

15 May 2023

Report to Geoscience Australia

Economic impact of the National Positioning Infrastructure Capability program

Executive Summary



About ACIL Allen

ACIL Allen is a leading independent economics, policy and strategy advisory firm, dedicated to helping clients solve complex issues.

Our purpose is to help clients make informed decisions about complex economic and public policy issues.

Our vision is to be Australia's most trusted economics, policy and strategy advisory firm. We are committed and passionate about providing rigorous independent advice that contributes to a better world.

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ACIL Allen acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land and its waters. We pay our respects to Elders, past and present, and to the youth, for the future. We extend this to all Aboriginal and Torres Strait Islander peoples reading this report.

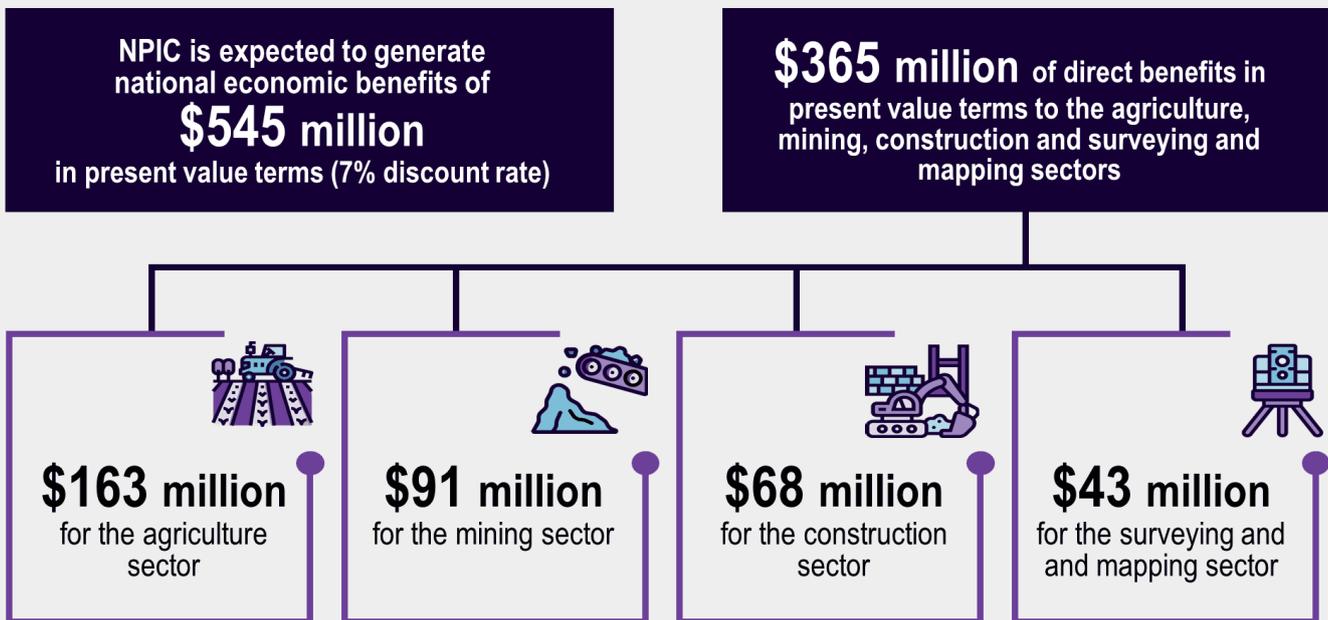


Goomup, by Jarni McGuire

National Positioning Infrastructure Capability Economic Benefits

FINANCIAL YEARS 2019 TO 2038

NATIONAL POSITIONING INFRASTRUCTURE (NPIC) ECONOMIC BENEFITS FINANCIAL YEAR (FY) 2018-19 TO 2037-38



NATIONAL POSITIONING INFRASTRUCTURE (NPIC) COST BENEFIT (DIRECT EFFECTS)^a



NPIC expected to return **\$2.58 for every dollar** of Australian Government funding at 7% discount rate (FY 2019 to FY 2038)

Discounted at	NPIC costs (FY 2022 prices)	NPIC measurable benefits (FY 2022 prices)	Benefit Cost Ratio
3%	\$171 m	\$494 m	2.89
7%	\$141 m	\$365 m	2.58
10%	\$126 m	\$301 m	2.28

