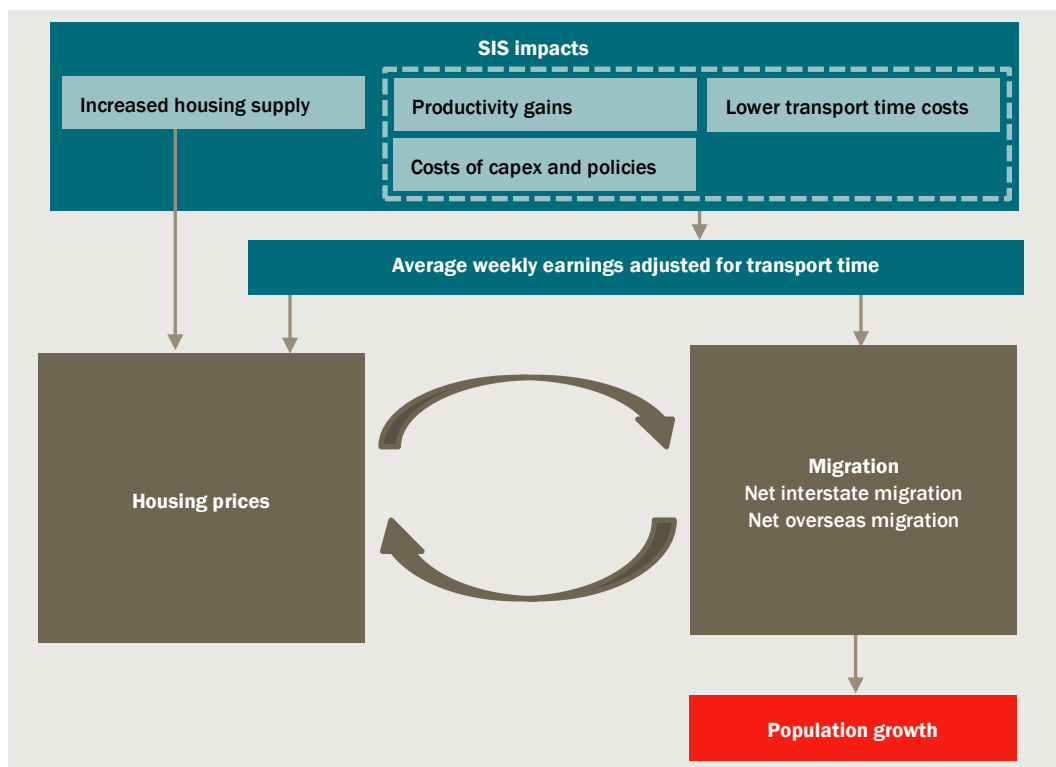
Impact on population

The SIS 2018 will impact on population (chart 3.11) by:

- changing average weekly earnings, including:
 - increasing the costs of providing capital expenditure and ongoing costs to support the investments and policies in the SIS. This in turn will reduce (after tax) average weekly earnings and make NSW less attractive for migrants

- increasing productivity, which translates into increased average weekly earnings which will make NSW more attractive to migrants
- reducing transport time costs, which will make NSW more attractive to migrants¹⁶
- increasing housing supply, mainly from additional public transport expenditure but also from recommendations that support the programs such as the Priority Precincts.

3.11 The SIS impacts on population



Data source: The CIE.

To estimate the first-round population impacts, we calculate the average weekly earnings impact from productivity changes, costs and transport, and the additional housing supply, as set out above.

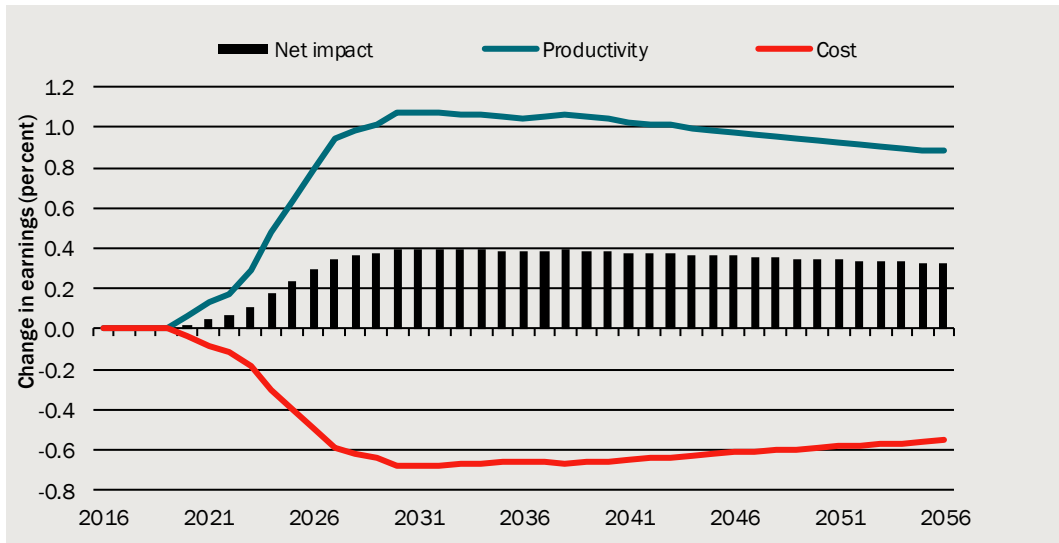
The changes substantiate an equivalent increase in average weekly earnings of around 2.5 per cent by 2056 and reflect the following.

