



ENGINEERS
AUSTRALIA

Regional development and a global Sydney

Engineers Australia Submission

5 June 2017

About Engineers Australia

The Institution of Engineers Australia (Engineers Australia) is the not-for-profit professional association for engineers. Established in 1919, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia is the trusted voice of the profession. We are the global home for engineering professionals renowned as leaders in shaping a sustainable world.

Introduction.

Sydney has established itself on the world stage as a global and modern city with an economy and lifestyle that relies on international market drivers in services, technology and finance.

Sydney's continued presence as a driver of the national economy cannot be underestimated, producing over 30 per cent of the national Gross Domestic Product (GDP)¹. This sizeable contribution to the economy should provide opportunities to drive development and investment into the regions of NSW. Feeding, powering, transporting and servicing Australia's largest city will provide opportunities for regional centres in NSW to develop and grow.

Sydney's expanding population will provide regional centres with opportunities to increase their populations as affordability factors push people out of the city. For regional centres, especially those that are close to Sydney, their growth will provide opportunities for new and updated transport networks including opportunities for new freight services, and developments in energy generation, transportation and supply.

Sydney will transform from a coastal-centric centre to a larger metropolis as Parramatta grows into a true de-centralised hub with the building of the Western Sydney Airport and the aligned infill around this centre.

The Western Sydney Airport will become the new focus of businesses that are associated with a major transport and freight hub including logistics, freight and aeronautics. Jobs will be created in this region and new housing will spring up along the fringe of the city. This will in turn change some of the regional centres around this new hub.

With the development of the Inland Rail on the other side of the Great Dividing Range, regional NSW stands to reap the benefits of this nation building infrastructure bringing jobs into the regions and growing population centres. It will also provide opportunities for NSW to move goods from the Inland Rail to ports along the coast and to the Western Sydney Airport.

The challenge for policy makers and government is how best to connect Sydney with regional centres and how to ensure that these connections form the basis of long term sustainability and growth. Better coordination of NSW's resources can transform regional towns to regional cities and therefore build a more diverse and resilient state.

Infrastructure as an enabler for regional growth.

Engineers Australia is strongly committed to the view that infrastructure is the essential enabler of productivity growth, vital to preserve and improve NSW's standard of living. This connection depends on infrastructure being fit for purpose, the flow of infrastructure services moving ahead of population growth and economic growth and utilising the best available technology to manage existing infrastructure assets and to develop new ones.

¹ SGS Economics and Planning, *Australian Cities Accounts 2015-2016*

While improvements have been made in improving infrastructure, Engineers Australia remains concerned that the connections in infrastructure in and around Sydney are not keeping up to date with future growth.

Major infrastructure developments ticketed by the federal government will require the state government to look at how state based and funded infrastructure will connect into these projects.

Ensuring passenger and freight rail is up to standard and that the highway system between towns and cities is free of bottlenecks will provide better services and delivery networks that will engender growth.

New freight lines to increase the speed of delivery of goods from ports around Sydney will be an important measure. As Sydney spreads out, better utilisation of ports like Newcastle and Port Kembla will ease congestion from the port at Botany.

Moving freight from the Inland Rail into and out of both regional centres and Sydney should be a key component of the type of infrastructure that will generate growth and provide development opportunities along the way

Freight movement is not restricted to rail with road freight forming the bedrock of freight movement into and out of centres. With increased rail freight efficiency will come the need to improve road freight from the production centre to the intermodal hub.

Changes in the way road freight will operate in the future will require long term planning across governmental lines. For example, autonomous transport systems will provide new forms of infrastructure concepts and ideas.

For Sydney to compete on a global scale into the future will require thinking on how goods and services are delivered to the city's international clients. With the Western Sydney Airport planned on a 24-hour operational model, in line with other major city airports, the opportunity to provide air freight globally will be available. However, this requires state policies that can bring goods to the hub in line with that operational model.

The transportation of people into and out of the Western Sydney Airport requires long term policy thinking. The integration of rail into the Western Sydney Airport should be a priority for planning.

In 2016, Engineers Australia noted the need for rail connections for the Western Sydney Airport². For regional centres, enabling rail delivery to the airport will provide efficiency in moving people into and out of the state.

These are long term structural plans that would, over time, provide long term employment opportunities.

Infrastructure planning and the institutional frameworks in which it occurs are especially important. Planning is too often short term, reactive and piecemeal. For too long political involvement with technical aspects of infrastructure planning has led to sub-optimal outcomes and higher than necessary costs.