^a Benefits to agriculture, mining, construction and the surveying and mapping sectors

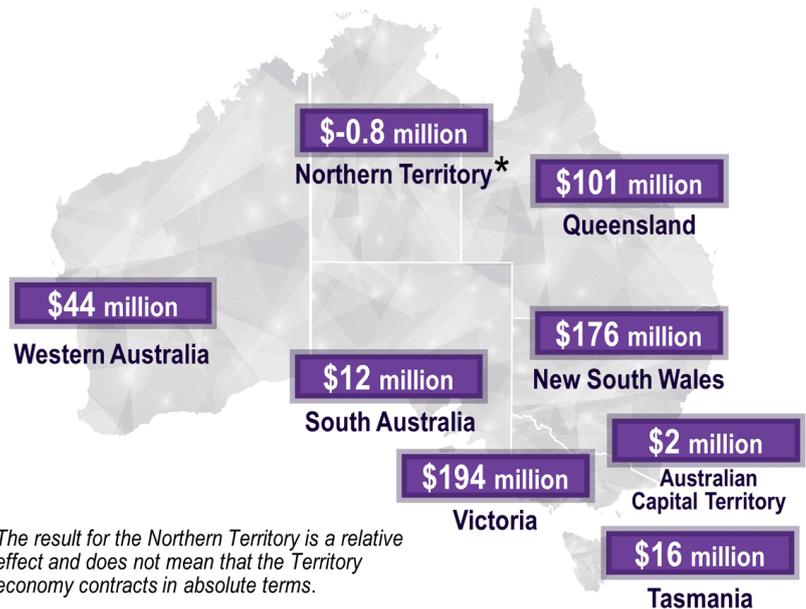
NATIONAL POSITIONING INFRASTRUCTURE NATIONAL ECONOMIC IMPACTS BY STATE FY 2019 TO FY 2038 DISCOUNTED AT 7%

NPIC is expected to generate national economic benefits of **\$545 million** in present value terms.

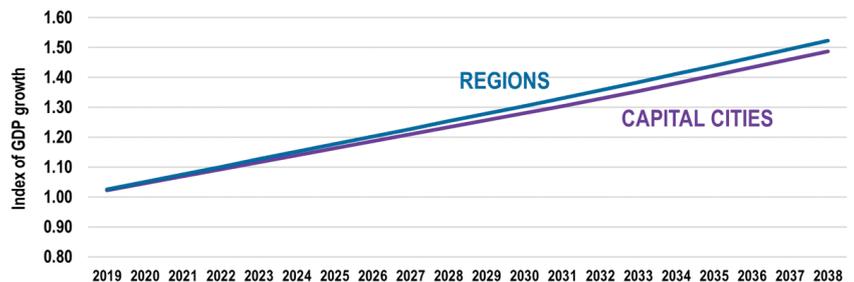


\$141 million

committed by the Australian Government present value terms.



The relative growth rate is **higher for regional areas** relative to capital cities regions as a result of NPIC.



ADDITIONAL EMPLOYMENT GENERATED FROM NATIONAL POSITION INFRASTRUCTURE (NPIC) FY 2019 TO FY 2038

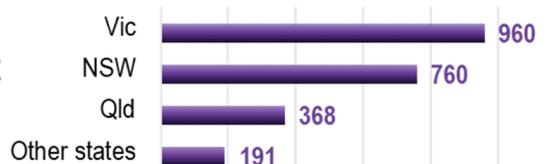
2,316 additional full-time equivalent (FTE)



Average increase in employment **116 FTE per annum**

The largest impact on employment is in **Victoria, New South Wales and Queensland.**

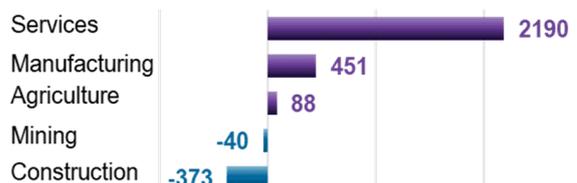
**ADDITIONAL FTE BY STATE
FY 2019 TO FY 2038**



The largest increase in employment from NPIC is in the **services sector** and the **manufacturing sector.**

Precise positioning from NPIC delivers improvements in labour productivity to end users. This is why employment is expected to fall in **mining** and **construction.**

ADDITIONAL FTE BY SECTOR FY 2019 TO FY 2038



Executive summary

The purpose of this report is to estimate the economic benefits that have been generated by Geoscience Australia's National Positioning Infrastructure Capability (NPIC) program since 1 July 2018 and that are expected to be realised by 30 June 2038. The economic benefits are considered in two parts: the direct economic benefits to four sectors of the economy; and the overall impact on economic growth and employment that can be attributed to the NPIC program.

