APPLIED

Australian Academy of
Technology & Engineering

POSITION STATEMENT
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Infrastructure to meet Australia's future needs

To meet future environmental, economic and social needs, investment in Australian infrastructure must be based on world-class technology, evaluation and analysis.

Infrastructure to meet Australia's future economic, environmental and social needs

Worldwide, countries are confronted with concerns about the planning, design, delivery, financing, operation and maintenance of public infrastructure. Growing populations are placing increased demands on physical infrastructure, information communications technologies, urban environments and other infrastructure needs that are required to maintain high living standards.

Infrastructure is crucial for Australia. It underpins productivity growth, supports a growing population, sustains industry growth, boosts competitiveness, enhances societal wellbeing and connects rural and urban environments. Improving investment in and the delivery of infrastructure makes the economy more attractive to foreign investors. But achieving sound infrastructure requires high quality planning, design, financing, delivery and management .

The challenge: enhance prosperity in a changing environment

Australia faces a number of challenges providing effective and adequate infrastructure. The nation must come to grips with an existing backlog of infrastructure investment, and address the potential decay of existing infrastructure. Population growth and the impacts of climate change will further exacerbate these inadequacies, and the ability to mitigate, respond to and recover from natural disasters will be an ongoing fundamental requirement.

In addition, declining investment in mining infrastructure will change the mix of investment in public infrastructure, requiring a strategic plan to ensure sound infrastructure provision, job creation and economic growth into the future.

Effective infrastructure planning across all areas is critical and overcoming the challenges on the path towards best-practice infrastructure planning (Box 1) can ensure Australia gets the best return on public investment. Essential to planning is a clear articulation of the desired outcomes of investments, and openness to identify the most sustainable and resilient set of means to meet current and future societal needs, including supply and demand measures. These considerations should be a priority during the earliest stages of decision-structuring and decision-making processes.

The vision

» Australian infrastructure investments are based on world-class technology, evaluation and analysis to provide the best possible economic, social and environmental outcomes for all users and for future generations.

» Infrastructure planning processes are improved to provide outcomes that are more effective and efficient and that are delivered with greater certainty and transparency.

Maintaining high quality of life for Australians

Our national aspirations should include infrastructure that is designed to promote social cohesion across demographics and makes best use of land. Further investment in nationally significant infrastructure will improve national productivity, including:

» Transport infrastructure;

» Water/wastewater infrastructure;

» Energy infrastructure;

» Information communications technologies; and

» Health and social infrastructure

Responding to challenges across infrastructure priority areas can be through the integration, consideration and investigation of the issues in Box 1 below:

BOX 1: OVERCOMING CHALLENGES ON THE PATH TOWARDS BEST-PRACTICE FOR AUSTRALIA'S INFRASTRUCTURE ASPIRATIONS

Objectives and intentions: What are the project-specific and societal objectives of current and planned infrastructure investments? What discernible and/or logical pattern do these objectives fit? How are goals for sustainability and resilience to future shifts and shocks embedded in objectives?

Needs and means: How were the societal service needs determined? How sustainable and resilient is the chosen set of means to meet the societal need both now and in the long term?

Performance: How have recent infrastructure projects performed relative to their objectives? What other benefits or detriments have emerged? How cost-effective have they proved to be in practice?

Evaluation: How have recent infrastructure projects contributed to economic, social, and environmental sustainability outcomes at local and societal levels? How well have the costs and benefits been distributed? How resilient have infrastructure investments proved to be in the face of significant shifts?

Benchmarking: How well does the design, financing, construction and operation of Australian infrastructure compare with world's best practice? How well priced, managed, and maintained is our public infrastructure?

The way forward

The Academy has identified four key action areas and recommendations that must be addressed to meet Australia's societal needs and demands into the future:

Recommendation 1: Commit to robust long-term infrastructure planning

Societal shifts should be considered upfront when designing Australia's future public infrastructure and re-purposing current investments. Looking at what is actually required with a broader-than-historical understanding and set of means to meet those needs is essential.

There is a need to develop a clearer understanding of the Australian context in the period from 2030 to 2045. This will identify major national infrastructure needs and align infrastructure spending and maintenance with national macro socio-economic policy. This long-term planning boosts the confidence of engineering and other firms to invest in the most modern and productive equipment and technology that needs to be amortised over several projects.

Cooperation between political parties and at all levels of government is required, alongside introduction of a formal consultative mechanism at the earliest possible planning stage that attempts to resolve differences as quickly as possible.

Governments need to follow through on their commitments to the development of robust and integrated long-term strategic plans for Australia's cities.

Recommendation 2: Ensure effective infrastructure development and delivery

Projects should be assessed not only on their potential patronage and their internal profitability, but also on the positive and negative impacts they may have on the whole system. Technical modelling (such as data analytics and optimisation techniques) can assist with planning through to execution and maintenance, but specific funding will need to be a priority in early budgets. This can ensure that new investments are planned to cope with future demands and that existing infrastructure is well maintained and optimally used.

The Academy recommends that current projects consider the various issues outlined in Box 1 when aspiring towards best-practice. Addressing these issues could help to restructure the cost-benefit analysis framework to consider a broader range of costs and benefits over a longer period of effect.

Recommendation 3: Implement best practice, whole-of-life infrastructure management

Current federal, state and local government processes lead to domination of selected projects with short-term financing. These projects have less than adequate provision for ongoing maintenance and whole-of-life costing is neglected. The outcome is often acceptance of lowest-cost tendering irrespective of the longer-term maintenance costs.

The Academy recommends that an appropriate asset management philosophy and whole-of-life budget, which is supported by a specific and quantitative maintenance regime, be adopted.

Examination of past projects, with respect to both alternative delivery mechanisms and practice in other countries, can help improve cost estimation frameworks.

Recommendation 4: Use existing infrastructure as effectively as possible

Rebalancing investment priorities and targeted, comparatively inexpensive investments are required, with greater attention to the maintenance of existing assets and demand management of existing networks. This is more likely to provide sustainable solutions to Australia's infrastructure challenges than focussing only on mega-projects.

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