² Engineers Australia, *Western Sydney Rail Needs Scoping Study Response*

To avoid this legacy issue governments, both state and local, should prepare and publish long term plans. These plans should inter-relate rather than work in isolation and determine how planning will interconnect each region, town and city to each other.

Engineers Australia has long argued that infrastructure investment, planning and project selection should be de-politicised in favour of politically neutral approaches favouring the overall community.

The successful delivery of new, fit-for-purpose infrastructure has the potential to support a more productive economy as well as a more equitable community.

Energy as a growth sector.

Access to reliable, affordable, quality electricity supply is crucial to the state's continued industrial and commercial prosperity, and to the standard of living currently enjoyed in NSW.

While NSW has historically used a variety of energy sources mainly in coal and gas, NSW will need to reconsider its energy supply mix as fossil fuel power stations reach the end of their economic life cycle. To overcome an impending and large loss of generation from the grid NSW will need to further diversify its energy supply.

NSW currently generates over 76.6 per cent of its energy from coal and gas³, with four major black coal stations generating the majority of this power. However, these four power stations are all due to be decommissioned over the coming 15 to 20 years, leaving a large gap in the energy supply.

NSW will need to examine the opportunities to build and commission power supplies that will fill the void in the supply.

As Sydney's population grows over the coming decades its dependence on energy will grow with it, placing greater strain on the grid. A secure energy future will be reliant on a diversity of energy options, connectivity, and the development of smart grids to help strengthen resilience.

Establishing energy policies that will limit that strain will be a significant challenge for decision makers. It will also be an opportunity to develop new jobs and economic growth through the energy sector.

For centres such as the Hunter Valley, where the majority of the current coal fired generators exist, labour transition plans need to be explored so as to soften the effects of changes in the employment mix. Providing training and education packages to re-skill the workforce to deliver new energy plants will ensure long term employment stability. Similarly, opportunities to develop NSW's energy mix in different parts of the state can enhance development and investment opportunities.

Workforce pipeline.

NSW needs a strong pipeline of engineers to take advantage of new infrastructure development and new economy opportunities.

³ AEMO 2016, *Statement of opportunities*

Practically every good and service consumed or used in productions embodies engineering. NSW's engineering capability is indispensable for achieving the ambition of becoming an innovative, globally competitive and connected state.

Building engineering capability is about much more than the number of people with engineering qualifications. It is about entry level engineering education, acquiring the skills and competence for engineering practice, retaining experienced and competent engineers in the engineering profession and the development of diversity in the profession through increasing the number of women recruited to the profession.

The capability to produce engineers begins at school. For NSW to develop more of its own engineers there needs to be a sufficient flow of high school students who are interested in engineering and who have studied the subjects that engineering relies on. Similarly, if engineering is to increase the number of women in the profession we need a sufficient flow of young women with these attributes.

Engineering courses are long in duration and subjects studied rely on students acquiring firm foundations in mathematics and science in later years of high school. Mathematics, physics, chemistry and other sciences are the tools that engineers use to solve real world problems and to convert good ideas into productive and valuable products suitable for domestic and international markets.

However, Engineers Australia is concerned about the development of NSW's engineering capability and current high school trends in Science, Technology, Engineering and Maths (STEM) subjects. Falling rates of participation in the core subjects of mathematics and physics demonstrate a trend that leads to decreasing numbers of students undertaking engineering courses in NSW universities.

If regional NSW is to benefit from the development of Sydney as a true global city it will need to rely on the construction of infrastructure projects, which will in turn rely on long term strategies that are only effectively done through engineering.

NSW is falling behind the rest of the nation in its retention of Year 12 students. NSW ranks third lowest in Australia for Year 12 retention, ahead of Tasmania and the Northern Territory.

The ACT, sitting above the national average in 2015 increased its retention rates in 2016 to 92.2 per cent for young men and 98.1 per cent for young women⁴. NSW on the other hand only reached a retention rate of approximately 80 per cent across the board.

