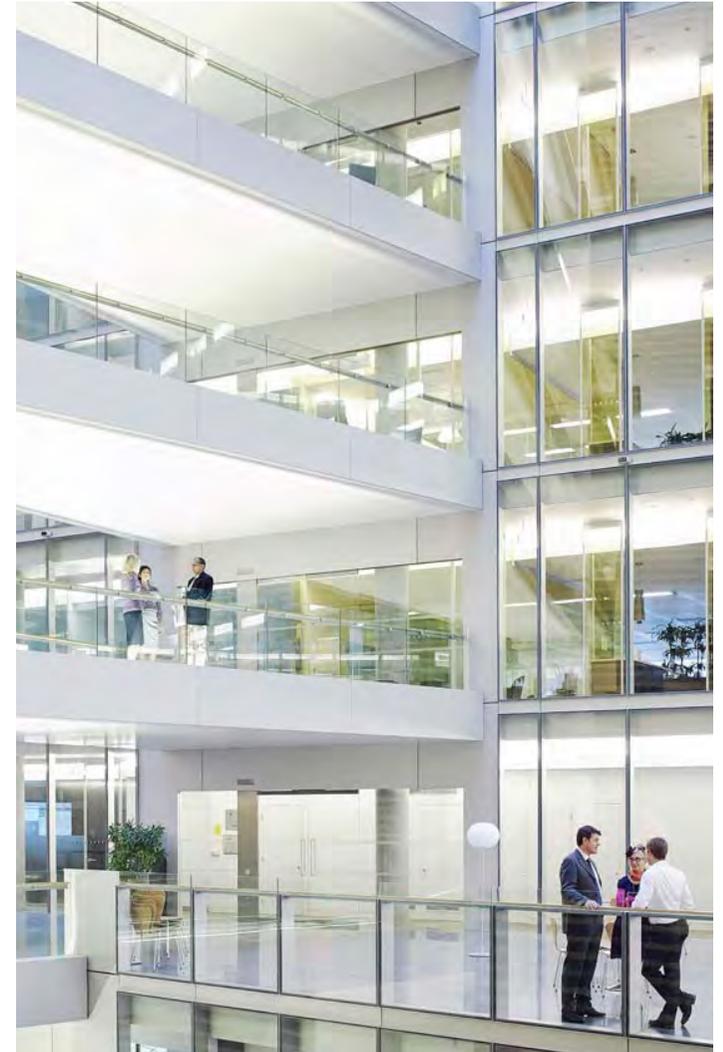


March 2014

# *Australia uncovered*

## A new lens for understanding our evolving economy



# Australia uncovered

## A new lens for understanding our evolving economy

Many Australians currently are grappling with the question: what will drive growth in our economy after the end of the resource investment boom?

It's a question at the forefront of our minds too.

In searching for the answer, we found that the current lenses through which we generally view our economy – such as an industry or state lens – provide only high level perspectives. There was nothing that told us how our economy is working 'on the ground'.

So we created a lens that did. This new lens captures the macroeconomic trends that shape our country, then zooms in to see how this plays out in 2,214 'locations' across Australia where business and government operate. 'Locations' refer to socially and economically distinct areas that have, on average, a population of approximately 10,000 people.

This white paper explains how this new lens works, what it tells us about our economy, and why this matters. Our lens shows that:

- economic *growth* is uneven, but more so than we had expected. While the Australian economy as a whole grew 2.6 per cent last financial year, 35 per cent of locations actually saw their economy shrink. On the other hand 4 per cent of locations grew by more than 10 per cent.
- economic *activity* is highly concentrated. 10 per cent of Australia's economic output comes from an area the size of Western Australia's Rottne Island – 19 km<sup>2</sup>. Furthermore, the concentration of economic activity in these key pockets has been steadily increasing over the past decade.

- not all locations within CBDs, cities and regions are faring alike and quite simply, not all are of equal economic importance. Each location has unique constraints and growth opportunities which need to flow into forecasts, targeted policies and evidence-based strategic plans.

Understanding the spatial characteristics of our economy, from 2000/01 with forecasts out to 2020, allows us to better understand the challenges our economy faces and map a course to meet these challenges. This enables decision makers to predict what is likely to happen and shows there are growth opportunities to be realised. Specifically business and government decision makers can:

1. Ensure that the largest, strongest performing locations remain unconstrained, efficient and productive. Given Australia's concentration of economic activity, even minor inefficiencies in these areas have a major impact on our national economy.
2. Identify locations that are operating under their potential and direct the appropriate investment into these locations to realise this growth.
3. Identify locations with specific social needs or innovative opportunities that require nurturing.
4. Tailor growth strategies and optimise capital investment based on local characteristics.

**Economic activity is highly concentrated**

**10 per cent of Australia's economic output comes from an area about the size of Rottne Island (WA)**

# How it works

## The new lens we have developed is called PwC's Geospatial Economic Model, or GEM for short

Taking a granular view of our economy is based on a methodology originally developed by Queensland Treasury for measuring economic activity in 14 Queensland regions. We have built on this methodology to include a greater range of data sources and have refined the weightings in order to apply it to 2,214 locations that make up Australia.<sup>1</sup>

We use Australian Bureau of Statistics (ABS) and industry data to calculate economic outputs for each location.<sup>2</sup> We use time series data beginning in 2000/01, with forecasts through to 2020.<sup>3</sup>

In addition to identifying the core economic output of each location we can also:



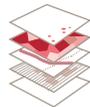
- Track the composition and estimated performance of 19 industries, in a consistent manner, in each of the 2,214 locations, as opposed to understanding industry composition and performance at a state or national level.



- Estimate productivity (output / worker) and the effects of clustering, density (output / m<sup>2</sup>), agglomeration and productivity metrics. For example, one square metre of land in the Sydney Central Business District (CBD) generated \$15,004 of economic output in 2012/13, the highest per square metre level in Australia.



- Estimate the wages received by employees, company profitability and taxes generated in each location, by industry.<sup>4</sup>



- Correlate these outputs to social and demographic factors, access to essential infrastructure and customer preference data.



<sup>1</sup> Locations are SA2 geographies as defined by the ABS. These loosely align with suburbs with a residential population of 10,000. However for our work, we have focussed on people employed in these areas, not people who live in them, as place of employment is generally where economic activity is located.

<sup>2</sup> The methodology is based on the income method of calculating Gross Domestic Product and Gross State Product. Gross State Product is distributed to locations based on weightings derived from Census and industry data. All SA2 economic and industry estimates reconcile to State level totals produced by the ABS. All estimates reported in this publication are subject to the same caveats, qualifications and statistical discrepancies as the ABS input and industry data. The methodology used to produce these estimates has been consistently applied since 2000/01 across all locations. Chain volume measures are used to allow comparisons of real output over time.

<sup>3</sup> Forecasts draw upon PwC's broader suite of macroeconomic models of the Australian economy.

<sup>4</sup> Using the income method of calculating GDP that looks at compensation of employees, gross operating surplus and gross mixed income, and taxes minus subsidies (on production and consumption).

# Using GEM to understand Australia's productivity

We understand that economic performance is only one dimension that business and government need to understand in order to prosper in our changing economy. That is why we treat the economics as just one 'layer' within the broader GEM. This allows economic performance to be tested and correlated to the other dimensions that matter. These include social and demographic factors (eg age, income, education, housing density, etc) access to transport and infrastructure, access to essential services, climatic conditions, customer preference, intention to purchase, crime statistics and more.

We also realise the importance of incorporating internal business or agency specific data into our analyses. Simply put: your data + our data = unparalleled clarity. In an uncertain and highly competitive environment, this is the type of clarity required to make the right strategic policy and investment decisions.

