



Pacific Motorway, Brisbane Australia



Infrastructure Australia:

2013 State of Play Report

Australia's Key Economic Infrastructure Sectors

December 2013



Australian Government
Infrastructure Australia



Lake Plimsoll in Tasmania, Australia

Wind turbine farm on a hillside in Australia



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Executive Summary

The focus of this paper is Australia's key economic infrastructure sectors which are the energy, transport, communications and water sectors.

This paper provides some insight into the level of confidence that the nationally significant infrastructure within these sectors is meeting the needs of Australian industry, households and individuals.

There may not be an immediate infrastructure crisis but there are some enduring weaknesses in how infrastructure is provided and used, which include:

1. Different approaches to how infrastructure is provided both within and across these four sectors which can create distortions when allocating resources across the economy;
2. Some sector-specific policies do not consider the potential for one form of infrastructure to substitute for another which can lead to inefficient outcomes;
3. The ways and means to increase the capacity of nationally significant infrastructure remains a contentious area, including who funds the cost of the investment; and
4. Road infrastructure stands out as a sub-sector which makes an important contribution to the Australian economy but rates poorly against the common assessment framework outlined in this paper.

These weaknesses adversely impact on Australia's sustainable economic performance and the quality of life of many Australians.

To remedy these weaknesses, a common approach to the provision and use of nationally significant infrastructure should be a key national goal.

A high-level assessment of the relative conformance of these sectors to common questions about a national approach is provided in Appendix A of this document.

In order to track the more detailed progress towards this goal, an important first step is to identify what to measure, how to measure it and to regularly publish information on these performance indicators.

Public accountability for infrastructure performance will help inform decisions to improve and identify shortcomings in how nationally significant infrastructure is provided within and across these four sectors. Infrastructure Australia will continue to progress further work in this area.

Chapter 1: Background

Purpose and Approach of this Paper

This paper contributes to public discussion on the expectations of Australia's nationally significant infrastructure.

It reports on a qualitative assessment by the Office of the National Infrastructure Coordinator on the status of Australia's economic infrastructure sectors against a common nationwide framework. The framework reviewed policy and economic structures, planning and investment arrangements, and infrastructure performance more broadly.

A traffic light report is provided in Appendix A. This is a high-level assessment of the relative conformance of these sectors to common questions about this framework. This assessment takes a national approach rather than a state or local perspective.

Infrastructure Australia undertook broad consultation on a draft of this paper in October and November 2013. A summary of the issues raised in submissions is provided in Appendix B. This feedback was considered in the preparation of this final document.

Importance of Economic Infrastructure

Economic infrastructure is an important enabler of increased productivity and sustained economic growth. Australia's key economic infrastructure includes assets and networks in the energy, transport, communications and water sectors.

This infrastructure has a lasting influence on the decisions of businesses and households. It can

include the choice of location for industry and dwellings, and the types of business activities that are undertaken. It is important for the community and their government to have a high level of confidence that this infrastructure is meeting the needs of businesses, households and individuals.

Two time dimensions are important for this level of confidence. The first is the short-term reliability of day-to-day services. The second is the long-term which relates to expectations of where services may be needed in the future, including current networks and extensions into new service areas.

Focus on National Significance

This paper only considers nationally significant infrastructure. There is no single definition, but there are some broadly accepted concepts and characteristics.

Nationally significant infrastructure describes the structural elements of the economy that provide essential services to large scale industry and many households. In some cases, this term can refer to infrastructure that is important to a sense of national identity or external affairs.

The Infrastructure Australia Act 2008 defines 'nationally significant infrastructure' to include:

- “(a) transport infrastructure;
- (b) energy infrastructure;
- (c) communications infrastructure; and
- (d) water infrastructure;

in which investment or further investment will materially improve national productivity.”

The size, economic impact and strategic importance of nationally significant infrastructure means that this infrastructure affects national-level matters such as standard of living, aggregate employment and strategic capabilities.

Therefore, decisions about the way in which this infrastructure is organised and governed materially affects many Australians.

The importance of this infrastructure has been recognised through the implementation of national competition policy principles in most of these sectors and by the ongoing agenda of the Council of Australian Governments (COAG).

Common Features of Nationally Significant Infrastructure

Australians have high expectations of reliability from this infrastructure. We expect that the lights will turn on; that we can make a phone call; that we can conduct transactions online or that we can get to work.

Governments are seen as accountable to fulfil these expectations, even if they do not directly control every aspect of the infrastructure or the services that it provides. The most productive approach by governments is one which seeks to create an environment that ensures supply continuity and addresses infrastructure bottlenecks. Other common features relate to the size of this infrastructure. It tends to be large, long-life assets. It can also be difficult to replicate or move and it is often easily identifiable. Ports are an obvious

example but similarly, electricity transmission networks or dams display these characteristics to varying degrees.

The substantial size of this infrastructure also generally means that there are significant financial costs involved in the construction, operation and expansion of these facilities.

Common Issues for Nationally Significant Infrastructure

While economic infrastructure sectors may vary in their detailed composition, there are some common issues that these sectors face.

It tends to be uneconomical to duplicate this infrastructure and therefore it is often provided by a single (or monopoly) provider.

Over the last few decades, governments have generally accepted the view that competitive markets are relatively efficient and outputs from monopoly facilities should mimic those that might be achieved by competitive markets.