- Based on the productivity gains and costs of the SIS, average weekly earnings in a financial sense would be higher (0.3 per cent, chart 3.12).¹⁷ In dollar terms this is equivalent to ~\$300 per employee initially, rising to \$600 by the end of the period.
- Private transport cost savings are more important, rising to be equivalent to a 2 per cent increase in average weekly earnings relative to the constrained baseline.

¹⁶ Note that transport costs may go up from transport pricing. However, revenue neutrality would decrease other taxes, with the net impact on average weekly earnings including transport being the avoided time costs we have estimated.

¹⁷ Note that costs have been smoothed so that they are incurred approximately equally in terms of percentage of earnings over the period.

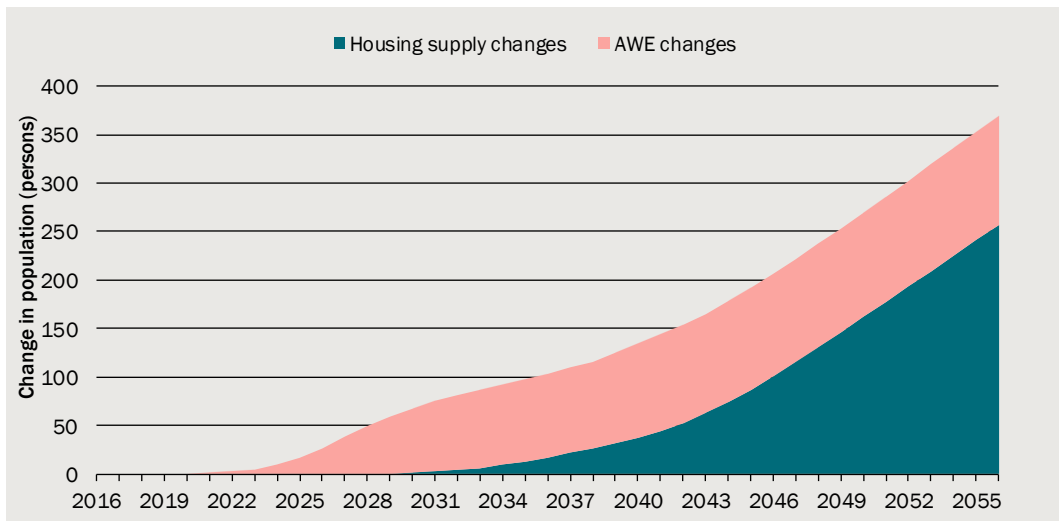
3.12 Impact on earnings from productivity and costs



Data source: The CIE.

The housing supply changes are as set out above, equating to an additional 125 000 dwellings over the 40-year period. Using the population model described in Appendix B, this change in population is shown in chart 3.13. The SIS is expected to increase the NSW population by over 100 000 people by 2036, with a further increase of 265 000 people by 2056. This increase more than surpasses population growth under the infrastructure constraints in the absence of the SIS. Impacts are more rapid after 2036 because housing supply impacts from major public transport projects occur later in the 40-year period.¹⁸

3.13 Estimated change in population from the State Infrastructure Strategy



Data source: The CIE.

¹⁸ Note that to some extent the lagged effect on housing supply is an artifice of the modelling, because we do not have a good evidence base to pattern dwelling changes from transport improvements. It may be that part of the dwelling impacts occur earlier in the benefit period of a transport project.

Impact on labour force participation

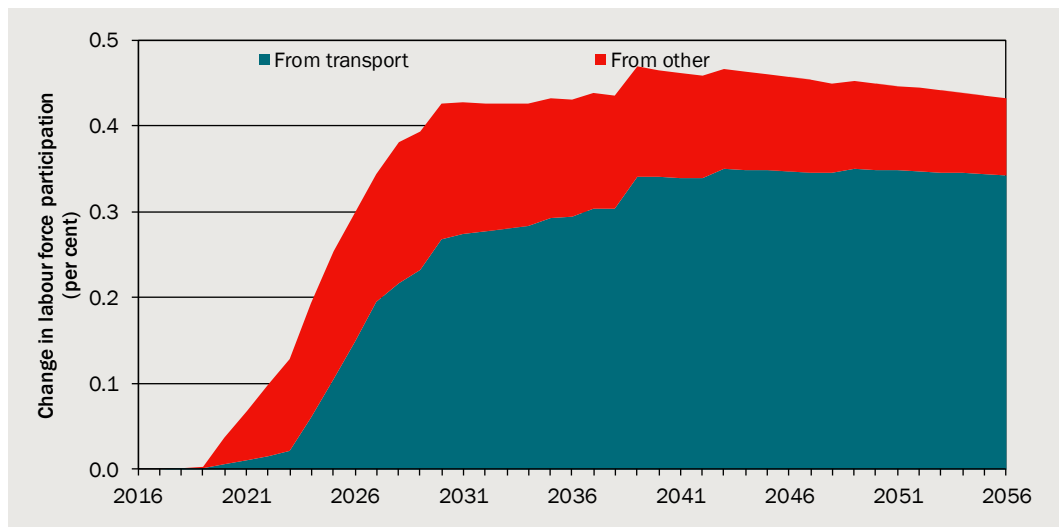
Labour force participation is expected to decline over time in the Common Planning Assumptions because of the ageing of the population. It is expected to decline more rapidly in the Constrained Baseline because transport times increase.

We use an aggregate measure of the labour supply elasticity to change participation rates. Note that we allocate the effects to higher participation rates, but this could also reflect longer work hours — the impacts on labour supply are the same, although the impacts on inequality would be different.

The main driver of higher labour force participation (or hours) from the SIS is reduced transport times. There are also some labour force participation impacts in other areas, such as health infrastructure which has a component of benefits for getting people back into the labour force more rapidly and education expenditure which will lead to higher participation rates in the longer term.