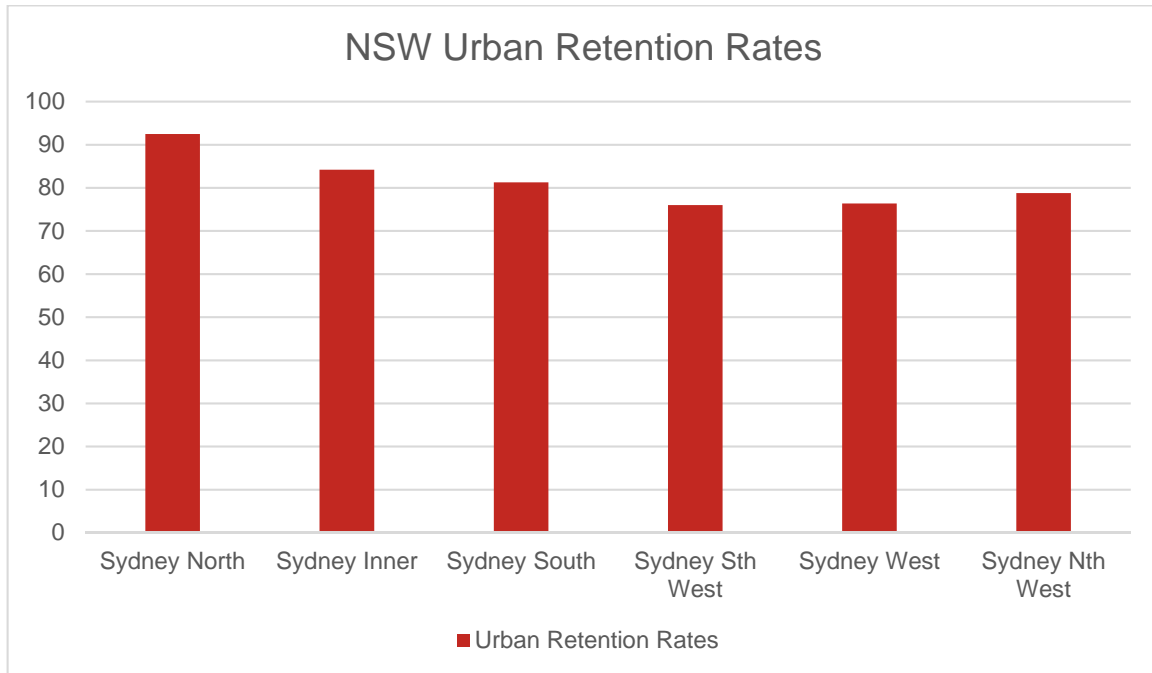
Issues are worse in regional NSW. While urban retention rates in NSW for 2016 ran from between 76.4 per cent to 92.5 per cent, regional retention rates only reached a height of 63.9 per cent in the Central Coast and Newcastle but fell as low as 56.2 per cent in the north west of the state.⁵

Retention rates are important if NSW wishes to reach its full potential of becoming a globally relevant state with each of its major centres connected to each other. Without more technically and scientifically literate people in the labour force, this ambition will not be realised.

⁴ Engineers Australia, *Engineers Make Things Happen 2017*

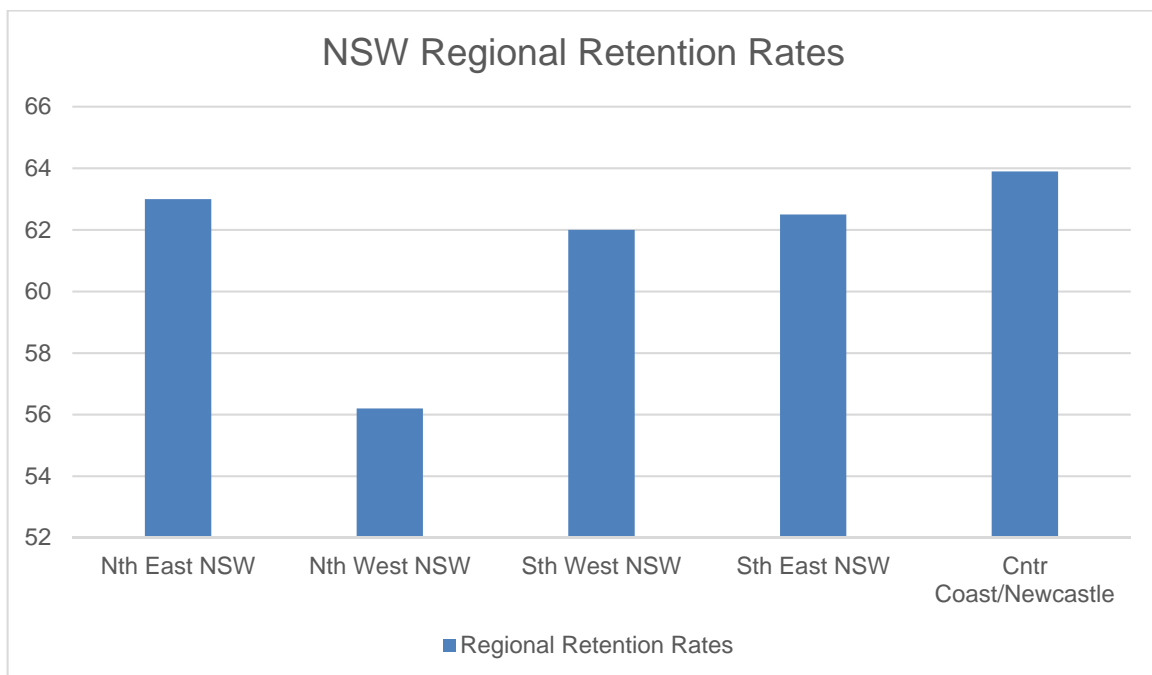
⁵ NSW Department of Education, Centre for Education Statistics and Evaluation, *NSW public school student retention rates by statistical areas*.