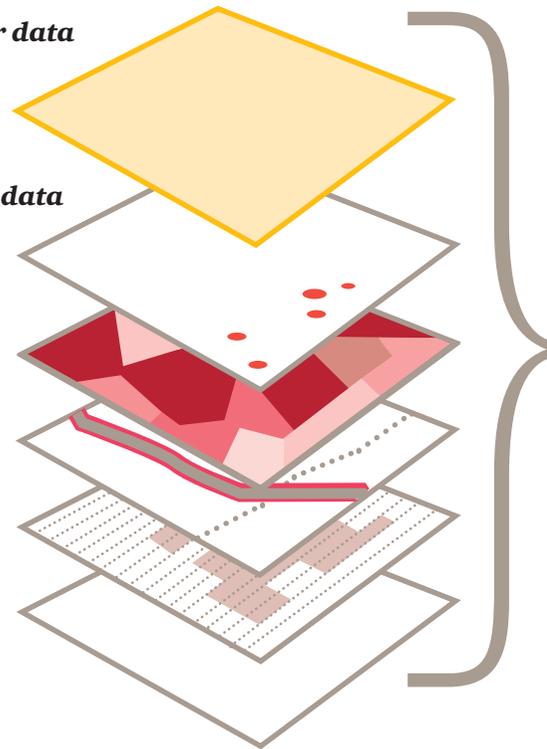


Figure 1: PwC's Geospatial Economic Model

## Data fusion

Your data

Our data



## Data lenses



Social and demographics factors



Retail and customer



Transport and infrastructure



Economic



Industry



Labour force



Climate

## Data layers

GDP (ABS)  
Gross Domestic Product

GSP (ABS)  
Gross State Product

GSAP (PwC)  
Gross Small Area Product

ABS  
Census  
data

ABS  
Economic  
data

ABS  
Industry  
data

Other industry data

# What it shows

A location-based analysis of the Australian economy answers important questions about economic output and productivity growth across the length and breadth of our continent.

For example, which locations made the biggest contribution to Australia's economy in 2012/13? Has this changed over the past 12 years? How has it changed more recently?

Figure 2 shows the top 10 locations nationally in terms of total contribution (economic output) in financial years 2001/02 and 2012/13.

The definition of a CBD is bound by perception. For the purposes of this report, the CBD is defined as the ABS SA2 region(s), which is perceived to be the economic, social and cultural centre of the city. In all cases except Melbourne, this is a single SA2. For Melbourne, the definition of the CBD has been expanded to also capture the Southbank and Dockland SA2s.

Figure 2: Top performing locations by Gross Product (\$ million)

Location	2001/02
1 Sydney CBD	\$50,441
2 Melbourne CBD	\$34,684
3 Roebourne (WA)	\$28,726
4 Perth CBD	\$17,597
5 Brisbane CBD	\$15,657
6 Adelaide CBD	\$11,725
7 North Sydney (NSW)	\$10,484
8 Parramatta (NSW)	\$6,614
9 Churchill (La Trobe Valley, VIC)	\$5,296
10 Dandenong (VIC)	\$5,275
<b>Top 10 as a per cent of total economic output</b>	<b>16.9%</b>

Location	2012/13
1 Sydney CBD	\$64,208
2 Melbourne CBD	\$55,315
3 Perth CBD	\$28,461
4 Roebourne (WA)	\$24,488
5 Ashburton (WA)	\$24,353
6 East Pilbara (WA)	\$24,168
7 Brisbane CBD	\$23,395
8 Adelaide CBD	\$16,136
9 North Sydney (NSW)	\$10,928
10 Macquarie Park (NSW)	\$9,113
<b>Top 10 as a per cent of total economic output</b>	<b>18.4%</b>



# Key insights

Looking at the key locations of economic activity over the past decade (Figure 2), three insights are apparent:

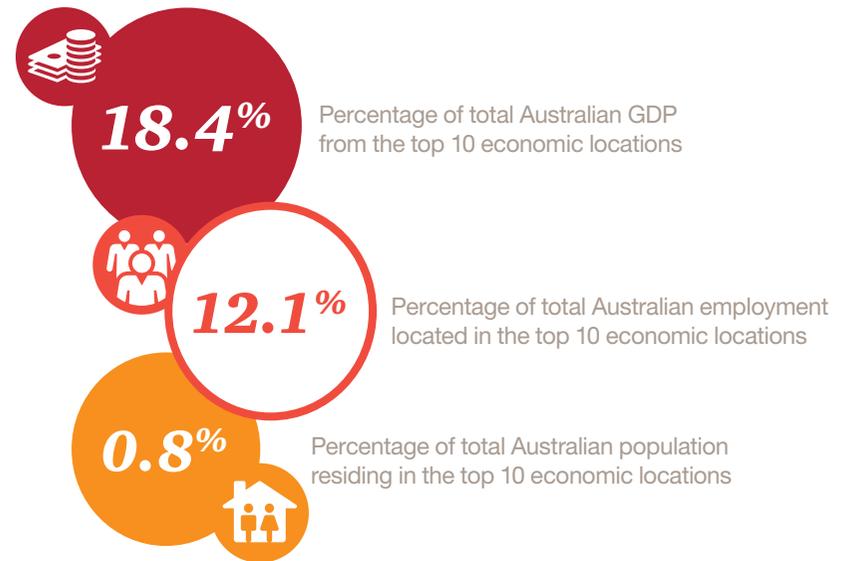
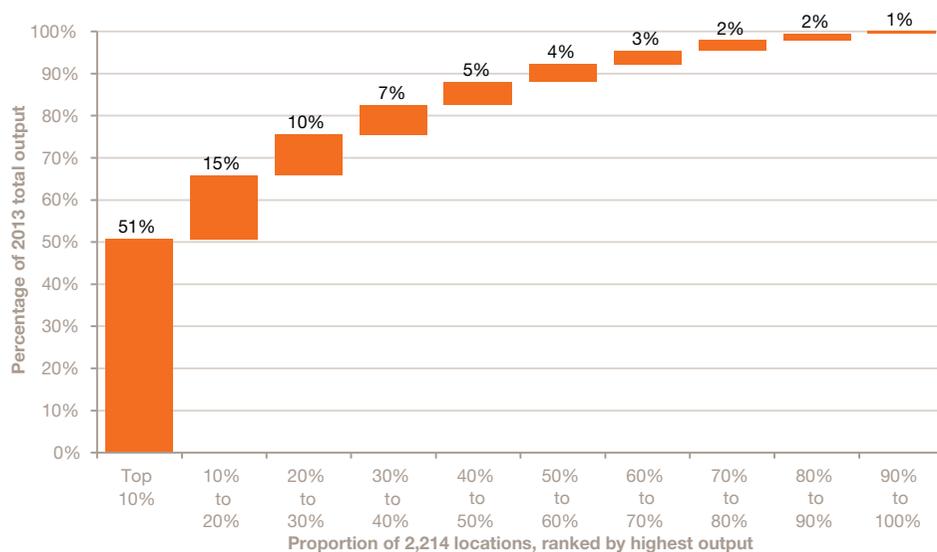
- Firstly, dense urban clusters continue to underpin the bulk of our economic activity. The CBDs of Sydney and Melbourne dominate the other areas in terms of economic contribution.
- Secondly, Australia's resource wealth has driven recent economic growth. Locations situated on resource deposits in the Pilbara now occupy three of the top six spots, continually demonstrating some of the strongest annual growth rates.
- Thirdly, despite Australia's size, areas of economic output are highly concentrated. For example, 85 per cent of economic output is concentrated in 1 per cent of the landmass. Ten per cent of economic output (generated by the CBDs of Sydney, Melbourne and Perth combined) comes from an area about the size of Western Australia's Rottnest Island.