The impacts on labour force participation are shown in chart 3.14. By 2056, labour force participation is expected to be 0.4 percentage points higher. Note that this means that labour force participation declines from 64.1 per cent in 2016 to 60.7 per cent in 2056.

3.14 Changes in labour force participation

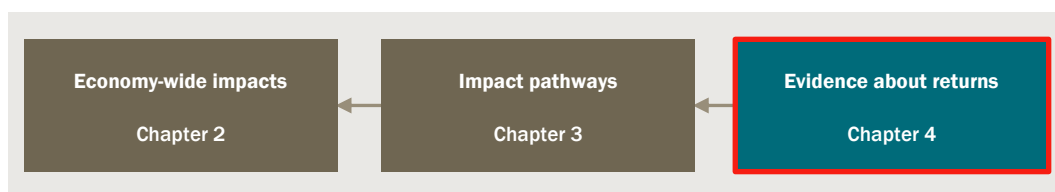


Data source: The CIE.

4 Evidence about returns of SIS recommendations

SIS recommendations are expected to generate a range of economic and non-economic returns. Chart 4.1 shows how this evidence about returns of recommendations fits into the overall structure of our approach.

4.1 Structure of Part I of the report



Data source: CIE.

The returns of each individual recommendation have been estimated by considering the following types of evidence, in order of robustness:

- Strategic Business Cases/past analysis
- CIE analysis of major policies/investments
- Extrapolation of return benchmarks applied to cost estimates
- Portfolio approach (assuming that project returns are zero, low, medium or high) applied to cost estimates.

Projects may generate seven types of returns. The following is a list of returns that can be generated from project implementation.

- Private transport – reduced congestion, fewer accidents, and other improvements to outcomes for private transport that improve liveability.
- Business transport productivity – reductions in costs of transporting goods and the cost of business travel.
- Government cost savings – savings for government in providing services such as healthcare or transport.
- Urban amenity – improved urban amenity, such as through the replacement of roads with bike paths, which reduces air pollution.
- Labour force participation – improvements to accessibility and other factors that induce more people to participate in the workforce.
- Other productivity – savings for industry associated with digital connectivity improvements.
- Other non-economic – a broad category including improved educational, health, justice and other non-economic outcomes. These returns tend not to be accurately

quantifiable, but we have sought to extend upon previous analysis and incorporate them in our analysis through impacts on liveability where possible.

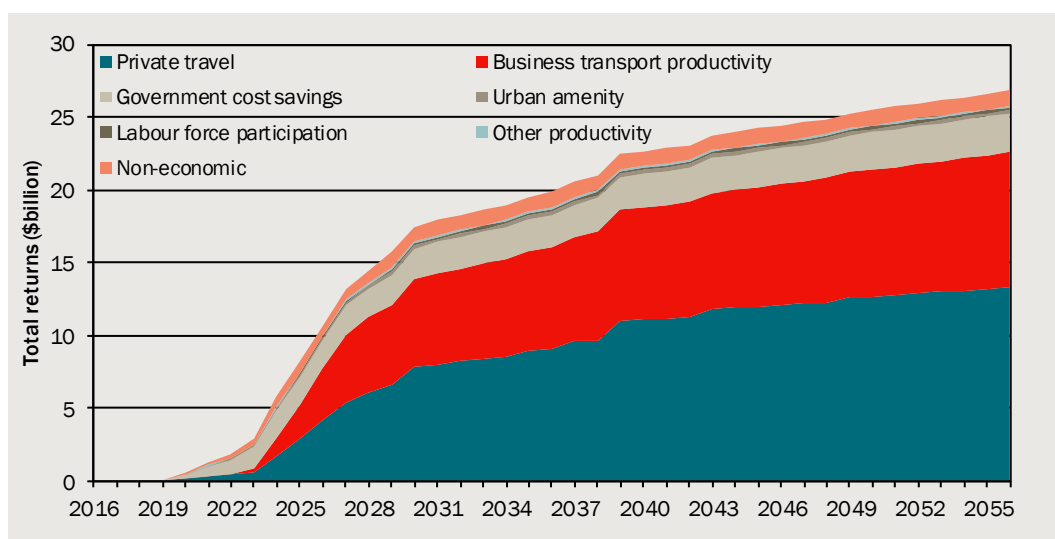
Business transport, government and other productivity returns, and participation impacts, are economic returns suitable for inclusion in our economic model. Private transport and urban are liveability returns, which are not directly economic although they drive population and participation outcomes, which have economic impacts.

The time when returns begin depends on the nature of the project.

- Large infrastructure project recommendations: returns begin after the construction period has ended, which may be 5 or more years after the first year of spending. This assumes that the infrastructure cannot be used and therefore provide returns until it has finished construction.
- Smaller discrete infrastructure projects within one recommendation: returns begin from the first year of spending and ramp up in line with spending, reaching 100 per cent of returns once all construction is finished. This reflects that spending in earlier years may have returns immediately. For example, the Pinch Points program consists of a number of smaller projects, and returns would begin as soon as the first smaller project is completed.
- Recommendations for funding programs ('programmatic recommendations'): returns begin from the first year of funding programs, and returns ramp up over time as spending increases, reaching 100 per cent of returns from the final year of spending onwards.

The size of each type of return over time is shown in chart 4.2. The largest returns from SIS recommendations are private transport returns and improved business transport productivity.