Among the tools used to mimic competitive markets is economic regulation of monopoly infrastructure, including mandating universal access to some services. The regulator seeks to balance the interests of infrastructure owners and consumers in achieving economically efficient outcomes.

In practice, this tends to result in an economic regulator acting in the interests of consumers by addressing the behaviour that it expects from an infrastructure owner in a monopoly position. This

behaviour can include the under-provision of services, inadequate asset renewal and excessive pricing. It is also important that economic regulation seeks economic efficiency and not simply financial cost-recovery for the infrastructure owners.

Another tool, sometimes used by regulators, is benchmarking or ‘yardstick competition’. Benchmarking seeks accountability from infrastructure owners through the independent assessment and publication of the performance of infrastructure and its services.

There are also some general economic issues that arise when examining these sectors:

- the use of some infrastructure creates negative externalities such as emissions;
- some infrastructure is complementary to each other (e.g. a road and a port in the delivery of freight) and some can be substitutes for each other (e.g. teleconferencing into a meeting and travelling by road or rail to the same meeting); and
- a specific issue for road infrastructure is the absence of adequate property rights for the use of public roads. This issue is raised in chapter three and has been discussed previously by Infrastructure Australia, including in a submission to the Productivity Commission’s Inquiry into the National Access Regime.

Common Assessment Framework

It is difficult to establish a unified measure across diverse infrastructure systems. However, some common rules and assumptions need to be defined in order to compare and prioritise infrastructure provision on a national basis.

The subsequent chapters of this paper compare the energy, transport, communications and water sectors against three factors which influence how infrastructure is provided:

- 1. Policy and Economic Frameworks:** this section looks at whether there are national frameworks and objectives and the strength of economic signals like commercial incentives and economic regulation;
- 2. Infrastructure Planning and Investment:** this section looks at whether there are stable long-term plans, who can invest in this infrastructure, and whether investment decisions are predictable; and
- 3. Infrastructure Capacity and Performance:** this section looks at whether there are performance and service standards and whether these standards meet the expectations of consumers and their willingness to pay.

Chapter 2: Energy

Overview

The product of energy infrastructure is electricity or gas to be consumed as power by households and industry at fixed locations. This power is created at an electricity generator or sourced from gas fields. It is then transmitted via an electricity network or gas pipeline network to consumers.

Electricity and gas infrastructure are separate modes of supplying power to consumers which are not interdependent on each other. In some cases, their service (power) is substitutable and in other cases they compete for the inputs (gas) to deliver these services.



Australia does not have a single nationwide network for electricity or gas. Instead, there are a series of networks. In the eastern states, there is a large interconnected electricity transmission network and an interconnected set of gas transmission pipelines (with systems within states

at the distribution level for both modes). There are smaller, separate networks for both electricity and gas in Western Australia and the Northern Territory.

Many regional communities are not connected to these larger networks. Stand-alone generators often provide power to these communities and they do not tend to deliver comparable levels of service to that of urban areas.

There is not a strong argument for a single national electricity network due to the costs and distances involved. But uniform frameworks are important to measure the comparable performance of infrastructure across these networks and communities. It also provides consistency for infrastructure owners operating across these networks (which may lead to efficiency gains for consumers) and a national network could become viable in the future.

There may be some merit in exploring the idea of a national gas network but the viability of this idea depends on several factors including accurate demand forecasting and the assurance of a long-term gas supply to the domestic market (particularly as many Australia's gas producers are increasingly focusing on high-value export markets).

It is generally considered that Australia's nationally significant energy infrastructure is broadly meeting aggregate needs. There is assurance about the ability of these networks to continue to transmit supply. This assertion arises from the presence

of commercially oriented owners, adequacy of revenue from users and a national approach to policy and regulation with the explicit objective of economic efficiency.

Despite this progress, in recent years the regulatory framework for the electricity network on the east coast of Australia has come under scrutiny for allowing over-investment in electricity networks (often referred to as ‘gold-plating’) which contributed to increases in electricity prices. Therefore, consumers may have paid more than what is necessary for a safe and reliable energy supply.

This issue suggests that there are further opportunities to reform the energy sector to mimic the outputs of competitive markets. These opportunities include more dynamic pricing, revising the regulated return on capital, reviewing reliability standards and considering a broader range of demand management options as alternatives to building new infrastructure.

Many of these reforms are being pursued through the energy market reform agenda of the COAG. The momentum of a collaborative reform approach needs to be championed and maintained in order to harness these opportunities.

Policy and Economic Frameworks

There are policy and economic frameworks in place for the nationally significant infrastructure of the energy sector.

The energy sector is often regarded as a good example of how a sector can achieve improved productivity through policy and economic reform. This improvement was largely due to strong collaboration between governments and industry to pursue national competition policy principles and changes to structural arrangements. While state and territory governments continue to have constitutional responsibility for electricity and gas infrastructure, there are broadly uniform policy and economic regimes in place.



In 2004, the COAG signed the Australian Energy Market Agreement which provides a national blueprint for energy sector reform and national priorities. These high level principles have then been detailed in legislation through the National Electricity Law and National Gas Law. These frameworks provide a national perspective and have sufficient flexibility to be amended as required.

The Australian Energy Regulator is responsible for the economic regulation of the energy sector, including competition and access functions under the National Electricity Law and the National Gas Law. These economic frameworks include an explicit objective to achieve economic efficiency which is in the long term interests of consumers.