Furthermore, the concentration of economic activity is increasing. The top 10 locations make up a steadily growing proportion of our national economy. If this is expanded out to the top 20 locations, we see an even greater clustering. Expanding out across Australia, the top 10 per cent of locations account for 51 per cent of economic output, as shown in Figure 3.

This is both a risk and opportunity for the Australian economy. It has major policy and investment implications around the role and importance of both regional areas and urban areas, including recent discussions around the development of Northern Australia. It also has implications for the prioritisation of access to, and the strengthening of linkages between these locations of highest economic concentration.

This economic concentration surpasses the concentration of jobs and population. With the decline in traditional manufacturing locations we see this trend not only continuing, but accelerating.

**Figure 3: The long tail of Australia's economic output (ranking of regions by contribution to GDP, FY2012/13)**



# Why it matters

Understanding these trends is critical for an informed discussion on our national economy and the challenges it faces. As we look beyond the resource investment boom and ask the question of where our future sustainable growth will come from, our attention is naturally drawn back to these concentrated areas of activity.

With such a large proportion of output generated in these areas, even seemingly minor bottlenecks (potentially driven by inadequate infrastructure, connectivity, regulation, access to labour markets, etc) have the potential to stifle economic growth.

The understanding of these concentrated pockets of economic activity is absolutely paramount; no two locations are faring alike. As we enter an era of constrained government and private sector budgets, being able to identify and prioritise funding and investment to locations where it is most needed or beneficial will be critical.

A deeper understanding of the economics of locations will enable decision-makers to:

1. Ensure that the largest, strongest performing locations remain unconstrained, efficient and productive. Given Australia's concentration of economic activity, even minor inefficiencies in these areas can have a major impact on our national economy.
2. Identify locations that are operating below their potential and direct the appropriate investment into these locations to realise this growth.
3. Identify locations with specific social needs or innovative opportunities that require nurturing.

Up to now, the functioning of a location, and its ability to either constrain or promote economic growth, has tended to be an overlooked or downplayed ingredient in previous discussions on Australia's economy. This is primarily because the data simply wasn't available to understand the economic growth (and underlying drivers of this growth) of these small concentrated pockets, let alone correlate this to other critical factors such as infrastructure, business dynamics and climatic and environmental characteristics.

For example, spatially aware economic data can be connected with information about physical and social infrastructure to help develop more targeted economic development plans, training and education resources, healthcare services, urban growth initiatives and housing policies.

It can also be used to help businesses optimise their store or branch locations based on location-specific demand for services, distance to suppliers or markets, and intensity of competition in an area. This all leads to a more efficient allocation of private capital.

Climatic characteristics such as rainfall, flood plain locations and urban form characteristics (eg clustering, density, connectivity) together with land use data can be incorporated into spatially aware economic analyses to assist with better planning and risk analysis.

In addition to these insights, this new lens inevitability leads to more intriguing questions that, for the first time, we are able to answer in a robust, transparent and consistent manner.

## GEM in Infrastructure

No one questions the critical role infrastructure has in underpinning the performance of our economy and the functioning of our society. There is no doubt that Australia has an infrastructure deficit that will continue to widen and that this is a major risk to our economy and society.

However, there are still critical questions to address:

- What are the most important types of infrastructure to invest in and when is the correct time to? (prioritisation)
- How do we sustainably fund the investment?

Part of the reason questions and debates still continue over prioritisation and funding of infrastructure is the lack of location specific data to support the evidence base required to resolve these questions.

From a prioritisation perspective, this new data can identify critical areas of concentrated economic activity. This in turn can inform infrastructure policy, key productivity metrics, or investment to maintain the service standards required to support the efficient functioning of the location, or facilitate access to and between locations.

On the funding side, this granular level data also provides a valuable mechanism for developing, applying and monitoring value capture initiatives. For the first time, it is possible to identify the impacts of infrastructure on the economic activity of locations and hence, the wages, company performance and taxes collected in that location. This provides an evidence base to apply a value capture mechanism that references the success of the infrastructure in supporting the location.

# CBDs: Our steady growth engines

A location-based analysis reveals that CBDs, the dense, multi-industry urban economic clusters within our major capital cities, account for a disproportionate and growing share of Australia's total economic output. They are the economic engines of our economy.

But these major engines have been effectively 'idling' of late. Despite growing in terms of total output, they are not becoming more productive.

Since 2007/08 the productivity (economic output per worker) across all major Australian CBDs has stagnated or declined (Figure 4). This coincides with the Global Financial Crisis and the resulting changes to not only the external drivers of Australia's economic fortunes, but also the shifting investment patterns of business, government and households.

When we look at total economic output over the past 13 years instead of productivity, two different growth stories emerge.

The CBDs of Darwin, Perth, Canberra, Melbourne and Brisbane have all experienced compound annual growth exceeding 4.4 per cent per annum since 2000/01. These CBDs have been the economic centres of resource states or, in the cases of Melbourne and Canberra, undergone major redevelopments (eg Civic redevelopment in Canberra) or expansions (eg Southbank and Docklands in Melbourne).

The CBDs of Adelaide, Sydney and Hobart on the other hand have experienced modest growth of around 3.0 per cent per annum or under since 2000/01.

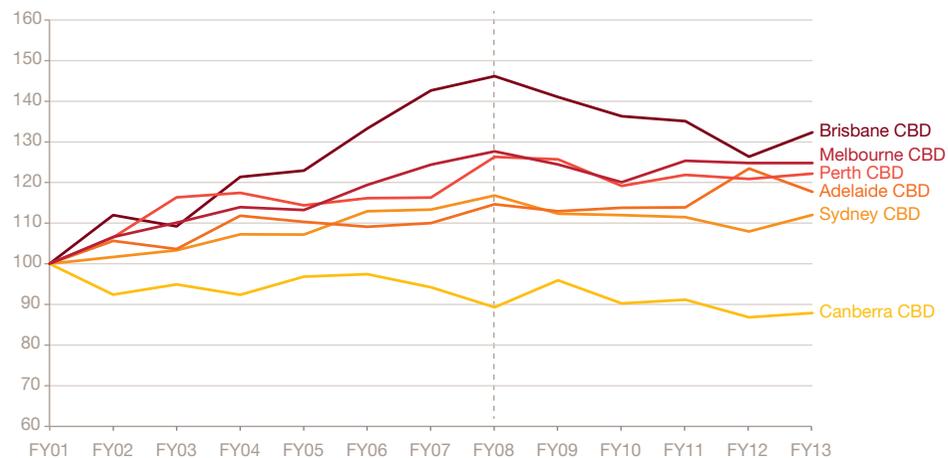
It is interesting to consider the different levels of investment in these locations that generated these varying growth rates and the role of planning frameworks which support each CBD. Are these more or less important than simply being a CBD in a resource state?

As we look to the future, the question turns to which locations are operating below their current potential and what are the barriers to reaching this potential? What Government policy and investments are required? How do we identify the areas with the most potential for growth? How can growth be realised in the most efficient manner?

Previously, these questions have been answered without a clear, consistent view of what the actual economic performance of each key location is or how this has changed over time. This evidence base is now available. Furthermore, it becomes possible to seamlessly overlay the other variables that contribute to a functioning CBD and city, like housing, population and employment density, affordability, accessibility, connectivity and vibrancy.