The National Positioning Infrastructure Capability (NPIC) provides a unified approach to the management of the nation's positioning infrastructure. This ensures that consistent, fit-for-purpose precise positioning data and services are available to government, business, and academia.

Through a unified national network:

- consumers have access to high-quality positioning data from certified reference stations,
- coverage of positioning services is increased and consistent between providers,
- service costs can be lowered due to free and open positioning data,
- service providers have increased flexibility to tailor offerings to different industry sectors.

By establishing a unified national network, NPIC is enabling the delivery of positioning services with accuracies better than 5 cm across Australia in areas of mobile phone coverage.

The Australian Government invested around \$64 million into better positioning to support Australian businesses between 1 July 2018 and 30 June 2022 and around \$12 million annually from 1 July 2023 to maintain the NPIC program. Of this around \$44 million and \$10 million respectively has been directly invested in the NPIC network. The research undertaken for this report indicates that this expenditure can be expected to deliver benefits to the Australian economy that exceed the Australian Government costs of the program.

These findings are based on quantification of the impact of the NPIC program on four selected sectors of the economy (surveying and mapping, agriculture, construction, and mining). This research also found other sectors, including research and innovation, infrastructure planning, manufacturing and transport and logistics would also be expected to benefit over time. These sectors have not been included in the estimates of the direct economic benefits of NPIC but have been captured as indirect benefits in the economy wide modelling.

Economic benefit of the NPIC on selected sectors

Direct benefits

This economic analysis found that NPIC is expected to deliver either productivity improvements or increases in revenue to the surveying and mapping, agriculture, construction, and mining sectors of the economy. Table ES 1 summarises the benefits for these four sectors.

NPIC is estimated to deliver \$365 million in direct benefits to the surveying and mapping, agriculture, construction, and mining sectors between financial year FY 2019 and FY 2038 in present value terms (FY 2022 prices). Of this, \$51 million (14 per cent of the total) is estimated to have already been realised between FY 2019 and FY 2022.

Table ES 1 Economic benefits of NPIC on selected sectors, FY 2019 to FY 2038

Sector	FY 2019 – FY 2022	FY 2023 – FY 2038	FY 2019 – FY 2038
	\$million (FY 2022 prices)	\$million (FY 2022 prices)	\$ million (FY 2022 prices)
Surveying and mapping	8.8	34.2	43.0
Agriculture	25.1	138.0	163.1
Construction	7.7	60.1	67.8
Mining	9.5	81.1	90.7
Total	51.1	313.4	364.6

Note: Benefits in terms of present value as at FY 2022 calculated with a discount rate of 7 per cent. Benefits are net of user costs but are not net of any GA NPIC costs.

Source: ACIL Allen

Benefit-cost ratio of the NPIC program

The NPIC program is generating more value for the surveying and mapping, agriculture, construction, and mining sectors than it costs, with an expected return of \$2.58 for every dollar of Australian Government funding.

The benefit-cost ratio of the NPIC (discounted at 7 per cent) is 2.58.

To assess this, the cash flows of benefits and costs were discounted at three discount rates (3 per cent, 7 per cent and 10 per cent). The results are summarised in Table ES 2 below. The table shows that these findings are not sensitive to the discount rate.

Table ES 2 Costs, benefits and benefit-cost ratio for the NPIC program for FY 2019 to FY 2038

Discounted at	NPIC costs	NPIC direct benefits	Benefit-Cost Ratio
	\$million (FY 2022 prices)	\$million (FY 2022 prices)	Ratio
3%	171	494	2.89
7%	141	365	2.58
10%	126	301	2.38

Note: Benefits in terms of present value as at FY 2022 calculated with a discount rate of 7 per cent. The NPIC costs are Australian Government costs only but include payments to service providers for access to private CORS data.