For Engineers Australia, the study of year 12 STEM subjects is the means to build a future engineering profession. Unless there is a competent engineering profession in the decades ahead then the ambition to benefit from a productive, technologically advanced, economy will not happen.



Source: NSW Department of Education. NSW public school retention rates 2010-2016 Years 10-12

For regional and rural NSW there will be a need to increase retention rates to match urban retention rates so that there is a consistent cohort of students who have more choices and who, as a better educated workforce, can provide the productivity potential to the economy.



Source: NSW Department of Education. NSW public school retention rates 2010-2016 Years 10-12

As trends within regions continue to move further into the service sector and away from manufacturing and mining, the transition into a workforce literate in STEM will be significant in developing local workforces that can take advantage of new jobs and therefore broaden the productivity of NSW to beyond Sydney's boundaries.

Conclusion.

NSW and its regions are at the beginning of a long term period of economic growth and prosperity.

Interestingly, while this inquiry is focussed on how regions will benefit from Sydney as a global city, much of the new phase of potential development is in regional centres that can operate separately from Sydney.

New or improved freight options into ports in the Illawarra and Newcastle can open up those regions to investment and development apart from Sydney.

In the central parts of the state the towns along the Inland Rail will benefit from this nation building infrastructure to develop their towns and regions, independently from Sydney. Towns like Parkes could see opportunities to attract business investment associated with the development of rail link.

Towns south of Sydney around the Southern Highlands and beyond will have an opportunity to develop and grow through factors such as affordability of housing and lifestyle choices as infill around greater western Sydney accelerates. These regions will have an opportunity to attract business and investment due to proximity of workers and location.

Cities are the economic generators of states because they are the focus of financial, technology and service industries. Cities are more and more becoming the trading centres of states and countries competing against and trading with each other, and while Sydney's contribution to the state's growth is large it cannot be seen in isolation.

Regional centres can benefit from the focus on Sydney as a global city, if those regional centres can develop themselves as independent players themselves. Cities such as Newcastle and Wollongong can compete and trade individually with cities both domestically and internationally, however to do that these centres need to be connected with themselves and with Sydney.

Infrastructure is the key enabler of any forward thinking strategy and the provision of that infrastructure must be done as part of long term plans that have a focus on community needs rather than political expediency.

Infrastructure also cannot be seen singularly as road, rail and ports, but economic infrastructure in its broadest sense and including energy and educational infrastructure.

Educational infrastructure, includes physical schools but also developing a long term focus on STEM related education that provides communities with a population that can take advantage of new economy jobs. A key component of this long term vision is ensuring that more students remain to a year 12 level and that more students study STEM subjects.

To ensure infrastructure development is fit for purpose and fit for the future relies on strong engineering know how, and to generate an engineering capability within the state that will foster employment and develop communities.

As our cities move to become more globally competitive, generating engineering capacity will help to foster innovation and, from that, more jobs and better investment capacity.

Finally, ensuring that the planning fundamentals are in place for transporting goods and people, ensuring long term energy supply and providing education must remain front of mind for policy makers. Without them, NSW cannot leverage off the opportunities that will come through Sydney's global city status.

Should the committee have any questions on this submission, please contact Mr Greg Ewing, General Manager Sydney Division on (02) 9410 5629 or by email at gewing@engineersaustralia.org.au.



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