



WATER SERVICES
ASSOCIATION OF AUSTRALIA



WSAA Submission

Innovation and Science
Australia

2030 Strategic Plan Issues
Paper



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Executive Summary and Recommendations

The Water Services Association of Australia (WSAA) is the peak body that supports the Australian urban water industry. Our members provide water and sewerage services to over 20 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. The collegiate approach of its members has led to industrywide advances to national water issues.

WSAA welcomes the opportunity to provide a submission to the Innovation and Science Australia 2030 Strategic Plan Issues Paper and to be part of the national conversation on the future of Australian innovation, science and research.

WSAA has worked with its members and international industry and research associations to advance innovation, science and research within the water sector however, it is noted that there is a role for a greater contribution from the Commonwealth Government to facilitate research and innovation which encourages cross-sector collaboration, results in the adoption of research and innovations and contributes to greater public good.

This submission highlights the role of water utilities and industry bodies, and the potential role of the Commonwealth Government in supporting urban water research and retaining Australia's reputation as an international leader in urban water management, research and innovation. It responds to the six challenges outlined in the Innovation and Science Australia 2030 Strategic Plan Issues Paper.

1.0 Introduction

WSAA is pleased to present a submission to Innovation and Science Australia on its Innovation and Science Australia 2030 Strategic Plan Issues Paper. The Australian urban water industry is well regarded across the world. It has made significant gains in efficiency and customer focus as a result of research and innovation.

Australia is one of the most highly urbanised countries in the world, with our cities recognised as some of the most liveable. The Australian urban water industry provides over 20 million customers with water and wastewater services and plays a significant role in contributing to the liveability of cities and regions by ensuring safe, secure and efficient water supplies. The liveability of Australian cities and regions remains a significant drawcard that encourages people with skills, knowledge and research capabilities to Australia, as well as allowing Australia to retain a skilled and adaptable workforce.

Research and innovation in the Australian urban water industry has been led by utilities where it has been directly applicable and/or unique to their business, co-ordinated through industry bodies, including WSAA, where a common benefit to utilities across the industry has been identified, and funded by Commonwealth Government initiatives where there is greater national benefit (Figure 1). WSAA also works to coordinate activities across each of these areas of research to avoid duplication, facilitate sharing of knowledge and to identify areas where collaboration can deliver the greatest value.

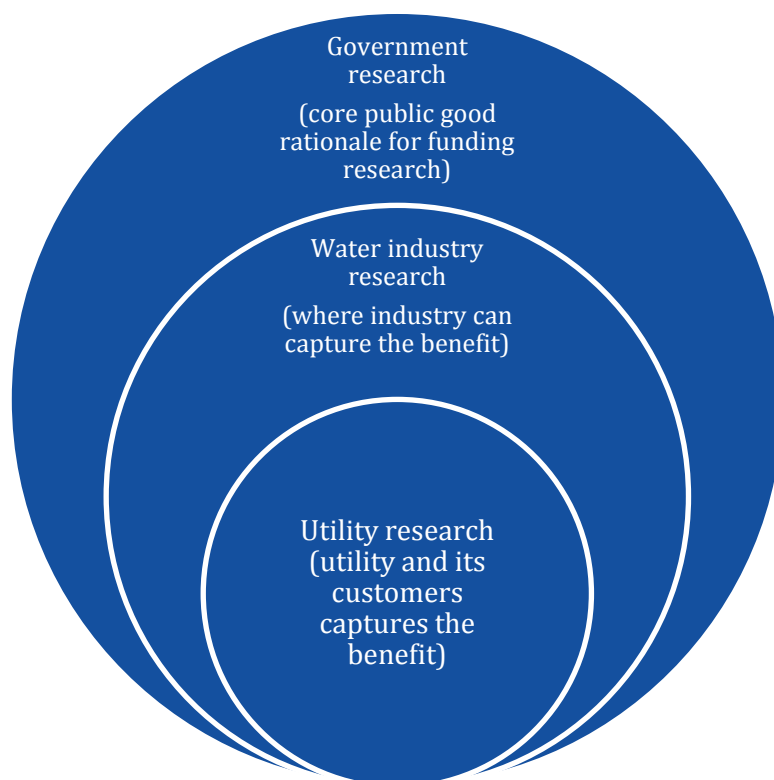


Figure 1: Research and Innovation in the Australian Urban Water context.

The Australian water industry has been recognised as a world leader in many areas associated with adapting and responding to global and local trends, risks and opportunities impacting the urban water sector. Australian innovation and expertise in the water sector has been sought in the areas of water management, particularly drought management, asset management, integrated water management, wastewater recycling, stormwater management and water sensitive urban design. There are many examples of innovative technology installations, with a few utilities developing and commercialising technologies themselves.