Investments to maintain and develop network infrastructure have been the largest contributor to increases in energy prices. The regulatory framework was drafted to stimulate new investment in energy infrastructure to address capacity issues and ageing infrastructure. While this approach was successful in achieving investment, it also restricted the regulator from making a full assessment of how much of that investment was efficient or necessary. The regulatory framework was recently reviewed and changes were made to allow for a broader assessment of these investments. The outcome of these changes will be seen in future regulatory periods.



Infrastructure Planning and Investment

Electricity and gas infrastructure have reasonably well-developed planning frameworks and strong opportunities for private sector investment.

The Australian Energy Market Operator (AEMO) is an independent market operator, funded by governments and industry, which also provides market information and planning documents for both electricity and gas infrastructure.

The AEMO publishes an Electricity Statement of Opportunities, a Gas Statement of Opportunities and the National (Electricity) Transmission Network Development Plan. These documents assist infrastructure owners and investors in making efficient planning decisions, including identifying opportunities for generation and demand-side investment along the networks. The Independent Market Operator in Western Australia has similar planning documents for its main electricity network and for its gas market.

Investment in both electricity and gas infrastructure is strong which is largely due to the fact that users pay the full cost of service through regulated prices. As part of the regulatory process, there are planning and investment documents which are published by energy businesses for near term investment, based on capacity indicators and demand forecasting.

There is strong private ownership in Australia's gas network infrastructure with all major pipelines privately owned. There is private ownership in parts

of Australia's electricity network infrastructure; while some infrastructure remains government-owned.

State governments traditionally had a strong ownership role in electricity networks. Over the last 20 years, structural reform and the implementation of competitive market principles have been pursued as a precursor to transferring assets to the private sector.

The subsequent transfer of these assets to the private sector has varied across the states. Victoria and South Australia are the leaders in the field with full private sector ownership resulting in efficiency gains for both producers and consumers. Other jurisdictions are in various stages of transferring or considering a transfer of these assets to the private sector.



Novel wind turbines, Busselton, South Western Australia

Infrastructure Capacity and Performance

The performance or service standards for electricity infrastructure are set by regulatory oversight which provides a basis for these services to be economically efficient. In addition, end users pay for the full cost of this infrastructure through regulated revenues and open access arrangements.

For gas infrastructure, performance or service standards are set by regulatory oversight (for covered pipelines) or market forces (for uncovered pipelines) which provide a basis for these services to be economically efficient. In addition, users pay for the full cost of this infrastructure through regulated revenues or access arrangements.

There is some debate over whether electricity service standards are set at the right level. Electricity networks are built to transport the peak level of demand. This means that even at times of lower demand consumers still pay for the level of investment in this infrastructure for the peak period. It may be possible that a reduced level of reliability could be identified that still meets public expectations but that requires reduced network expenditure and therefore reduced electricity prices.

An alternative to infrastructure investment is demand side participation, whereby users are incentivised to reduce consumption at times of

peak demand. Demand management seeks to modify demand for a product through two broad mechanisms – financial incentives and education. Financial incentives include charging the consumer based on the true price of the product at that time. While education includes providing better information to consumers so they make more informed decisions and potentially smooth out the peak periods. The demand management structures in the electricity sector should better align incentives for reducing peak load with incentives to invest in the network.

Conclusion

The energy sector has reasonably strong frameworks in place to provide nationally significant infrastructure. There are opportunities to improve the provision of infrastructure in Australia's energy sector which can be largely addressed through current and proposed regulatory reforms. Accelerating and implementing these reforms should enhance the operation of competitive national markets in both electricity and gas and stimulate changes to both consumer behaviour and investment in energy infrastructure.

Solar Electricity Generation, Thargomindah, Queensland Australia



Chapter 3: Transport

Overview

The product of transport infrastructure is the movement of people or goods from one place to another. The infrastructure to support the various transport modes includes roads, railways, marine channels, ports, airports, interchanges and intermodal terminals.

Some of these modes are interdependent as the movement of people and goods for a particular journey can often use a combination of transport types. At other times they are in direct competition with each other. There are major issues which can arise from this including the potential for incompatibilities in the interfaces between this infrastructure.

Road Train in Australia's Northern Territory



The movement of people and goods involves physical interactions resulting in a number of differences between transport and the other infrastructure. First, there is a significant exposure

of users and the public to safety risk. Second, the infrastructure wears rapidly with use which means that it is essential to monitor physical asset condition. Third, the location of major routes and locations have proven to be very stable over many years. This has led to a perceptions that transport infrastructure, particularly road infrastructure, should be maintained in perpetuity.

There are public perceptions that some transport infrastructure, notably roads and some urban rail systems, are not meeting aggregate needs. 'Long term plans' published by governments can change substantially within short periods of time and few provide evidence of a systematic approach to identifying infrastructure gaps. Hence there is a lack of assurance about the ability of much of the nationally significant transport infrastructure to meet current or future needs.

In the last 20 years, structural changes have taken place across some but not all types of transport infrastructure. In most cases, national competition policy principles have been pursued. These principles include identification and separate treatment of national facilities, an economic and location specific approach to services and charges, and some development of local performance and asset metrics. Examples where these principles have been applied are railways and airports, and similar changes are underway for marine channels, seaports and intermodal terminals. The approach to roads has been different, with no attempt to apply national competition policy, economic or location concepts.