4.2 Total returns of SIS recommendations

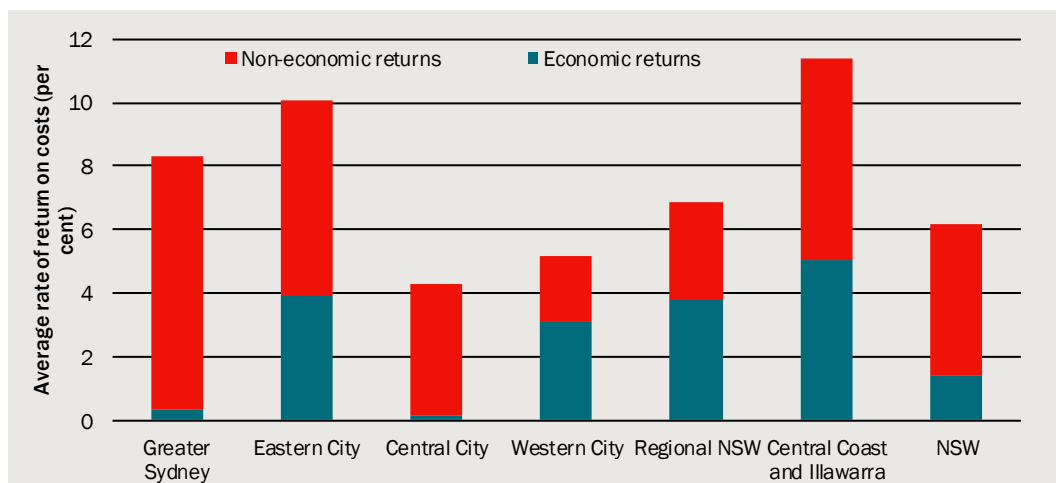


Data source: CIE.

Chart 4.3 shows the average rate of return for SIS recommendations by region. It shows that the highest returns are associated with the recommendations for the Eastern City,

Central Coast, and Illawarra. State-wide recommendations and those in the Western City and the Central City have the lowest returns.

4.3 Returns of SIS recommendations by region

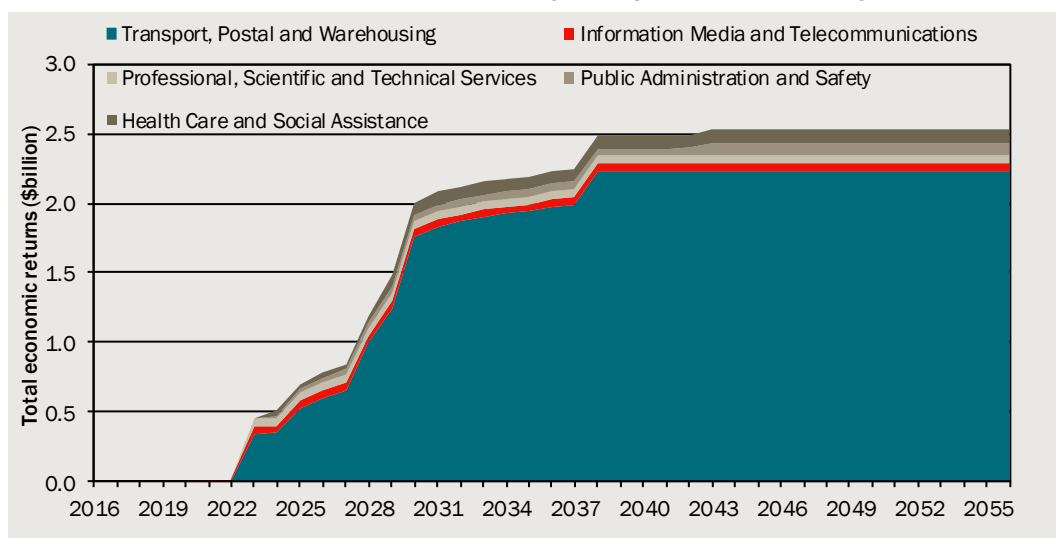


Data source: CIE.

Economic returns of infrastructure projects and policies

These returns are the result of recommendations to investment in transport infrastructure and implementation of policies such as transport pricing. The impact of capital spending (excluding policies) by sector is shown in chart 4.4. Most returns are related to transport projects, with the staggered pattern of increase due to completion of very large projects. For example, the completion of the Western Harbour Tunnel is assumed to occur in 2024/25, which leads to a dramatic increase in benefits per year beginning in 2025/26.

4.4 Economic returns of infrastructure projects by sector where project occurs

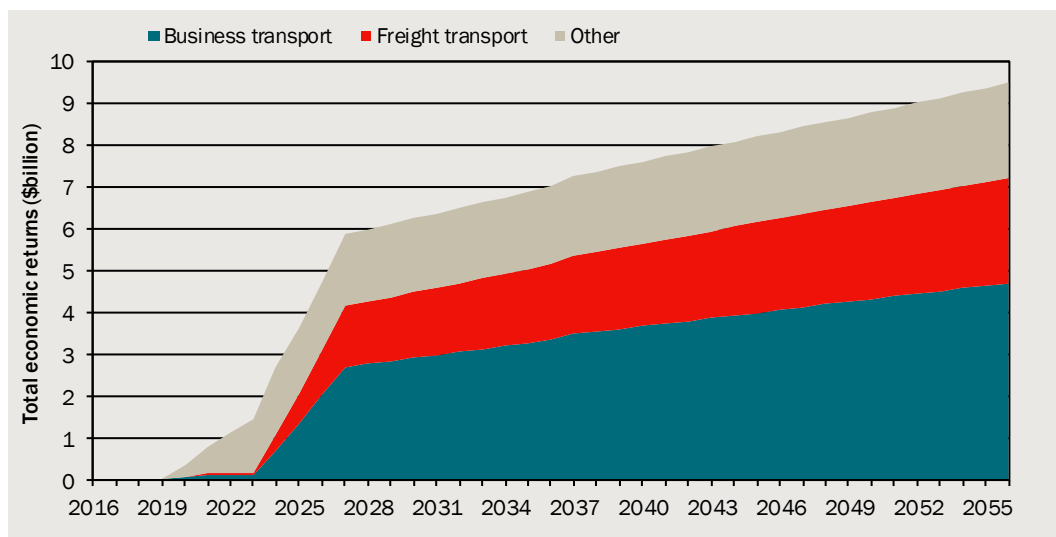


Note: This series indicates only the economic returns from infrastructure projects. That is, it excludes policies, such as transport pricing.