Source: ACIL Allen

Wider benefits of the NPIC to the Australian economy

Economic impacts by state and territory

Broader impacts on the Australian economy from NPIC will accrue as the wider economy responds to the increased efficiency of precise positioning, particularly in the four sectors assessed: surveying and mapping, agriculture, construction, and mining.

The economic impacts of NPIC by state and territory are summarised in Table ES 3. The table shows that the highest benefits accrue to Victoria, New South Wales and Queensland. This reflects the size of their economies, more extensive mobile phone coverage, and the maturity, dependence and sustained update of positioning infrastructure and services.

Table ES 3 Direct and indirect economic benefits of NPIC, FY 2019 to FY 2038

State	Direct and indirect net economic benefit
	\$million (FY 2022 prices)
New South Wales	176
Victoria	194
Queensland	101
South Australia	12
Western Australia	44
Tasmania	16
Northern Territory	-0.8
Australian Capital Territory	2
Australia	545

Note: Net economic benefit has been calculated as a present value as of FY 2022, using a 7 per cent discount rate.
Source: ACIL Allen

The present value of the total (direct and indirect) net economic benefit of the NPIC program to Australia is estimated at \$545 million (discounted at 7 per cent). All jurisdictions, apart from the Northern Territory, benefit from the NPIC program. The Northern Territory experiences a relative negative result due to limited mobile phone coverage outside of the main population centres restricting the ability to deliver precise positioning services over the internet. This is a relative effect and does not mean that the Northern Territory economy contracts in absolute terms.

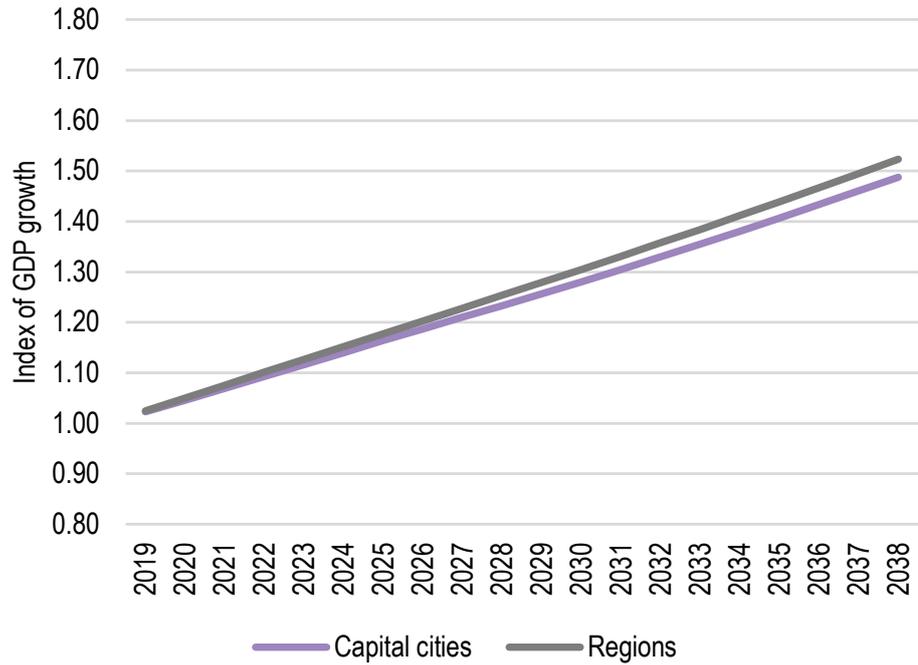
Regional impacts of the NPIC

There is larger relative increase in output in the regions compared to the output of the capital cities as a result of NPIC. This is the result of capital and labour mobility.

This means the regional areas grow faster than capital cities and reflects in part the fact that the agricultural and mining sectors are largely located in regional areas. A significant component of heavy engineering is also located in regional areas.

The indices of growth in Gross Regional Product (GRP) for Australian capital cities and regional areas are summarised in Figure ES 1.

Figure ES 1 NPIC Gross Regional Product (GRP) impact, Index of capital and non-capital city regions GRP impact (FY 2018 to FY 2038)



Note: FY 2018=1

Source: ACIL Allen modelling based on the direct impact estimates

Employment impacts of the NPIC

Full-time equivalent (FTE) employment as a result of the NPIC program is expected to increase as shown in Table ES 4.