Cargo train platform at sunset with container

Policy and Economic Frameworks

The policy and economic frameworks for the transport sector are incomplete or not fully applied in practice.

Nationally significant infrastructure has been identified for airports, seaports, and partially in rail infrastructure. It has not been identified for roads, terminals or interchanges between modes. Furthermore, some descriptions of national facilities or networks lack credibility because they omit major locations such as Chullora or Newcastle.

There have been attempts to identify nationally significant roads but largely for the purposes of funding by the Australian Government. For example, the National Highway and Auslink programs were designed to identify important roads for Commonwealth funding. This is in contrast to the reasons for identifying nationally significant facilities in other infrastructure sectors such as user-funding from high volume of usage or demand, to enable user initiated investment, or for purposes such as urban and industry planning, promotion of interoperability, support of other infrastructure or strategic matters.

The establishment of the National Heavy Vehicle Regulator is a step towards a national approach to road infrastructure but its focus is vehicles rather than road infrastructure. The bigger reform, which has not yet been achieved, is a well-defined national network that identifies nationally

significant roads and does not treat all roads alike.

Different levels of government have responsibility for different types of transport infrastructure. The criteria, stability and transparency of this involvement in decision-making vary by infrastructure type. It is most clear in major airports and least clear for roads.

All transport infrastructure types, other than roads, have an explicit or implicit objective of economic efficiency, which should take into account interfaces between these transport types. But there are issues of coordination between the various types of transport infrastructure when being used for a single 'journey' of a passenger or freight. For example, the framework for airports does not deal with necessary land transport interfaces.

For rail, the question of interoperability between all major locations remains unresolved with policy and economic frameworks unable to address critical compatibility issues. For example, there are reports of new rail projects in urban areas which are designed so that they cannot work with adjacent or interfacing railways.

The economic frameworks vary across the transport sector. For example, nationally significant airports, seaports and some railways (like the Hunter system or Melbourne to Perth) can be sustained by user charges, which under a commercial framework, provides assurance of supply. In contrast, railways in urban transit systems such as Melbourne, Sydney and

Brisbane are not recovering their full cost through user charges or other value capture options.

There are further practical questions about whether the commercial framework is adequate for assurance when a government owns an organisation within that framework. For example, for some seaports, the commercial framework may not be adequately used, which is evidenced by unusually low rates of return.

Infrastructure Planning and Investment

There are opportunities for more coordinated planning across the various infrastructure modes in the transport sector and to incentivise greater private sector investment. Unlike other infrastructure sectors, transport – namely airports, seaports, large terminals and central metropolitan corridors – has particular land requirements which can present long term planning and investment challenges. Examples include the difficulty in determining the location for a second airport for Sydney, locations of potential ports on the Queensland coast, and inner city tunnel routes.

For rail freight and airports, there are published plans by businesses for near term investment, based on analyses which identify gaps by reference to capacity indicators. In most cases these do not address interface issues. The exception, in which inter-dependencies are addressed, are some parts of rail and some terminals including where investment plans are required to be authorised by competition authorities.

Currently, there are no coordinated long-term plans for seaports. Under the National Ports Strategy which was endorsed by the COAG in 2012, it is intended that there be published plans for major seaports, which deal with interface and coordination issues.

For roads and urban railways, governments regularly publish plans showing proposed ‘new infrastructure projects’ but very few of these plans demonstrate that these projects fill a gap identified by capacity analysis. There is virtually no systematic and robust reporting on capacity utilisation of these systems.

Private investment occurs in rail, ports airports and terminals. Furthermore, there is increasing private ownership of assets in these areas of the transport sector.

By contrast, there is no coordinated planning and investment in roads. This could be due to an absence of nation-wide available performance metrics, and some uncertainty as to ‘funding responsibility’. Private investment in roads is limited to places selected by governments. There is no process for users to determine these locations, and no commercial mechanism for users or the private sector to influence capacity or design. There is no review of proposals or results by competition authorities.

Infrastructure Capacity and Performance

The performance or service standards and end-user pricing for ports, airports and existing terminals



Flinders Street Station, Melbourne Victoria

are market driven which provides some basis for services to be economically efficient, subject to two caveats.

First, externalities arise from service activities at these locations. Regulation, such as noise permits, seeks to address this. While there can be some debate about the regulatory settings, these should not fundamentally undermine incentives for efficiency. Second, government organisations are involved in the management of some ports and terminals. In some cases it is unclear whether the standards set are efficient, and in other cases, whether their activities potentially 'crowd-out' private sector approaches.

The performance or service standards and end-user pricing for rail freight are also market driven, either directly through regulatory oversight or indirectly via competition with road transport. In the case of services competing with roads, there is potential for service standards to be sub-optimal if there are cross-subsidies within the road infrastructure.

The performance or service standards for passenger rail are generally set by governments, rather than by markets. For example, in New South Wales, urban passenger rail service standards, and fares, are set with the aim to reduce car use and to be economically efficient.

As noted earlier, there is no explicit or implicit objective of economic efficiency for roads. This is evidenced by the degradation of some roads and the substitution of trucks for trains in some

high volume long distance routes. This suggests that a cross subsidy to those particular routes is occurring rather than just general improvements in trucking efficiency. This, in turn, leads to higher levels of road externalities such as safety risk than in other modes and large variations in congestion across road networks.