Data source: CIE.

In contrast to the staggered pattern of returns from infrastructure projects, economic returns from infrastructure policies are very smooth and dominated by the steadily increasing impacts of transport pricing (chart 4.5). The productivity savings associated with business transport are greater than the savings from freight transport based on the value of total passenger hours for business-to-business transport compared to freight.

4.5 Economic returns of infrastructure policies



Data source: CIE.

Split between economic and liveability returns of transport recommendations

Table 4.6 presents the average economic and non-economic return for projects by industry. The total return on cost is comprised of economic returns and non-economic returns. Returns are highest for bus and walking/cycling and interchanges (such as improvements to train stations) recommendations, which represent 5.5 per cent of total spending. Rates of return are relatively low for rail projects, despite accounting for 56 per cent of total spending.

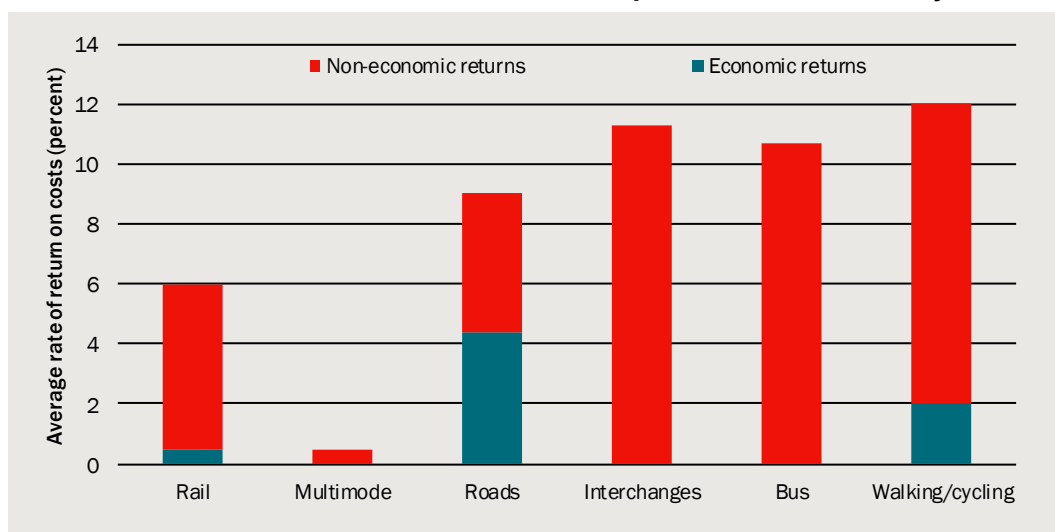
4.6 Costs and returns of transport recommendations by mode

Sectors	Total cost	Average total return on costs
	\$billion	Per cent
Rail	65 679	6.0
Multimode	1 997	0.4
Roads	42 687	9.0
Interchanges	2 227	11.3
Bus	3 208	10.7
Walking/cycling	1 000	12.0
All modes	116 798	7.3

Note: The average rate of return on costs has been estimated by weighting the rate of return for each recommendation by its costs. Multimode recommendations refer to those where the recommendation does not prescribe a single mode of transport, such as those relating to safety programs across multiple modes, public transport recommendations that could be achieved by multiple modes, or improvements to forecasting appraisal tools for transport projects across all modes.

Chart 4.7 shows the breakdown of returns to transport spending into economic and non-economic returns. Only road and walking/cycling projects have economic returns while urban public transport recommendations have only non-economic returns through improved private travel.

4.7 Economic and non-economic returns of transport recommendations by mode



Note: The average weight of return on costs has been estimated by weighting the rate of return for each recommendation by its costs. Data source: CIE.

Chart 4.8 shows the costs and returns of transport recommendations by region. The largest spending region is 'Greater Sydney', which includes whole-of-network policies such as SMART Rail. Around 17 per cent of spending is allocated to regional NSW. Economic returns are highest for recommendations in Greater Sydney and the Eastern City, while returns are lowest for recommendations in the Western and Central cities.