The Millennium Drought highlighted that the industry needed to be open and adaptable to change. Significant utility investment in research, development and innovation during the period of the drought resulted not only in significant innovations and diversification of supply options, but also a mounting level of debt as a result of the rapid construction of climate resilient infrastructure.

Water utilities, their predominantly government shareholders and state-based regulators have a renewed focus on productivity, efficiency, delivering greater value to customers, liveability and adapting to the changing operating environment. There has also been investment into emerging markets and technologies such as energy and nutrient recovery and intelligent networks.

Research and innovation remains important cost-effective investments for the urban water industry to tackle challenges, harness emerging opportunities, maintain viability and continue to provide value to their customers. Despite this, rising debt, and increased pressure to reduce customer bills whilst increasing levels of service has resulted in a rationalisation of utility investment in research and development over recent years. Individual utility research has declined while the industry has pursued more collaborative initiatives (including through WSAA).

There has also been a recent decline in the number of government funded water focused research institutions in Australia (Figure 2). This may reduce the likelihood of Australia capitalising on its current perception as a global leader, reducing the public benefit of urban water research and potentially becoming less attractive for investment in research and innovation and less competitive as a country to attract skilled workers.

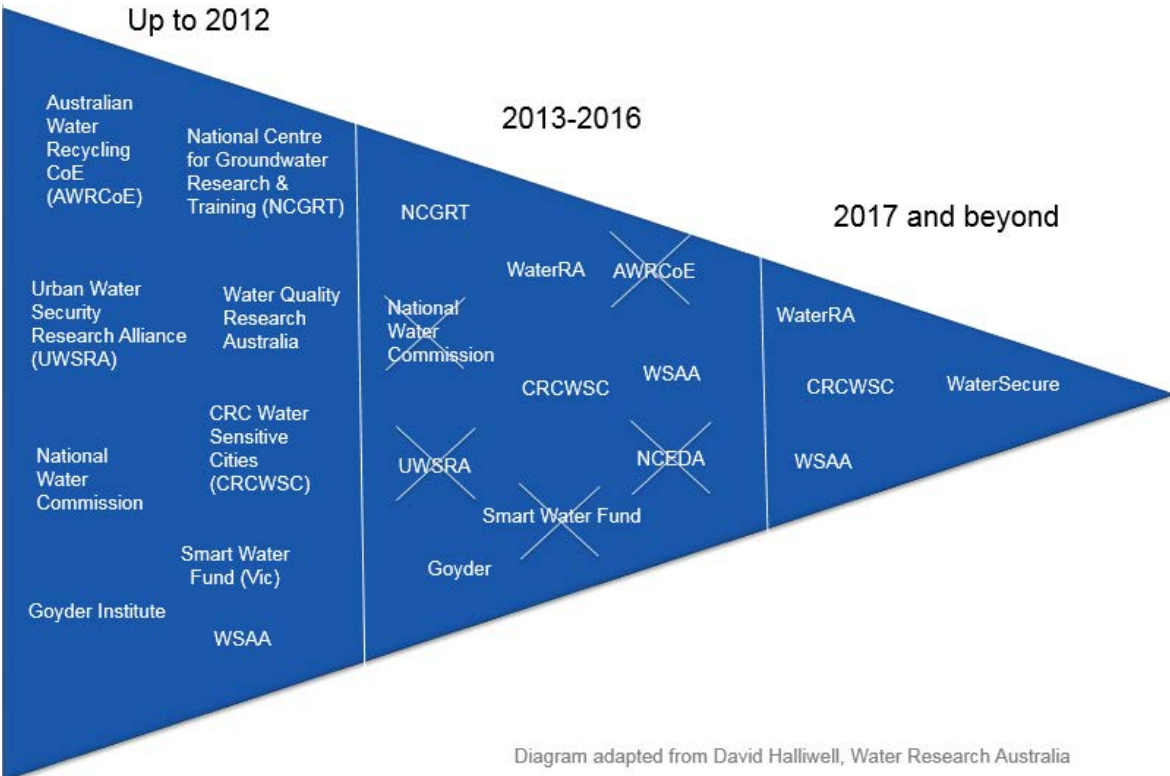


Diagram adapted from David Halliwell, Water Research Australia

Figure 2: Australian water industry and government funded water research landscape

The reducing investment in research and development by utilities has resulted in an increased need to leverage collaborative funding and attract investment from new sources.

WSAA led the development of the [National Urban Water Research Strategy](#) in response to the need for urban water utilities to adapt and respond to emerging challenges and opportunities.

The strategy was developed to align with industry strategic priorities (Figure 3) and national research priorities, leverage off the existing success and reputation of the Australian water industry, and enable Australia to remain a global water industry leader and position Australia and

the water industry to respond to future challenges and opportunities. The Strategy identifies critical research priorities for the urban water industry, and provides a framework for delivery of the research.