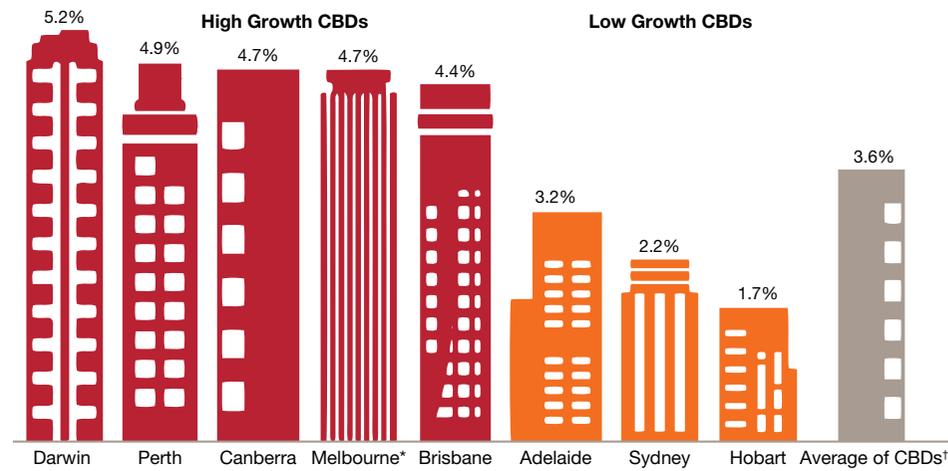
Answering these questions correctly is critical. The subsequent decisions have an immediate impact on constrained public sector budgets. The success of these decisions underpins the long-term economic prosperity and standards of living for residents of the city, state and country.

**Figure 4: Output per worker** (Gross output / worker, Index, 2000/01=100)



Note: \* Melbourne CBD includes the areas of Melbourne City, Southbank and Docklands

**Figure 5: Compound annual growth rate for CBDs 2000/01 - 2012/13**



†Averages hide the nuances critical to growing and remaining competitive in an evolving economy.

# PwC's CBD Growth Index

Given the importance of CBDs to our national economy, PwC has developed a robust and consistent index to rank and track the growth or decline in their economic output over time. It's called the CBD Growth Index and it will be released annually.

The inaugural CBD Growth Index for 2012/13 (Figure 6) shows that growth across all CBDs was below their long-term average. Perth CBD had the highest growth, driven by the resources industry, followed by Canberra and Brisbane CBDs.

In the Melbourne CBD, Docklands and Southbank grew strongly, with economic growth in central Melbourne stagnating.

In the Sydney CBD, there was a pick up in construction activity (Barangaroo commencement) and modest growth across a range of high value add service sectors.

Darwin CBD's decline is coming off the back of very strong recent growth in construction while in the Hobart CBD, the decline was across all sectors and coincides with the contraction in the broader Tasmanian economy that occurred during 2012/13.

Figure 6: Financial year 2012/13 growth

CBD	2012/13 growth	Long term growth*
Perth	4.6%	4.9%
Canberra	3.8%	4.7%
Brisbane	2.2%	4.4%
Melbourne	1.9%	4.7%
Adelaide	1.8%	3.2%
Sydney	1.1%	2.2%
Darwin	-3.4%	5.2%
Hobart	-3.8%	1.7%

\*Long term growth refers to 2000/01 - 2012/13 CAGR

## Sydney under the microscope: what is happening outside the CBD?

In the last 13 years:

- the economy of *North Sydney* hasn't grown
- the economy of *Macquarie Park* has doubled in size.

At these rates, our prediction is that the Macquarie Park economy is set to surpass North Sydney's economy in the next 4 to 5 years. This will make it NSW's 2nd largest economy and Australia's 9th largest economy.

But to what extent has the growth in Macquarie Park come at the expense of other locations – potentially North Sydney? And more importantly, if there is a transfer of economic growth between locations within a city, how do we ensure that there is a net positive impact?

The government need to understand which of these locations are operating at capacity and which areas have the greatest potential for further growth so as to inform the right policy and investment focus.

# GEM in action

## GEM for Retailers

The Retail industry in 2014 is complex, competitive and multichannel. Many retailers are now recognising that to be more customer centric they need to leverage their data assets and become more data driven in response to changing customer demands.

GEM has many uses in the Retail sector. The first question that can be answered by GEM is “how well is each bricks’n’mortar store performing?” Most retailers will look at their internal store data to report performance. We believe there are three additional layers of insight required to bring store performance to life. For example:

1. Where is my target market? Understanding who is your target market (eg demographic characteristics, attitudinal alignment, intention to purchase) and where the current and prospective customers are located will create a unique store catchment.
2. How intense is the competition? This requires pinpointing key competitors within and around your defined store catchment. This not only shows the intensity of competition, but can show the local market share of a store.
3. How big is the prize? To understand this, we look at the underlying local economic and demographic trends, as well as planned changes of the location. Fusing this context together with the understanding of the local customer and competition makes it possible to identify drivers of individual store performance.

## Using GEM to understanding the Manufacturing industry

High profile manufacturing plant closures currently dominate the media. In locations such as Geelong, this news reflects a rapid acceleration of an existing trend. The manufacturing industry in Geelong has been in decline for more than a decade, with the number of people employed in manufacturing trending downwards since 2000/01. The trend accelerated between 2005/06 and 2010/11, coinciding with the Global Financial Crisis and subsequent restructuring of the local manufacturing industry.

What are the local and national impacts of these plant closures? How can we navigate the transition of these economies in the quickest, most painless manner? What can we learn from other locations which have been through similar structural adjustments, such as Tonsley (SA) with the closure of the Mitsubishi plant and Newcastle (NSW) with the closure of the BHP Billiton steel mills? And what does the future hold for other manufacturers in Australia?

Most would be forgiven thinking that there will be no manufacturing industry in Australia within five years' time, based on recent press. While the announced closures are cause for concern, the industry is much more nuanced and dynamic than a simple analysis through a ‘manufacturing’ industry lens would suggest.

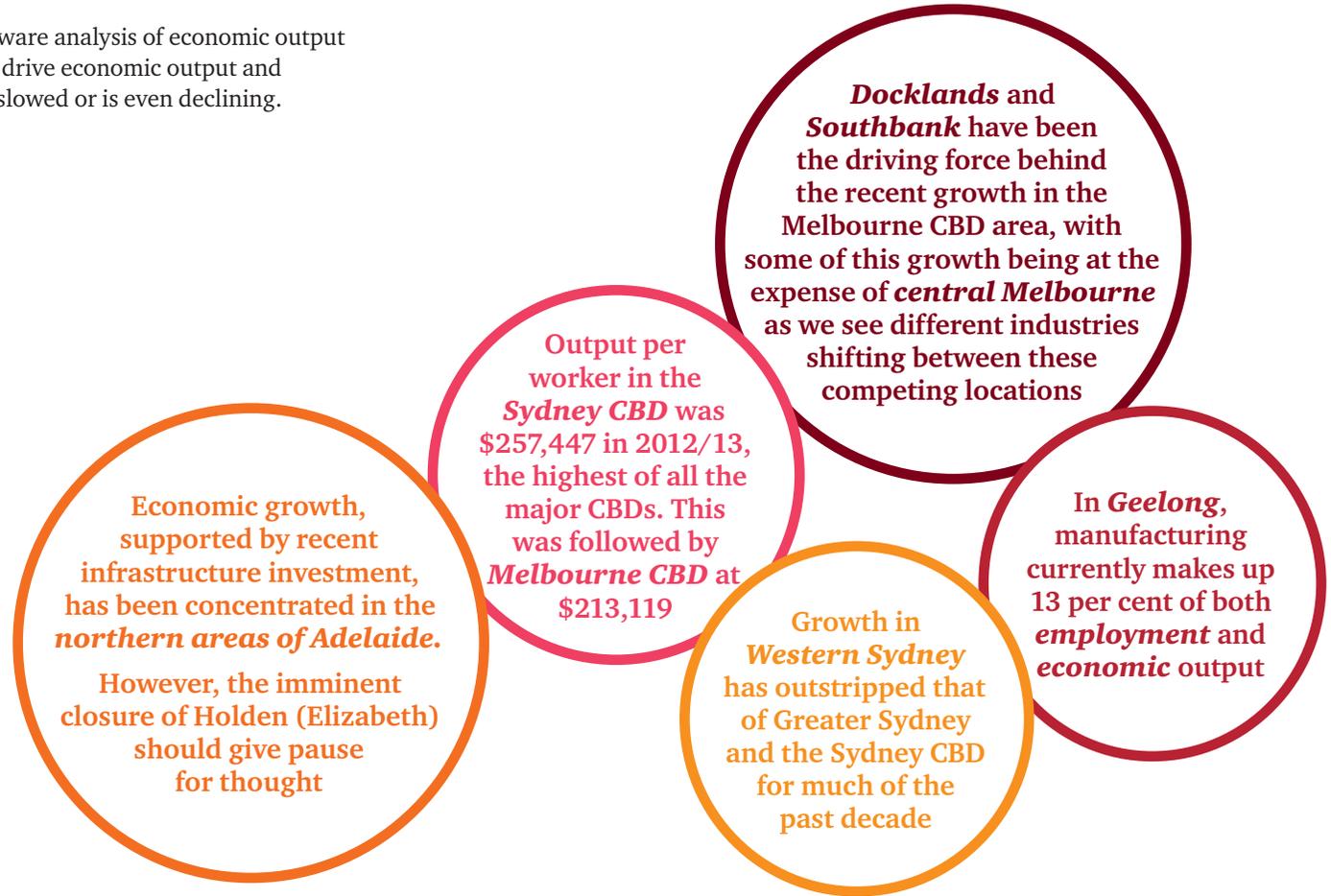
Through the GEM lens, we do see pockets that are struggling to remain competitive in a globalised marketplace.