The question of 'outside of road user' effects, including externalities and tax subsidisation of motorists is much more important to efficient pricing and regulation in roads than in other infrastructure sectors. To date this appears unacknowledged in transport reform efforts which have aimed primarily at securing revenue sources for road renewals. By comparison, this was a key issue identified in Australia's future tax system report in 2010 and is subject to much academic research to date.

Conclusion

There are differences in the way that infrastructure is provided across Australia's transport sector which means that it is difficult to achieve coordinated, flexible and responsive transport infrastructure systems. Integrated, long-term plans and public reporting on the performance of infrastructure should be key goals for the transport sector. Infrastructure Australia continues to undertake work in a number of fields relevant to the reform of Australia's transport sector.



Chapter 4: Communications

Overview

The product of communications infrastructure is communicating and sharing information through telephones, computers and other devices.

There are two main infrastructure modes (or service types) of the communications sector – fixed and mobile. Fixed services refer to land line telephony and broadband internet connections. Mobile services refer to telephony, data and multimedia services to mobile devices.

It should be noted that there is some overlap in the infrastructure that is used to provide fixed and mobile communication services. For example, fixed and mobile services tend to use the same backhaul infrastructure. Backhaul generally

refers to the transmission networks that connect local exchanges, main exchanges and wireless towers between service areas. Nevertheless, the frameworks and market structures for fixed and mobile communications have evolved differently which leads to a difference experience for the customer.

Australia's communications infrastructure is broadly meeting aggregate needs. Overall, there is assurance about the ability of the networks to continue to transmit supply. This assertion arises from the commercially oriented owners in the sector and a national approach to policy and regulation with the explicit objective of economic efficiency.

Despite this overall assurance, this sector faces similar issues to the other infrastructure sectors in providing an assurance of supply to regional areas. The result is that deficiencies remain in rural and remote areas where commercial provision, even with government support, has not delivered comparable services to that of urban areas.

The communications sector has seen a rapid transformation in the way that we use its products. This transformation has been driven by technological improvements (including the advent of the internet and smart mobile devices). This rapid innovation and change in consumptive behaviour creates particular challenges in current planning and investment decisions on the provision of these long-life infrastructure assets.

There is also much debate over what our changing communication needs are, the various technologies





to meet these needs and who should pay for the cost of investment.

In 2009, the previous Australian Government began implementing a project to deliver high-speed broadband internet connections across Australia through a large deployment of optical fibre internet connections (plus a mix of wireless and satellite in more remote areas).

The Australian Government continues to implement the National Broadband Network. The project has been given greater flexibility to consider a wider range of technologies to connect homes and businesses to the network. The Government is also currently undertaking a series of reviews which will inform the future direction of this project.

Policy and Economic Frameworks

Unlike the other sectors (with the exception of major airports in the transport sector), state and territory governments have limited involvement in the regulation or ownership of communications infrastructure. This is largely due to the fact that under the Australian Constitution, the Australian Government has responsibility for providing telecommunications services.

Traditionally, the Australian Government had a strong ownership role in communications infrastructure. With the application of national competition policy principles over the last 20 years, this role evolved into a regulatory and broader policy setting role. The Australian Government will reassume an ownership role in nationally significant communications infrastructure with the

rollout of the National Broadband Network.

The Australian Competition and Consumer Commission (ACCC) is responsible for the economic regulation of the communications sector. The Commission also performs competition and access functions under the Competition and Consumer Act 2010 and other industry-specific legislation. Technical regulation for communications infrastructure is conducted on a national basis by the Australian Communications and Media Authority.

Similar to the energy sector, Australia's fixed communications infrastructure is subject to a regulatory framework which broadly aligns with national competition policy principles. It has a clear objective which is to promote the long-term interests of consumers.

There has been criticism over the regulatory framework and in particular the access arrangements for fixed communications infrastructure. A key concern is that there is heavy regulation as a legacy of the monopoly position of Telstra, despite the privatisation and the introduction of competitors in the retail market. The counter-argument is that Telstra retains monopoly power in the market which requires heavier regulation than the more competitive mobile infrastructure market. The debate is further complicated by questions of the substitutability of fixed infrastructure with mobile infrastructure.

Infrastructure Planning and Investment

The communications sector has some planning frameworks in place and opportunities for private sector investment.

Australia's government-owned fixed telecommunications service (Telecom; then Telstra) was privatised in three stages between 1997 and 2006. As a result of the pursuit of national competition principles and regulatory decisions on access arrangements and pricing, new private carriers and service providers have entered the fixed communications market.

Despite the emergence of competition and private sector investment at the retail service level, the development of a comparable level of competition and diversified ownership in fixed infrastructure has been relatively limited. Many retail providers rely on access to parts of Telstra's infrastructure network to supply services to consumers.

In 2012, the ACCC accepted Telstra's proposal for structural separation of its retail and wholesale businesses. This separation formed part of the progressive closure of Telstra's copper network and the commencement of National Broadband Network services. The change in the Australian Government's policy on the roll-out of the National Broadband Network may impact on any future use of this copper network.

Australia's mobile infrastructure is subject to light regulation which is the result of the development of a competitive market structure. This competitive market structure, together with technological advances and the increasing use of smart mobile phones, has led to significant private investment in infrastructure related to mobile services.