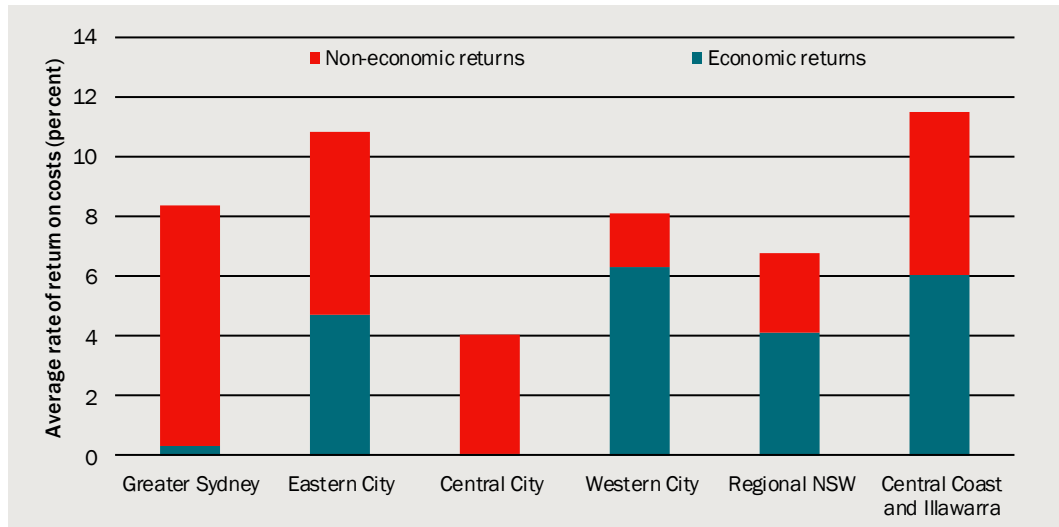
4.8 Costs and returns of transport recommendations by region

Region	Total cost	Average total return on costs
	\$billion	Per cent
Greater Sydney	41 844	8.3
Eastern City	14 389	10.8
Central City	31 687	4.0
Western City	5 269	8.1
Regional NSW	23 608	7.5
All regions	116 798	7.3

Note: The average weight of return on costs has been estimated by weighting the rate of return for each recommendation by its costs. Source: CIE.

Chart 4.9 shows the split of economic and non-economic returns for each region. Around 44 per cent of returns to recommendations for the Eastern City are economic returns, largely associated with projects such as Sydney Gateway or Western Harbour tunnel which affect freight productivity. Central City projects have entirely non-economic returns as they are generally public transport projects such as new rail lines.

4.9 Economic and non-economic returns of transport recommendations by region



Note: The average weight of return on costs has been estimated by weighting the rate of return for each recommendation by its costs.
Data source: CIE.

5 *Geographic impacts of the SIS*

Spatially, the SIS investments and policies are aligned to the areas of growth expected across NSW. The spatial changes within Sydney reflect a movement of jobs Westwards relative to current patterns, as Parramatta becomes a Central City and a Western City emerges, and more rapid growth in Sydney than in the regions.

In general, the returns of each project are assumed to accrue in the area that the infrastructure is built in. For example, the Western Harbour Tunnel is assumed to provide a benefit to the Eastern City. However, there may be 'spillover' impacts for other parts of Sydney and NSW due to reduced congestion and other factors.

Note that the spatial dynamics of population flows are not well understood, and spatial impacts will depend heavily on issues such as funding (such as transport pricing), which would need to be developed in detail.

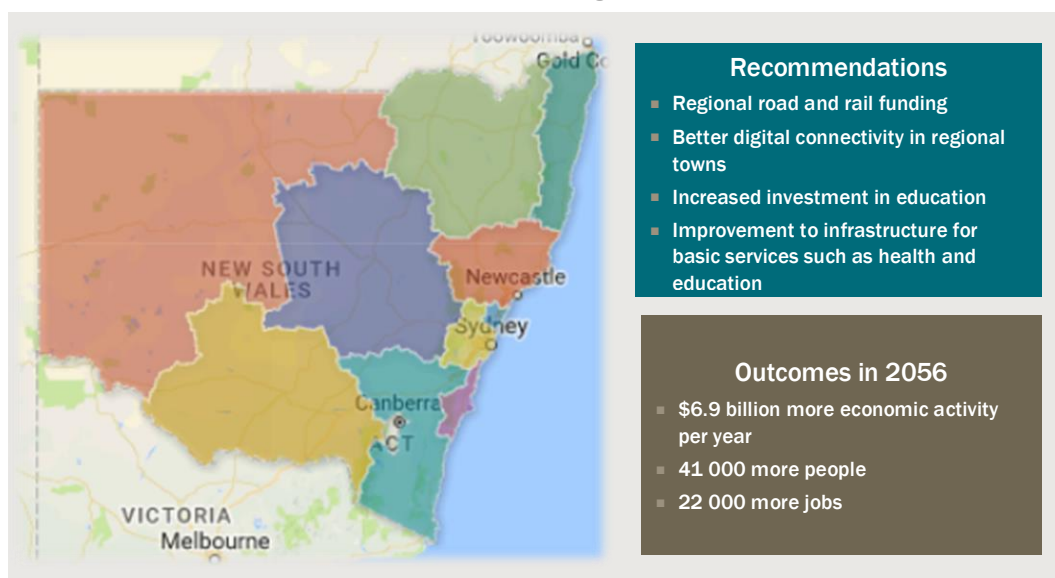
Impacts of the SIS in Regional NSW

A number of capital spending initiatives recommended by the SIS would lead to substantial economic impacts in regional NSW. Funding programs for transport infrastructure and digital connectivity improvements would lead to more population, jobs and economic activity in Regional NSW.

The results presented in this section include the impact of transport pricing development work proceeding to implementation.

Chart 5.1 summarise the major SIS recommendations and economic outcomes for Regional NSW. Regional NSW benefits from a number of funding programs for transport infrastructure in addition to upgrades to the Pacific Highway and Princes Highway. These programs contribute to significant increases in economic activity, population and jobs.

5.1 SIS recommendations and impacts for Regional NSW



Data source: CIE.

The SIS 2018 recommendations for Regional NSW are all fully implemented within the first 20 years. More than 85 per cent (\$6.1 billion) of the increase in economic activity in Regional NSW occurs by 2036. The anticipated changes in the economic activity, population and jobs across regional NSW as a result of the SIS are shown in table 5.2.