Importantly, we also see through the GEM lens a contrasting cohort of growing, highly productive clusters of manufacturing scattered throughout the country. These clusters have an output per employee that rivals the highest value add service jobs found in the CBDs. These are the manufacturing businesses that are competitive and a driving force behind their local economies.

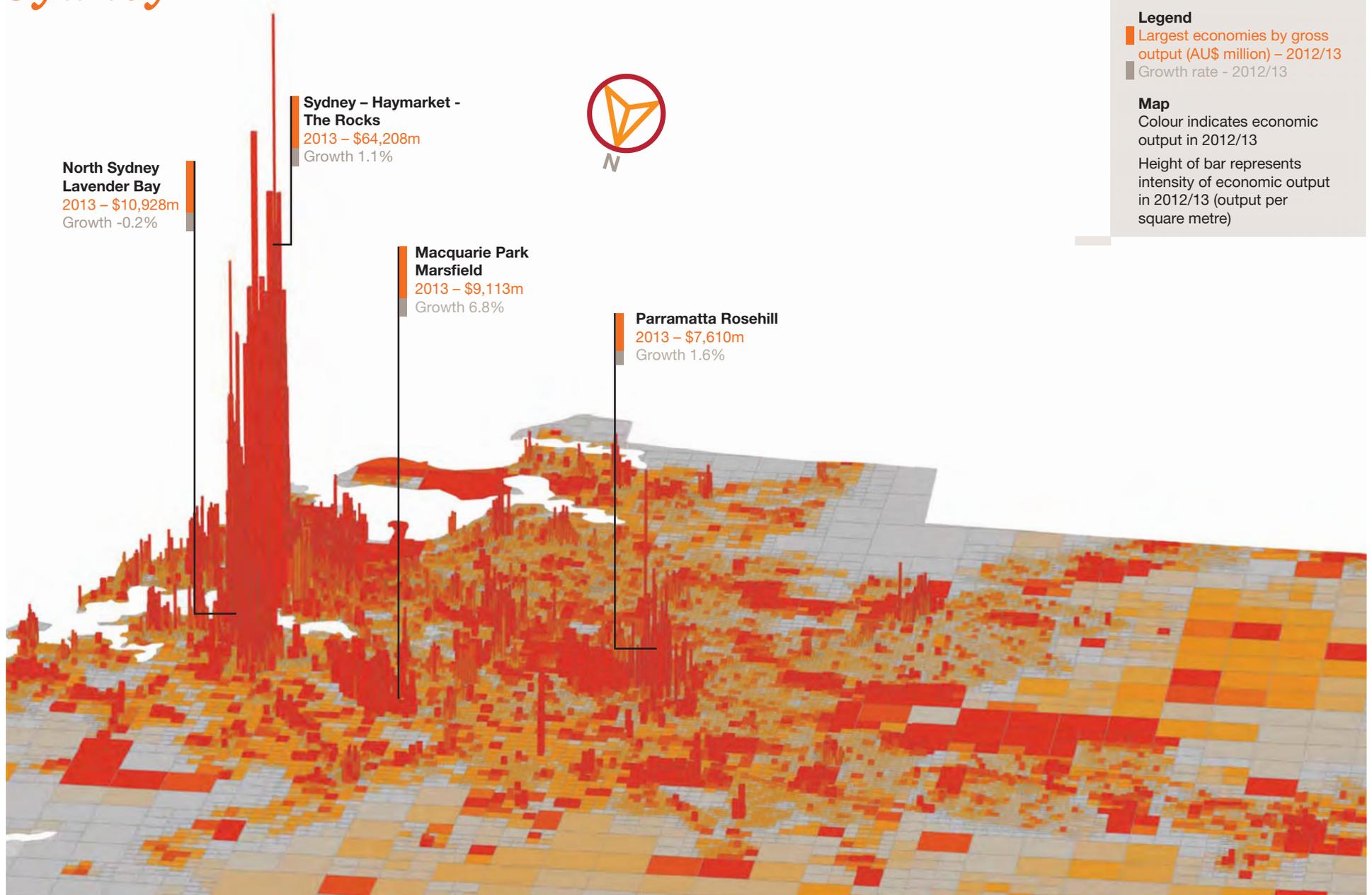
This high value manufacturing is not a direct substitute for the closures currently occurring, nor will it ever be. However, understanding an industry’s composition, location and potential at this level of granularity is paramount for an informed public debate, subsequent policy and investment decisions.