Infrastructure Capacity and Performance

The performance or service standards in the communications sector are set by market forces and regulatory oversight which provides some basis for these services to be economically efficient.

There are some services which remain somewhat unreliable due to the vast distances and high costs involved particularly for services to regional communities. This raises further questions over whether service standards are set at the right levels and whether customers may be willing to accept access to a lower level of service rather than no service.

There is a range of service standards and guidelines for communications infrastructure but there are gaps in these service standards. For example, while there are some industry guidelines, there is an absence of national service standards for voice calls over internet.

The rapidly increasing consumption of the internet represents both a challenge and an opportunity for the communications sector. The key challenge is that a congested network can degrade the quality of service available to all consumers. This challenge requires both infrastructure owners and the regulatory framework to meet these changing needs. The key opportunity is that this can help overcome the 'tyranny of distance' which Australia faces and provide the type of connectivity which has historically been enjoyed by smaller, more densely populated nations.

Conclusion

The communications sector has reasonably sound national frameworks in place but there are opportunities for improvement in the planning and investment areas. A strengthened communications sector has the potential to alleviate many of the current strains on Australia's physical infrastructure.

Infrastructure Australia continues to observe progress of the National Broadband Network and its potential to shape other economic infrastructure sectors, as well as the education and health sectors. Infrastructure Australia also continues to monitor developments in the regulatory frameworks for both fixed and mobile infrastructure services.



Chapter 5: Water

Overview

The product of water infrastructure is the consumption of drinking water, sewage, drainage and water for commercial or industrial use (including agricultural irrigation).

The infrastructure of the water sector can be divided into urban, regional and agricultural water supply systems. This infrastructure includes the systems used for the collection, treatment and distribution of water to fixed locations and the collection and treatment of waste water.

Australia does not have a single national water network. Water systems tend to be geographically separate to serve particular demand areas. These systems source their product (water) from a combination of rivers, groundwater (via aquifers), rainwater (via dams) and seawater (via desalination plants).

Australia's capital cities represent the nationally significant urban water systems (in particular Sydney and Melbourne due to their large populations). The Murray Darling Basin is the most important agricultural system as it supplies water to agricultural producers across four states and one territory in eastern Australia.

Australia's water infrastructure networks are broadly meeting aggregate needs. There is a general assurance about the ability of these networks to continue to transmit supply. Overall, the current frameworks in urban water systems have delivered safe and healthy water supplies, with only isolated incidents of public concern. Australia's regional

and remote water sectors may not meet health standards and the security of supply is still a major challenge.

Urban water systems have largely addressed the security of supply, in the short term, by water restrictions and, in the long term, by diversification in supply (such as investment in desalination plants). A strong focus of this investment has been around the need for supply assurance and a system which is more independent of the Australian climate's variability.

Policy and Economic Frameworks

There are policy and economic frameworks in place for parts of the water sector. The COAG adopted the National Water Initiative in 2004 as the national blueprint for water policy reform. This initiative includes commitments by governments to preparing plans, expanding trade in water rights, improving pricing and better managing demand.

The 2009 Water for the Future program advanced the implementation of the National Water Initiative along with other key priorities around addressing climate change, water management, water efficiency and water security. However, as a high-level set of policy documents, this framework is a long way from providing clarity, detail or certainty of policy direction. As a result, it can be argued that progress against these high level objectives has been variable and slow.

While the National Water Initiative promotes consistent economic regulation principles, the implementation of those principles varies across



jurisdictional regulators. Urban water supply systems in major cities generally have some form of economic regulation following those principles, although the level of independence of regulators varies widely as does the level of cost reflectivity in water tariffs.

Australia's water sector has a complex regulatory system. Each state and territory has its own economic regulator, some more mature than others, with the seven regulators serving a population of 22 million people. Notwithstanding the differences in landmass, by comparison one national water regulator in the United Kingdom serves more than 60 million people.

The social and political pressure to keep prices down during some recent pricing determinations has seen a move away from full cost recovery and commercial returns. A national water regulator would provide stability, a clear national policy objective, improve opportunities for private sector investment through great accountability less red tape, and appropriately put distance between a state-owned business and the regulator.

Australia's agricultural water trading market across the Murray Darling Basin is recognised as one of the most sophisticated in the world. However, some jurisdictions have intervened in ways that limit its effectiveness by restricting how owners of water property rights can trade in the market. Some examples include restrictions on trade between catchments, on trade between agricultural and urban users, and volumetric caps on trade.

In order to address this issue, the Basin Plan water trading rules will commence on 1 July 2014. These rules seek to ensure that restrictions on trade are limited to those reasonably required to address physical constraints, connections and water supply considerations or to protect the needs of the environment.

Infrastructure Planning and Investment

Australia's water sector does not have coordinated and comprehensive planning documents. The Basin Plan provides a coordinated approach to water use across the Murray Darling Basin's four States and the Australian Capital Territory but beyond that there are only high level principles.



Planning for the urban water systems varies across the various areas. In some urban systems, planning is driven by the utility provider, while in other systems it can be driven by the state or territory government. Unfortunately, water planning is often heavily compromised by a lack of agreed and clear objectives for utilities and by political intervention in planning options and decisions – especially in the sourcing of bulk water and more particularly dams.