5.2 Regional NSW economic impacts of the SIS 2018

Region	GRP		Population		Jobs	
	2036	2056	2036	2056	2036	2056
	\$billion	\$billion	000's	000's	000's	000's
Central Coast, Hunter and Newcastle	2.2	2.5	15.0	19.8	8.8	8.7
Illawarra and Shoalhaven	0.9	0.9	5.3	6.8	3.2	3.0
Rest of Regional NSW	3.0	3.5	11.9	14.8	9.7	10.5
Regional NSW total	6.1	6.9	32.2	41.4	21.7	22.3

Source: CIE.

Economic activity in Regional NSW is 2.7 per cent higher in 2036 compared to economic activity without the SIS (table 5.3). The percentage increase in jobs by 2056 (1.5 per cent) is larger than the percentage increase in population (1.1 per cent), suggesting that the SIS will achieve a higher participation rate for Regional NSW compared to the baseline without the SIS.

5.3 Proportional economic impacts of the SIS 2018 in Regional NSW

Regions	GRP		Population		Jobs	
	2036	2056	2036	2056	2036	2056
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Central Coast, Hunter and Newcastle	3.0	2.4	1.3	1.5	1.7	1.6

Regions	GRP		Population		Jobs	
	2036	2056	2036	2056	2036	2056
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Illawarra and Shoalhaven	2.8	2.2	1.0	1.2	1.5	1.4
Rest of Regional NSW	2.5	2.2	0.7	0.8	1.3	1.4
Regional NSW total	2.7	2.2	0.9	1.1	1.5	1.5

Source: CIE.

SIS recommendations in Regional NSW tend to have both economic returns and returns which are not directly economic, with a total average return of 7.7 per cent. Projects in the metropolitan areas of the Central Coast and Illawarra (including Newcastle) have higher returns (10.8 per cent) compared to the rest of Regional NSW.

5.4 Economic and non-economic returns of recommendations in Regional NSW

Region	Total cost	Economic returns	Returns which are not directly economic	Total returns
	\$billion	Per cent	Per cent	Per cent
Central Coast and Illawarra	5 652	4.8	6.0	10.8
Rest of Regional NSW	21 303	3.8	3.1	6.9
Regional NSW total	26 955	4.0	3.7	7.7

Note: Separate totals for Central Coast/Newcastle and Illawarra are not shown in this table because some recommendations overlap across both areas (such as recommendations to expand the 30 minute catchment in the Central Coast and Illawarra).

Source: CIE.

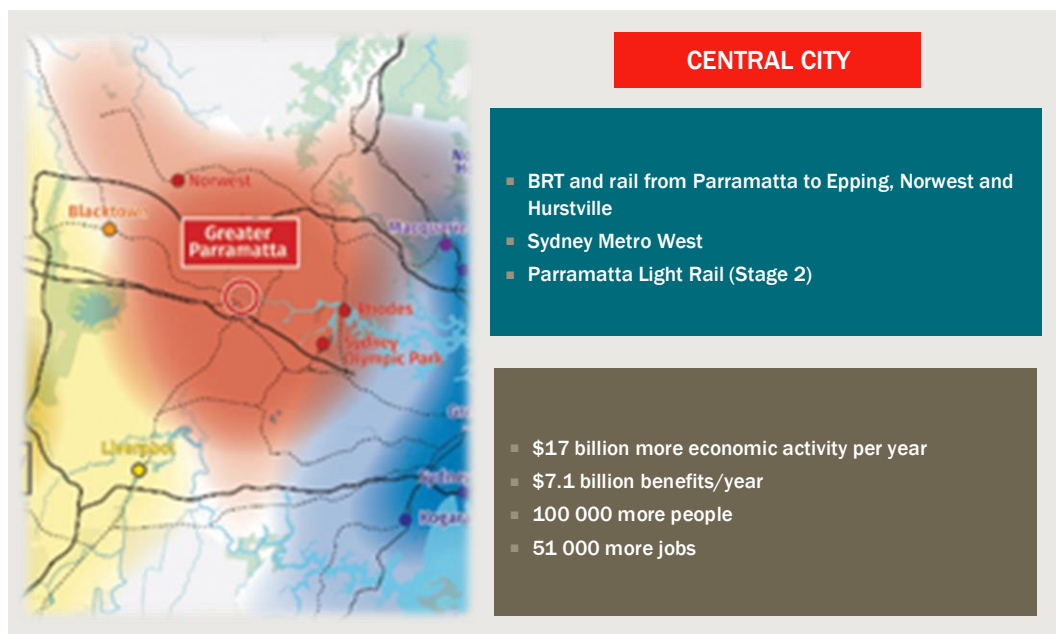
The Regional Economic Development Plans will provide the next level of detail about the specific infrastructure investments that will support economic performance in Regional NSW.

We have assumed that dwelling growth follows population growth implied by the model. The model does not estimate the quantity of additional housing which is implied by these population impacts. We have assumed that transport projects do not directly result in more housing due to relaxed zoning restrictions for residential dwellings, since zoning is largely not a constraint on development in regional NSW.

Impacts of the SIS in the Central City

The SIS recommends significant investment in the Central City, with particularly large investment in public transport projects such as Sydney Metro West and Parramatta Light Rail. Chart 5.5 summarises the main recommendations and outcomes for the Central City as a result of the SIS. These results include the impact of transport pricing development work proceeding to implementation.

5.5 SIS recommendations and impacts for the Central City



Data source: CIE.

Compared to the baseline without the SIS, economic activity is \$17 billion higher by 2056. The majority of the increase in Gross Regional Product for the Central City occurs between 2036 and 2056, reflecting the large investment in mass transit connections from Parramatta to urban centres at Epping, Norwest and Hurstville/Kogarah. Gross Regional Product increases more than population, suggesting that GRP per capita in the Central City increases as a result of the SIS.