# Redefining how we view our cities

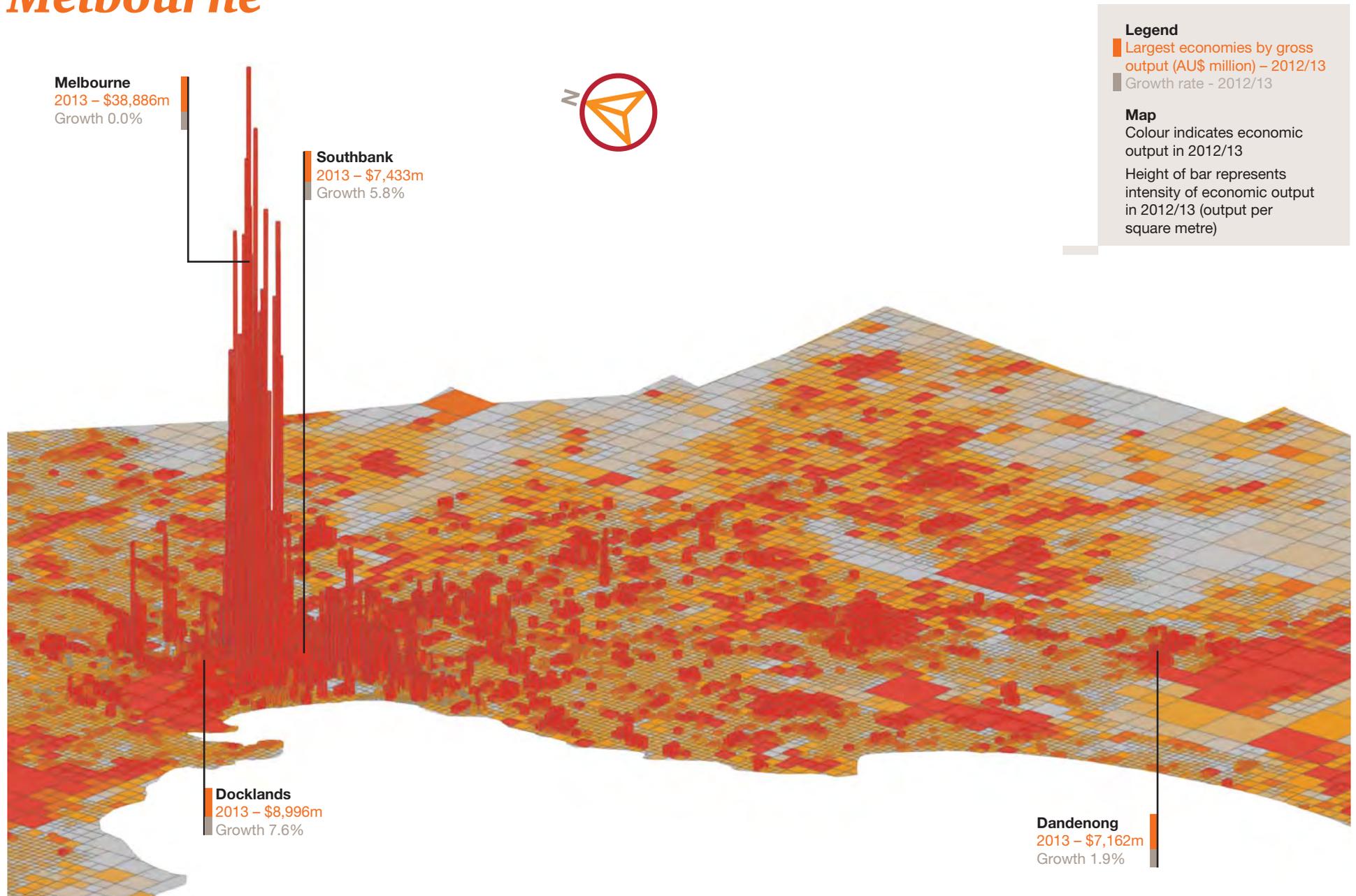
Growth within cities is highly varied. A spatially aware analysis of economic output reveals a patchwork of locations within cities that drive economic output and productivity growth and those where growth has slowed or is even declining.



# Sydney



# Melbourne



# Perth



**Perth City**  
2013 - \$28,461m  
Growth 4.6%

**Osborne Park Industrial**  
2013 - \$3,834m  
Growth 3.1%

**Subiaco Shenton Park**  
2013 - \$3,808m  
Growth 4.9%

**Nedlands - Dalkeith - Crawley**  
2013 - \$3,750m  
Growth 28.5%

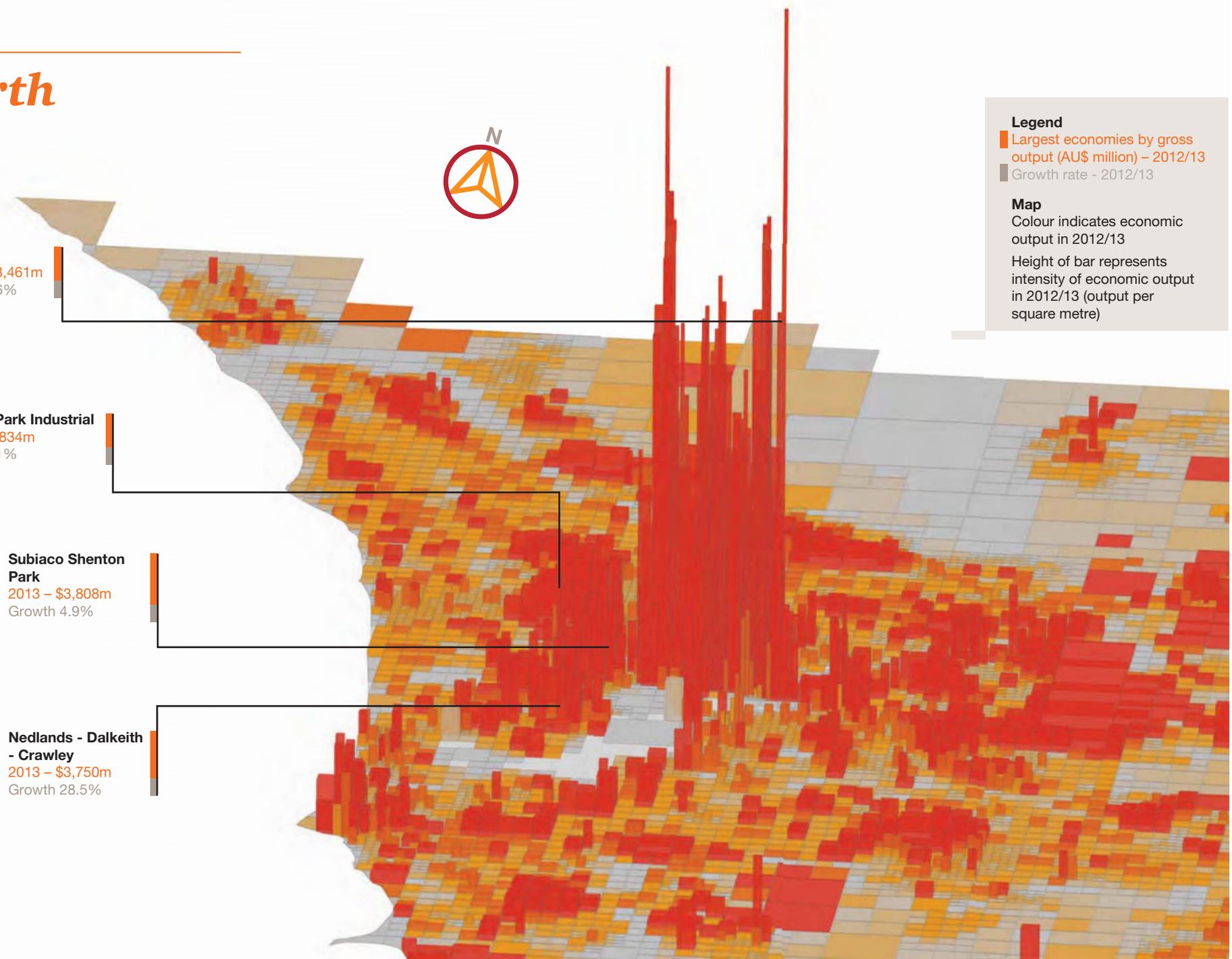
**Legend**

- Largest economies by gross output (AU\$ million) - 2012/13
- Growth rate - 2012/13