Total employment as result of NPIC is projected to increase. The average annual increase is 116 full-time equivalent employment (FTE) with a total increase of 2,316 FTE years over the period from FY 2019 to FY 2038.

The largest impact on employment is expected to occur in Victoria, New South Wales and Queensland.

Table ES 4 Increase in full-time equivalent (FTE) employment due to NPIC, FY 2019 to FY 2038.

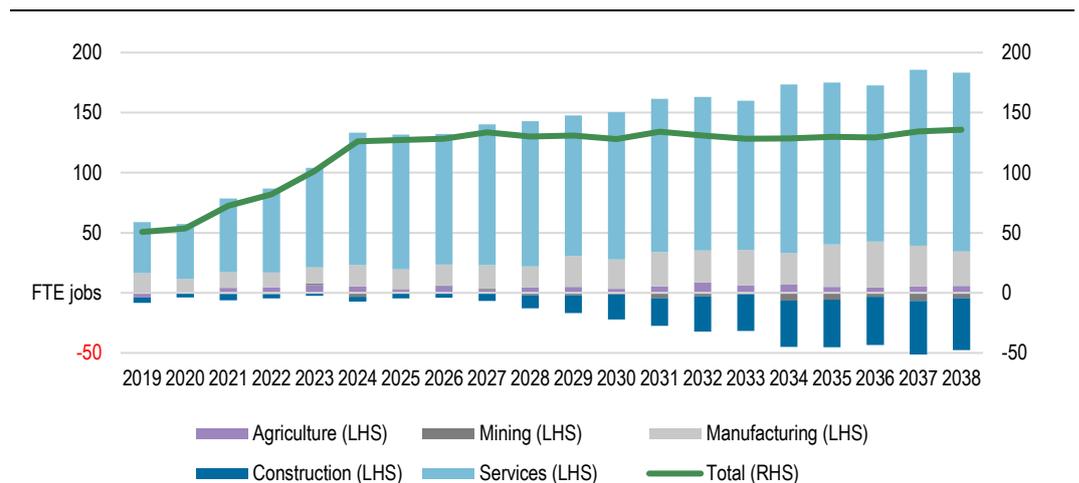
Regions	Annual average	Employment in FY 2038	Total (FY 2019 –FY 2038)
	FTE	FTE	FTE
New South Wales	38	40	760
Victoria	50	47	996
Queensland	18	31	368
South Australia	2	3	31
Western Australia	2	6	35
Tasmania	5	6	90
Northern Territory	1	1	15
Australian Capital Territory	1	1	21
Australia	116	136	2,316

Note: Columns do not add to total due to rounding errors.

Source: ACIL Allen modelling

The relative impact of NPIC on employment across the economy is shown in Figure ES 2. Employment growth due to NPIC is forecast in the services, manufacturing and agricultural sectors. The increase in output from the four sectors modelled (surveying and mapping, agriculture, mining and construction) will result in the purchase of more goods and services by these sectors. These goods and services will increase employment in the services and manufacturing sectors. Employment is forecast to fall in the mining and construction sectors as improvements in productivity reduce the demand for workers in those sectors. This is a relative fall and does not imply employment falls in absolute terms in these sectors. The absolute level of employment will depend on the rate of growth in the economy.

Figure ES 2 Employment impacts of NPIC by broad sectors, Full-time Equivalent (FTE) jobs, financial years FY 2019 to FY2038



Note: The services sector includes surveying and mapping.

Source: ACIL Allen

Melbourne

Suite 4, Level 19; North Tower
80 Collins Street
Melbourne VIC 3000 Australia
+61 3 8650 6000

Canberra

Level 6, 54 Marcus Clarke Street
Canberra ACT 2601 Australia
+61 2 6103 8200

ACIL Allen Pty Ltd
ABN 68 102 652 148

acilallen.com.au

Sydney

Suite 603, Level 6
309 Kent Street
Sydney NSW 2000 Australia
+61 2 8272 5100

Perth

Level 12, 28 The Esplanade
Perth WA 6000 Australia
+61 8 9449 9600

Brisbane

Level 15, 127 Creek Street
Brisbane QLD 4000 Australia
+61 7 3009 8700

Adelaide

167 Flinders Street
Adelaide SA 5000 Australia
+61 8 8122 4965