5.6 Economic impacts of SIS recommendations in the Central City

Outcomes	Level impact		Percentage impact	
	2036	2056	2036	2056
GRP (\$billion)	6	17	4.0	6.5
Population('000s)	25	100	1.4	4.4
Jobs ('000s)	17	51	2.2	5.3

Note: These results include the impact of transport pricing development work proceeding to implementation.

Source: CIE.

Accessibility impacts

A key factor that will drive success for businesses in the Central City will be transport accessibility to labour markets.

A projection of labour accessible to Parramatta and to the Sydney CBD under two scenarios has been modelled:

- the base case, and
- the project case, which is the Future Transport scenario of transport infrastructure investments developed by Transport for NSW. This scenario broadly aligns to the SIS

recommendations; however, it includes greater investment in transport infrastructure in the Western City relative to the SIS recommendations. This scenario does not include the impact of transport pricing.

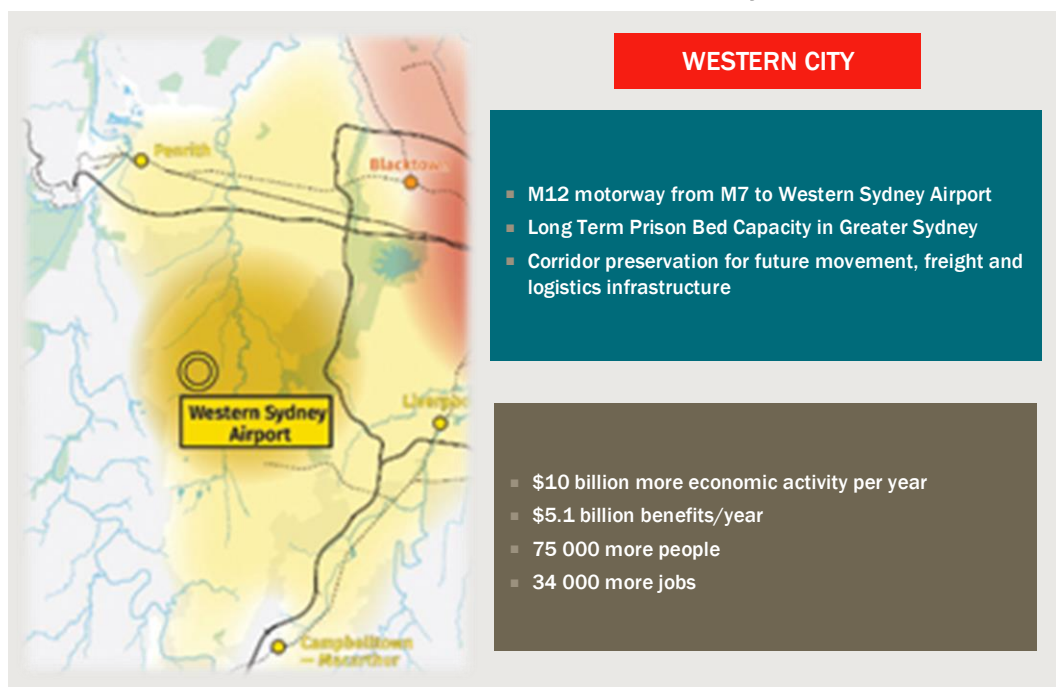
Under the base case, Sydney will see an increase in labour supply accessible within 30 minutes of 28 per cent relative to 2016 levels, and an increase in labour supply accessible within 45 minutes of 42 per cent. Parramatta will see a 79 per cent increase in labour accessibility within 30 minutes and 98 per cent within 45 minutes (relative to 2016 levels).

Under the project case, Parramatta labour supply accessibility reaches 643 000 people in 2036 and 771 000 people by 2056. The Future Transport investment conditions almost put accessibility between Parramatta and Sydney on par, with Sydney expecting access levels of 800 000 people within 45 minutes of the CBD by 2056.

Impacts of the SIS in the Western City

The major investments of the SIS in the Western City are forward-looking investments that aim to enable the GSC's Three Cities plan and ensure the efficient delivery of infrastructure to support the Western Sydney Airport. This includes corridor preservation for future mass transit links such as a North-South rail link. These results include the impact of transport pricing development work proceeding to implementation.

5.7 SIS recommendations and impacts for the Western City



Data source: CIE.

The SIS recommendations result in increased economic activity of \$10 billion per year by 2056 in the Western City (table 5.8). This increase represents 6.6 per cent of economic activity in the Western City. The additional population and jobs due to the SIS

recommendations are mostly accrued in the 2036-2056 period. GRP increases by more than population growth by 2036 and 2056, suggesting that the SIS results in a higher level of GRP per capita than the level without the SIS.

The number of additional jobs in the Western City is greater than the additional population. This may reflect fewer people living in the Western City commuting to jobs in other parts of Sydney, or an increase in the employment rate in the Western City. Increased employment in the Western City supports the Three Cities plan by the GSC to reduce congestion by changing the distribution of jobs and develop the Western Parkland City as the next metropolitan cluster of Sydney.

5.8 Economic impacts of SIS recommendations in the Western City

Outcomes	Level impact		Percentage impact	
	2036	2056	2036	2056
Additional GRP (\$billion)	4	10	4.1	6.6
Additional population('000s)	17	75	1.2	4.3
Additional jobs ('000s)	11	34	2.3	5.4

Note: These results include the impact of transport pricing development work proceeding to implementation.

Source: CIE.



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