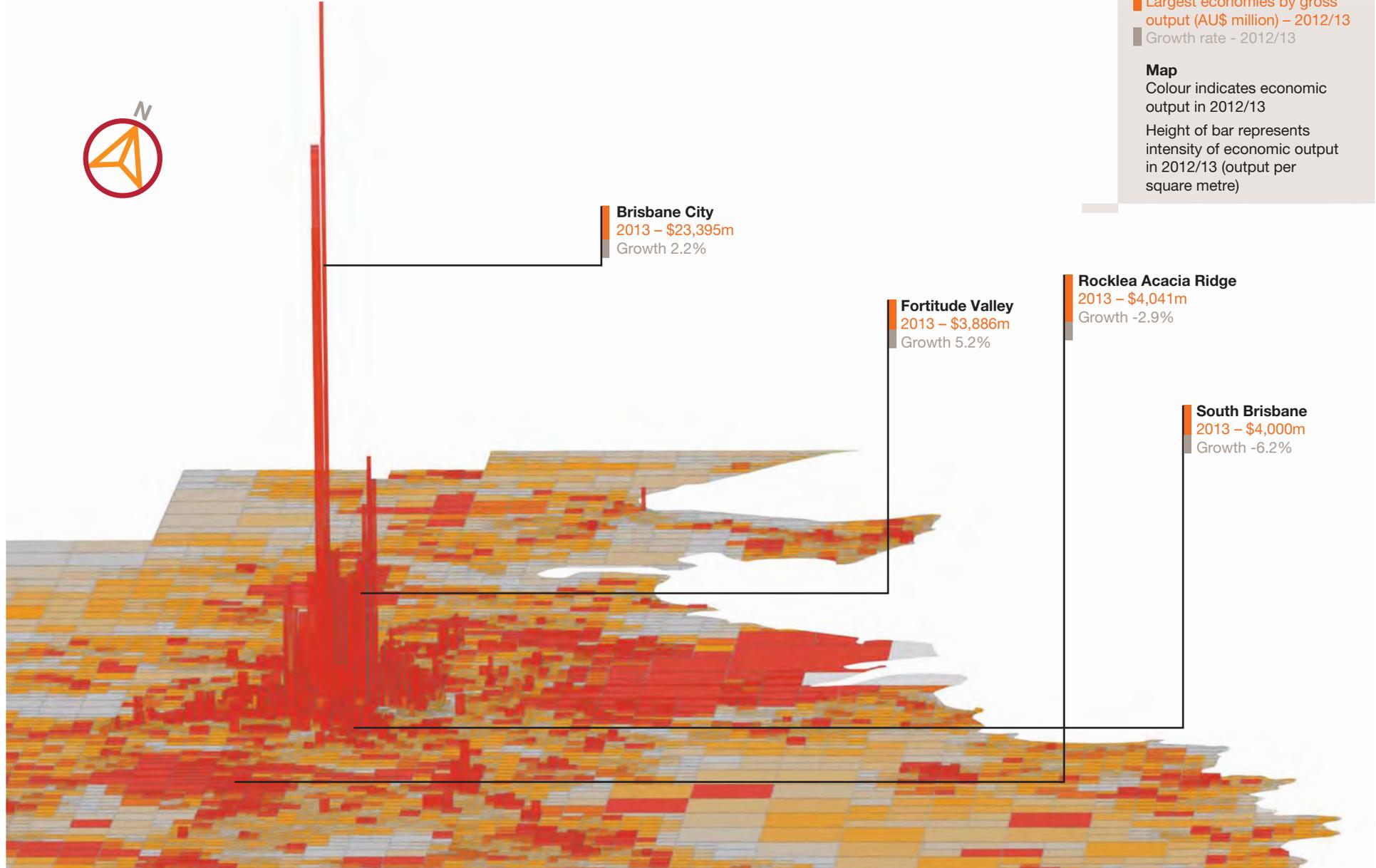
**Map**

Colour indicates economic output in 2012/13

Height of bar represents intensity of economic output in 2012/13 (output per square metre)



# Brisbane



**Legend**

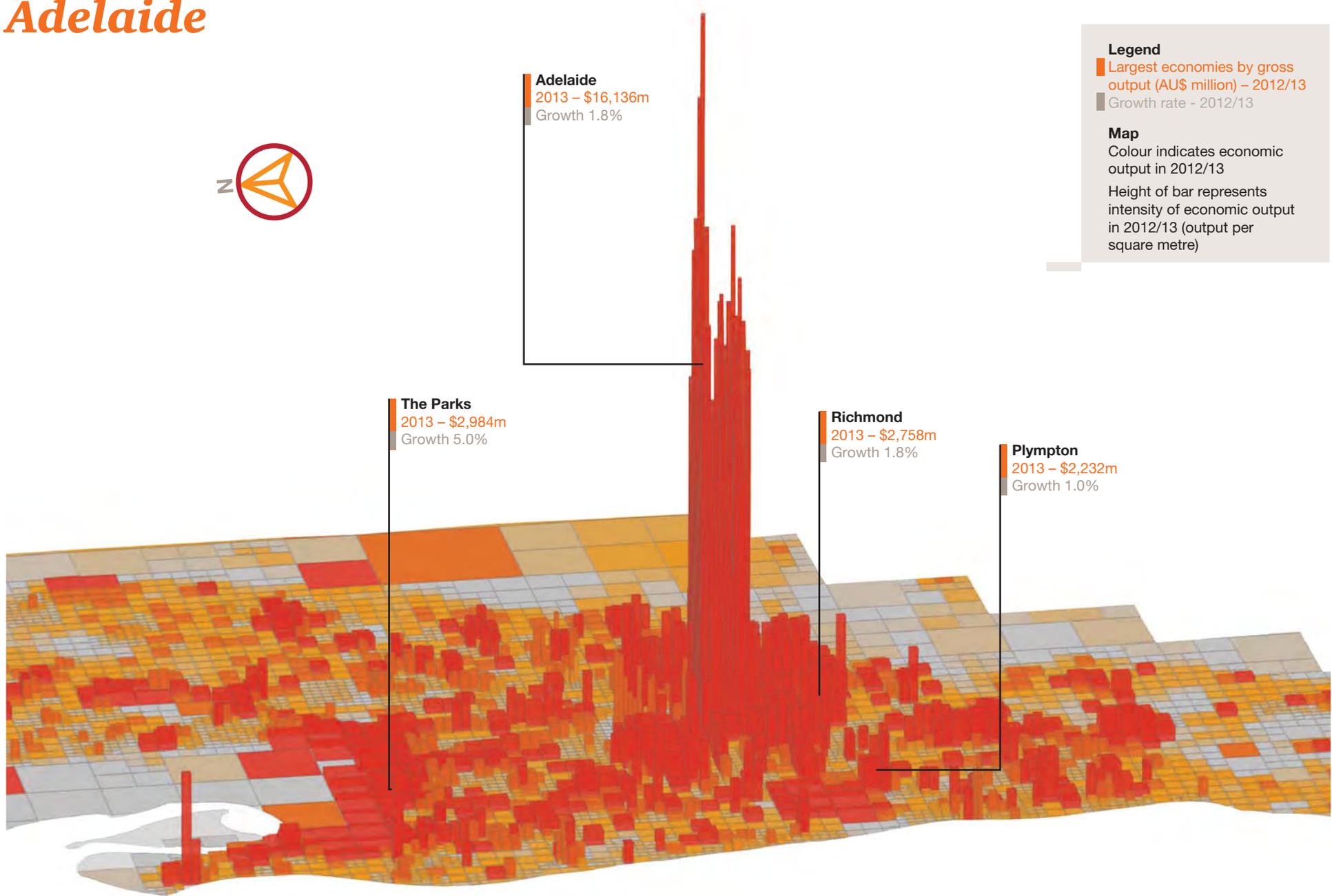
- Largest economies by gross output (AU\$ million) - 2012/13
- Growth rate - 2012/13

**Map**

Colour indicates economic output in 2012/13

Height of bar represents intensity of economic output in 2012/13 (output per square metre)

