

# A new approach to long-term infrastructure planning and decision making

Australia must plan infrastructure based on how we envision the future, not on how we understand the present.

## Sustainability now and in the future

Infrastructure decisions must meet the needs and aspirations of the population, align with changing technology and ensure sustainability both now and into the future. The process of infrastructure planning is complex and requires systemic thinking. People's needs and preferences are shifting rapidly, especially in mobility. Cities are a 20th century invention and they need to be reimagined to fit the 21st century. The incremental approach that historically served Australia well is no longer sufficient.

The Infrastructure Australia Act 2008 defines nationally significant infrastructure as transport, energy, communications, or water infrastructure in which investment or further investment will materially improve national productivity. Australia needs more effective infrastructure decisions and delivery of infrastructure projects at a lower cost. New thinking about how to manage, organise and deliver infrastructure is required, in order to improve performance, drive innovation, promote collaboration, capture lessons and deliver more successful outcomes than are currently being achieved.

Infrastructure should be designed to promote social cohesion across demographics, deliver equitable access to infrastructure and promote systemic ecological improvements. Long-term planning requires ongoing bipartisan support, and must be integrated with extensive land-use planning. It should be the role of federal, state and territory governments to seek common ground that is of benefit to the community. Trust, continuity and consistency are the key drivers for projects that require long-term planning and implementation strategies.

*"...we need to be more strategic about preparing for changes in infrastructure demand, and invest in the projects that deliver the best outcomes for the community."*

- Mr Philip Davies, CEO Infrastructure Australia - August 2016

## The vision

Developing a systemic vision for infrastructure planning will enable better transitional delivery plans and workforce management, particularly in engineering. Increasing economic, social and environmental benefits, such as jobs growth and creation, reduced demand through efficiency, equitable access to public assets and reduced greenhouse gas emissions, will accrue as a result of the strengthening focus on sustainable infrastructure. Cooperation with communities and collaboration across sectors through empowered learning systems will result in speedier delivery of more successful high-quality infrastructure because infrastructure decisions are made with the support and understanding of the public.

## The challenge

Australia is experiencing a rapid shift in infrastructure needs, expectations, and uses, while uncertainty is increasing in scale and nature. These evolutions and revolutions challenge historical deterministic approaches to predicting future demand.

Drivers as disparate as climate change and international security place significant new and varying pressures on infrastructure. Other challenges, such as an unpredictable economic climate and changing environmental conditions, generate a growing level of uncertainty on what is required of infrastructure for the future. As extreme weather becomes more prominent owing to climate change, definitions of resilience need to expand beyond conventional notions and triggers of engineering failure.

Furthermore, Australia's population is both ageing and rising. The Australian Bureau of Statistics reports that Australia's population is expected to increase from 24.3 in 2016 to between 36.8 and 48.3 million by 2061, with the majority of growth occurring in Melbourne and Sydney. The median age is also expected to rise from 37 years in 2012 to between 41 and 45 years by 2061.

1. Professional degrees refer to those that qualify individuals to commence employment in specific occupations. For professional engineering, for example, this is either a 4 or 5 year BEng(Hons) or MEng degree.

*“The fundamental point is how do you provide the infrastructure for your existing and growing population?” State governments are going to have to respond to that. You can’t have a growing population without the capacity to provide the physical and social infrastructure.”*

– Dr Catherine Livingstone AO FTSE, Business Council of Australia – April 2015

As consumers become more knowledgeable, connected, and empowered, their expectations for services, experiences and social interaction expand and broaden, as does their notion of what constitutes value. The ramifications for infrastructure are significant, as the healthcare and transport sectors can currently attest. There are also significant ramifications for infrastructure assessment processes, going beyond legislated conventional cost-benefit methodologies.

As always, the interaction of technological and cultural change will have a major impact on the supply and demand of infrastructure, especially where disruptive technologies are emerging. A case in point is the rapidly advancing integration of digital and physical infrastructure, through for example the ‘Internet of Things’, sensors, and driverless vehicles. This technology shift will impact a wide range of sectors (e.g. Figure 1). On the other hand, per capita car ownership and use is in decline in developed cities globally and walkability in cities is becoming increasingly more important. Therefore, infrastructure projects must include adaptive plans in response to emerging technological and cultural shifts.

While Australia’s infrastructure struggles to keep up with society’s continual transformation, there is also the challenge of ensuring that it is working alongside the natural environment. For example, Australia’s energy infrastructure must transition towards lowering the carbon intensity of the nation’s electricity production. The nation’s infrastructure must be designed to embrace and protect its biodiversity and habitats and withstand future potential effects of climate change.

Figure 1: Sectors potentially impacted by the introduction of driverless vehicles on Australian roads.



Sources and availability of financing are shifting and diversifying. Private sector service provision is expanding and infrastructure assets and service provision models are increasingly diverse and decentralised. The role of governments is to put in place mechanisms that ensure needs are met cost-effectively, and substantive public good outcomes are delivered, regardless of who constructs, owns and operates the assets.

Together, these changes demonstrate the increasing and shifting infrastructure needs and demands for high quality services across Australia, especially in cities. If governments do not act, Australia will see growing issues of transport chaos, community disruption, loss of social cohesiveness, breakdown of public services, reduced health and safety, and loss of biodiversity.

*“What is needed is clearer articulation of the social, economic and environmental goals we are trying to achieve with our land use/ transport system, and the outcomes which the candidate investment options offer in terms of meeting human and commercial needs and wants – a perspective which is surely broader than that which can be accommodated within a conventional project appraisal framework. Only then, I suggest, can we really make intelligent decisions about transport investments and system productivity improvements.”*

– Dr Ken Ogden, Pitcher Partners – 10 March 2016

## The way forward

The Academy calls for the following priority actions for government, industry and other peak bodies:

1. New Engagement Model: commitment to community, industry and government partnership during the development phase of all infrastructure projects
  - » Earlier richer community engagement and deliberation on processes for infrastructure development and delivery will result in greater community acceptance of and hence faster and more successful completions of infrastructure projects.
2. Identify how Australia can improve efficiency and reduce cost in delivering infrastructure projects
  - » Undertaking a benchmarking study would help to identify where the cost and efficiency gaps are in Australia compared with best practice in USA, Europe and China.
3. Integrate infrastructure planning and delivery with extensive land use planning
  - » The nature of infrastructure and the timing of its delivery fundamentally impact the efficacy of choices available to citizens and businesses in terms of their investments and behaviours. Great infrastructure directs those choices towards socially, economically, and ecologically preferable outcomes.

4. Invest in infrastructure that is future-proof from a technology perspective and has clear social, economic and environmental goals
  - » Setting best practice benchmarks for infrastructure planning will ensure that Australia's infrastructure meets future societal need, and maximises economic productivity, equitable access, social cohesion, and systemic ecological improvements. Industry involvement through public-private partnerships needs to be encouraged for both technological innovation and capital investment.
5. Develop flexible and sustainable infrastructure projects that anticipate future needs
  - » Infrastructure decisions must be made objectively and reflexively, to address the long-term changing needs of its users, rather than to simply cover any short-term political agendas and to solve immediate problems. Solid and sensible planning is needed to ensure that there are provisions for future upgrades in the long- term.