In addition, water utilities are often required to pursue contradictory objectives – such as commerciality, environmental protection and public health – while at the same time working under economic, environmental and health regulators. A primary commercial objective, subject to health and environmental regulation, would be a significant improvement. Public ownership of major water utilities prevents progress in this area towards a primary commercial objective.

Australia's last drought extended from 2003 to 2012. During that time, most major cities in Australia invested heavily in water infrastructure to supplement its water supply. This included the construction of desalination plants as well as recycled water, groundwater and many private rainwater tanks.

In urban water systems, investment is usually funded by users through water tariff revenue. In smaller regional areas, this often needs to be supplemented by government subsidies because tariffs are not cost reflective.

Health standards can also drive investment in water treatment infrastructure and process improvement but it is generally viewed that these standards have not driven excessive investment.

Australia's agricultural water trading market offers real lessons in how a market based approach could be broadened in scope across the sector to address urban water supply deficits, both on a temporary and long-term basis.

Infrastructure Capacity and Performance

The reliability of water supply and water quality are subject to regulated standards and performance is monitored by the relevant jurisdictional regulator. In addition, in some urban systems end-users pay for the full cost of this infrastructure through regulated revenues. This provides some basis for these services to be economically efficient.



Wivenhoe Dam with one open gate

The performance or service standards for regional water systems are not as clear as urban water systems. The end-user rarely pays for the full cost of this infrastructure.

The National Water Commission annually publishes reports which provide some information on the performance of Australia's urban and regional water systems. These reports publish information on capital and operating costs, demand, consumer prices and health standards.

As a natural resource, the capacity and performance of water infrastructure is influenced by the climate. Like the energy sector, the water sector has used demand management (through water restrictions) to manage capacity and performance during supply constraints.

Supply reliability is also a key driver in many investment decisions for capacity augmentation and existing infrastructure performance. In many urban water systems, capacity improvements have included a mixture of sources that are both dependent and independent of rainfall.

Unfortunately, compromises in the planning for augmentation of urban water supply resulted in somewhat rushed, major investments in desalination plants around Australia – many of which are under-utilised or inactive at present.

Conclusion

There are differences in the way that infrastructure is provided across Australia's urban, regional and agricultural water systems. The National Water Initiative provides a reasonably sound framework for pursuing water reform. However, there is a need to accelerate the implementation of already agreed reforms and to achieve a more efficient and effective means for managing the trade and delivery of water.

Infrastructure Australia supports the establishment of a national water regulator. A national regulator would provide a more efficient regulatory system with clear national objectives, performance standards and national benchmarking.

Chapter 6: Key Conclusions and Next Steps

Overview

This paper has discussed Australia's four key economic infrastructure sectors and provided some insight into the level of confidence that the nationally significant infrastructure within these sectors is meeting our needs.

Australia's energy and communications sectors have reasonably strong frameworks in place to provide nationally significant infrastructure. There are differences in the way that infrastructure is provided across Australia's urban, regional and agricultural water systems. A national approach appears to be most clear in the agricultural system and least clear in regional systems.

There are also differences in the way that infrastructure is provided across Australia's transport sector. The identification of nationally significant infrastructure and structural changes to service delivery has taken place across some but not all the different types of transport infrastructure in the last 20 years. But there are some obvious omissions of nationally significant infrastructure from defined networks.

The approach to roads has been different, with no attempt to apply national competition policy, economic or location concepts. This is particularly significant where road and rail are in competition as a transport mode. The under-pricing of road infrastructure can constrain the ability of rail to invest in potentially productivity and capacity building enhancements.

Key Conclusions

This paper has identified that there are some enduring weaknesses in how this infrastructure is provided. These weaknesses adversely impact on Australia's sustainable economic performance and quality of life.

This paper reaches four conclusions about Australia's key economic infrastructure sectors.

First, there are differences in the approach to how infrastructure is provided both within and across these four sectors. This is evidenced by the range of policy drivers and market structures which this paper has outlined across these four sectors.

One of the key goals for Australia's economic infrastructure sectors should be to move as close as practically possible towards a common approach to delivering nationally significant infrastructure. This will minimise distortions when allocating limited resources within the economy.

Second, some sector-specific policies do not consider the potential for one form of infrastructure to substitute for another. This has implications for the type of infrastructure networks which are provided and the locations for these networks. This means that subsidies in one of these modes will have a direct impact on the costs and usage of the substitutable mode.

Third, the ways and means to increase the capacity of nationally significant infrastructure remains a contentious area. If left unaddressed, constraints or bottlenecks in this infrastructure will

increasingly have an adverse impact on national productivity.

It is important to continue the debate between governments, infrastructure owners and the broader community about the real cost of infrastructure and the most efficient way to deliver the kind of infrastructure that the Australian economy needs to prosper.

Finally, road infrastructure stands out as the sub-sector which makes a significant contribution to the Australian economy but rates poorly against the common assessment framework outlined in this paper. This suggests that the provision of road infrastructure is leading to less than efficient outcomes for the overall economy – particularly where roads are complementary or a substitute for another type of infrastructure.

Next Steps

A common approach to the provision and use of nationally significant infrastructure should be an important national goal. The key benefit of a common approach is that it allocates Australia's resources (namely land, labour and capital) in the most efficient manner across these four sectors.