# Adelaide



**Legend**

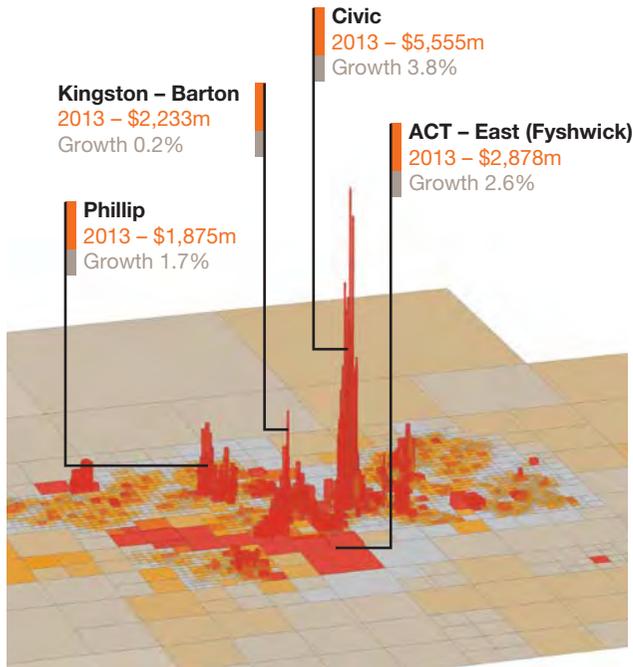
- Largest economies by gross output (AU\$ million) – 2012/13
- Growth rate - 2012/13

**Map**

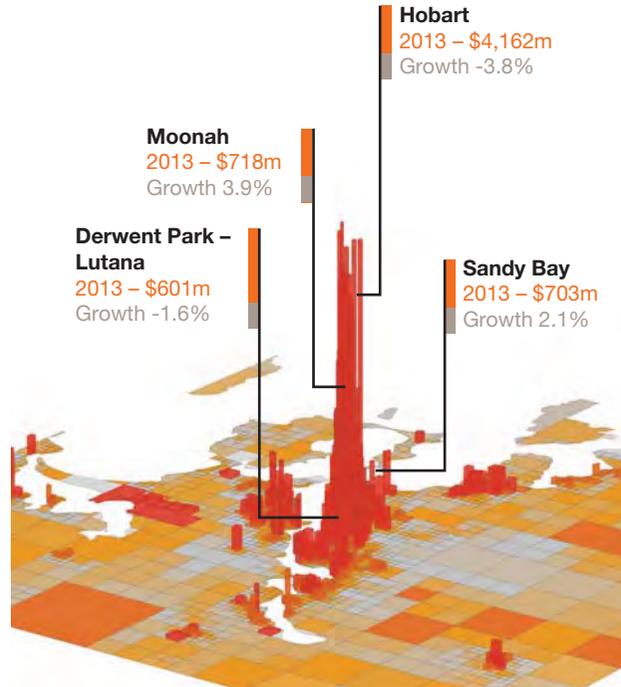
Colour indicates economic output in 2012/13

Height of bar represents intensity of economic output in 2012/13 (output per square metre)

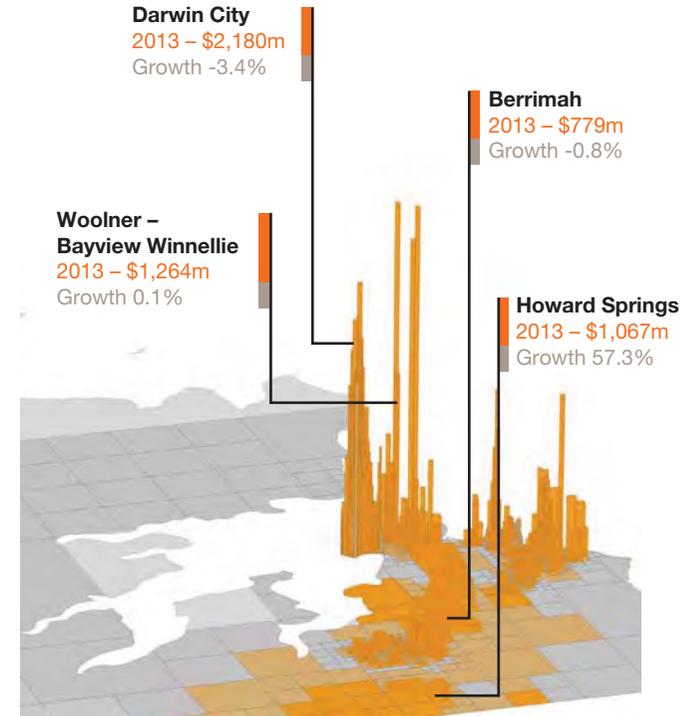
# Canberra



# Hobart



# Darwin



# Conclusion

The question of how we can grow our economy after the end of the resource investment boom is one of the most significant currently facing Australia.

What's becoming increasingly clear is that to help answer that question, we need a much better understanding of how our economy works 'on the ground'. In other words, we need to understand the importance and impact of locations.

New analytical techniques and access to data has enabled PwC to develop a model that will provide business and government with the most detailed and granular understanding of the economics of locations.

As we enter an era of constrained government and private sector budgets, the ability to identify and prioritise funding and investment to locations where it is most needed or beneficial will be critical to Australia's fortunes.

This new location-based model is nothing short of a step-change in the way policy and business leaders can understand and deliver growth. Finally, it also provides a new and exciting lens through which to re-examine some very topical questions:

- Where are property prices out-of-sync with the economic, demographic and infrastructure characteristics of a local area?
- What would the economic terrain of Western Sydney look like with a second airport at Badgerys Creek?
- What does a vision for Northern Australia look like on the ground?
- If this information had been available, how could the roll-out of the NBN be planned to maximise take-up rates and economic returns while identifying and balancing skills shortages?
- What is the 'locational' economic risk profiles associated with different weather patterns, natural disasters or changing climatic conditions?
- Where is Australia's infrastructure backlog most pronounced and what industries and locations are most affected?

# Meet the team



**John Studley**  
Business Analytics leader  
+61 3 8603 3770  
john.w.studley@au.pwc.com



**Jeremy Thorpe**  
Economics & Policy Partner  
+61 2 6271 3131  
jeremy.thorpe@au.pwc.com



**Stuart Shinfield**  
Business Analytics Partner  
+61 2 8266 1382  
stuart.shinfield@au.pwc.com



**Craig Fenton**  
Economics & Policy leader  
+61 7 3257 8851  
craig.fenton@au.pwc.com



**Mark Wynter**  
Spatial Analytics Director  
+61 8 8218 7113  
mark.wynter@au.pwc.com



**Rob Tyson**  
Economics & Policy Senior Manager  
+61 2 8266 5366  
rob.tyson@au.pwc.com

## Acknowledgements

**Rujia Wang**  
Economics & Policy Senior Consultant

**Carl Gabel**  
Business Analytics Senior Consultant

**Blake Bentley**  
Business Analytics Senior Consultant

**Chris Broeren**  
Business Analytics Senior Consultant

## Marketing and Media contacts

**Haley Robinson**  
Marketing Advisor  
+61 3 8603 4307  
haley.robinson@au.pwc.com

**Dannielle Hinwood**  
Media Advisor  
+61 2 8266 0636  
dannielle.hinwood@au.pwc.com



PwC Australia was recognised by its clients in three categories at the annual 2014 BRW Client Choice Awards.

PwC was recognised as:

- Market Leader
- Best Accounting Firm (\$500m+)
- Best South Australian Firm

Now in the eleventh year, the BRW Client Choice Awards are the most prestigious and comprehensive for the professional services sector recognising outstanding performance. These awards recognise the cream of the crop of professional service firms when it comes to client service excellence.

The awards are unique in that they are judged on the basis of feedback provided directly and independently by clients who have used the firm in the last 12 months. Research for the awards is based on Beaton Research + Consulting's Annual Business and Professions Study (ABPS) which received 41,500 responses this year. It is the largest study of clients of professional services in the world.

---

[www.pwc.com.au](http://www.pwc.com.au)

© 2014 PricewaterhouseCoopers. All rights reserved. PwC refers to the Australian member firm, and may sometimes refer to the PwC network. Each member firm is a separate legal entity. Please see [www.pwc.com/structure](http://www.pwc.com/structure) for further details. Liability limited by a scheme approved under Professional Standards Legislation

WL 127012763