In order to track the more detailed progress towards this goal, an important first step is to identify what to measure, how to measure it and to regularly publish information on these performance indicators.

Public reporting against benchmarks for physical performance and asset condition should be particularly important for infrastructure which does not have adequate user charges or commercial incentives to drive efficient outcomes. Without this reporting, there is a risk of under-provision of services and potential inadequate asset renewal.

Public accountability for infrastructure performance will help inform decisions and identify shortcomings in how nationally significant infrastructure is provided within and across these four sectors. Infrastructure Australia will continue to progress further work in this area.

Appendix A - Traffic Light Report

Table 1: A National Report Card of Australia’s Key Economic Infrastructure Sectors

		ENERGY		TRANSPORT				COMMUNICATIONS		WATER		
		Electricity	Gas	Road	Rail	Seaports	Airports	Fixed Services	Mobile Services	Urban	Regional	Agricultural
Policy and Economic Framework	Is there a framework designed for nationally significant infrastructure?											
	Is there a national framework which provides overall assurance of supply?											
Infrastructure Planning and Investment	Are there coordinated planning and transparent investment decisions?											
	Are there opportunities for private investment into nationally significant infrastructure?											
Infrastructure Capacity and Performance	Are there economically efficient service standards?											
	Is there economically efficient end-user pricing?											

Key to traffic lights: Green = broadly in place Orange = underway or partially in place Red = further work is required.

Note: Jurisdictional and regional differences are not necessarily reflected in this assessment.



Appendix B - Consultation Results

Overview

A first draft of this document was provided to key stakeholders and made publicly available on the Infrastructure Australia website.

Over 40 submissions were received from all levels of government, regulators, financial institutions, industry associations, infrastructure advisory firms, infrastructure owners and infrastructure users. These stakeholders were broadly supportive of Infrastructure Australia's draft report and the issues that it discussed.

Summary

Many responses acknowledged these sectors are facing some similar challenges including fostering a competitive market structure, addressing gaps in service standards and the broader question of what kind of infrastructure consumers want (and at what cost).

Several responders agreed that moving towards a common national approach to infrastructure provision is likely to address inefficiencies across these sectors by minimising distortions when allocating Australia's resources (including land, labour and capital).

Many stakeholders agreed that the public reporting of performance indicators will help improve transparency and foster greater public debate about the performance of nationally significant infrastructure. Several respondents also remarked that interoperability should be a prerequisite for all infrastructure investment. Others highlighted that the infrastructure planning and investment

timeframe for nationally significant infrastructure is a significant challenge because it is often beyond the term of any single government.

Several stakeholders recommended that Infrastructure Australia regularly publish updates to this report to increase transparency, report on progress and further the debate about infrastructure provision across these sectors.

Some stakeholders suggested that the paper could contain greater discussion of regional and Indigenous infrastructure issues. These are important issues which Infrastructure Australia continues to raise with all levels of government, industry and the broader community.

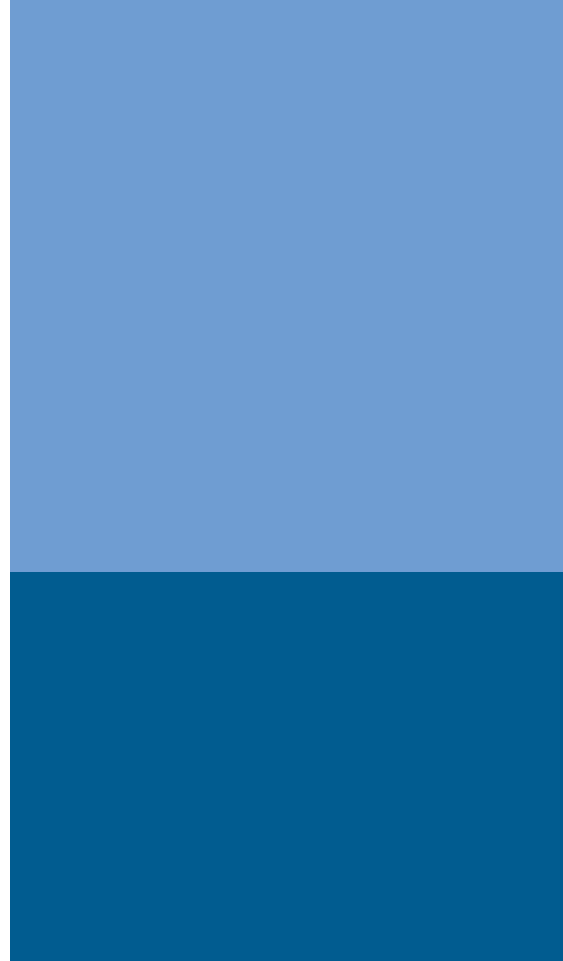
The traffic light report card system received some criticism with suggestions that the assessment was too kind to rail or electricity or too critical of roads or urban water. On the other hand, many stakeholders liked the simplicity of the traffic lights as an effective visual representation of the status of these sectors.

Infrastructure Australia acknowledges the difficulties in measuring these issues across the different jurisdictions and regions. The benefit of a high-level qualitative approach is that it can broadly indicate whether further effort and analysis may be required.

Conclusion

Infrastructure Australia thanks contributors who provided input to this report. Infrastructure Australia will continue to progress further work on these issues.





Australian Government
Infrastructure Australia