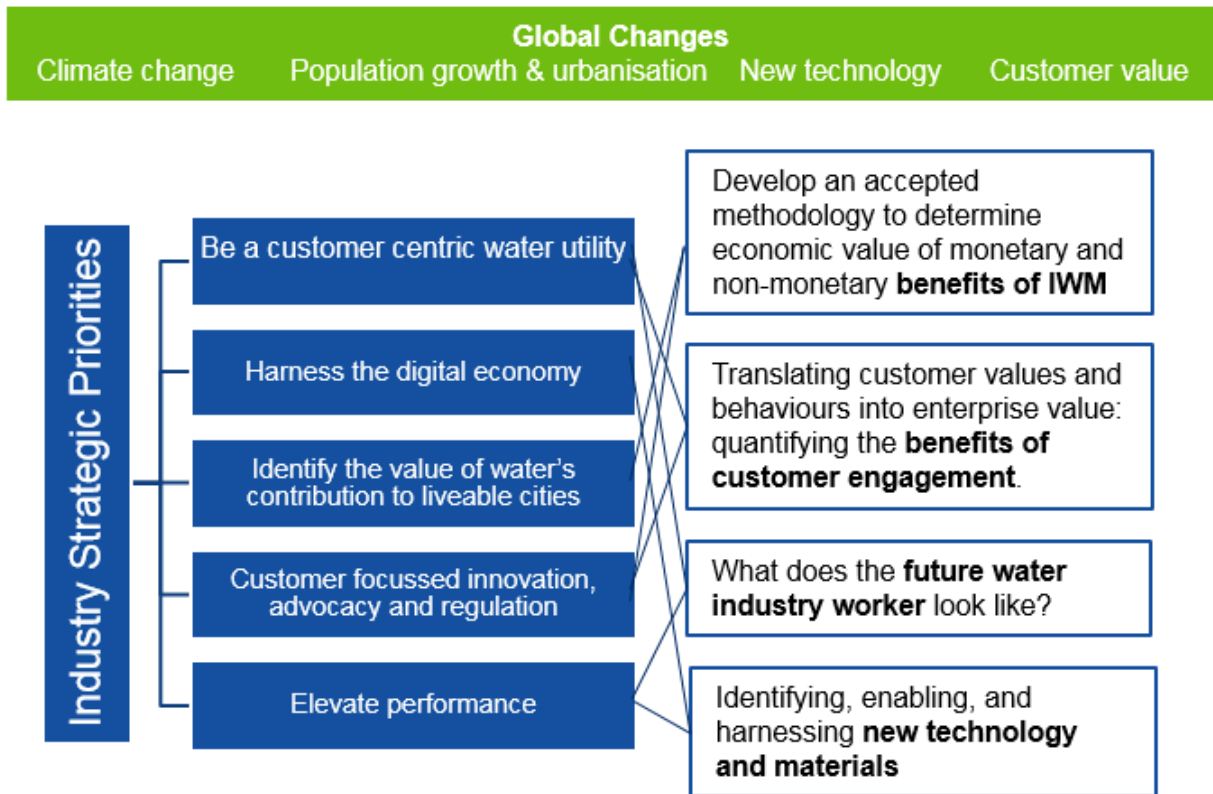


Figure 3: Australian urban water industry strategic priorities and alignment with critical research priorities

The following key priority research areas were identified by the Australian urban water industry to achieve the industry's vision of 'Customer driven, enriching life':

- Customers
- Liveability
- External business environment
- Utility agility
- Assets, technology, data

The National Urban Water Research Strategy proposes how undertaking research and driving innovation in these area will position the Australian urban water industry to meet future challenges and benefit from emerging opportunities, both nationally and internationally (Figure 4).

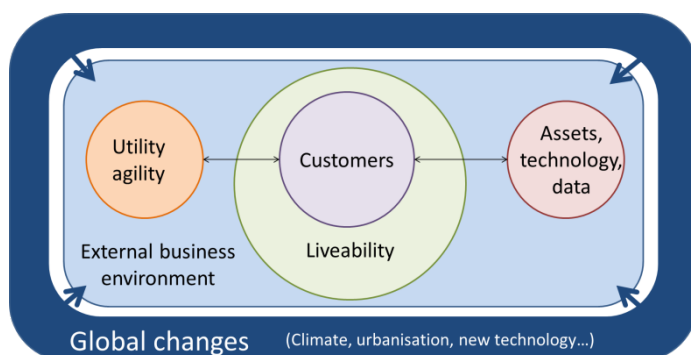


Figure 4: Priority research areas

This National Urban Water Research Strategy ('Research Strategy') provides an important link between the Australian Science and Research Priorities of the Australian Government¹ and the development and delivery of urban water research (Figure 5) within multiple separate organisations across Australia. It articulates the vision and common research priorities of the Australian urban water industry for the next 15 years, and provides a high-level framework for implementation (Figure 6).

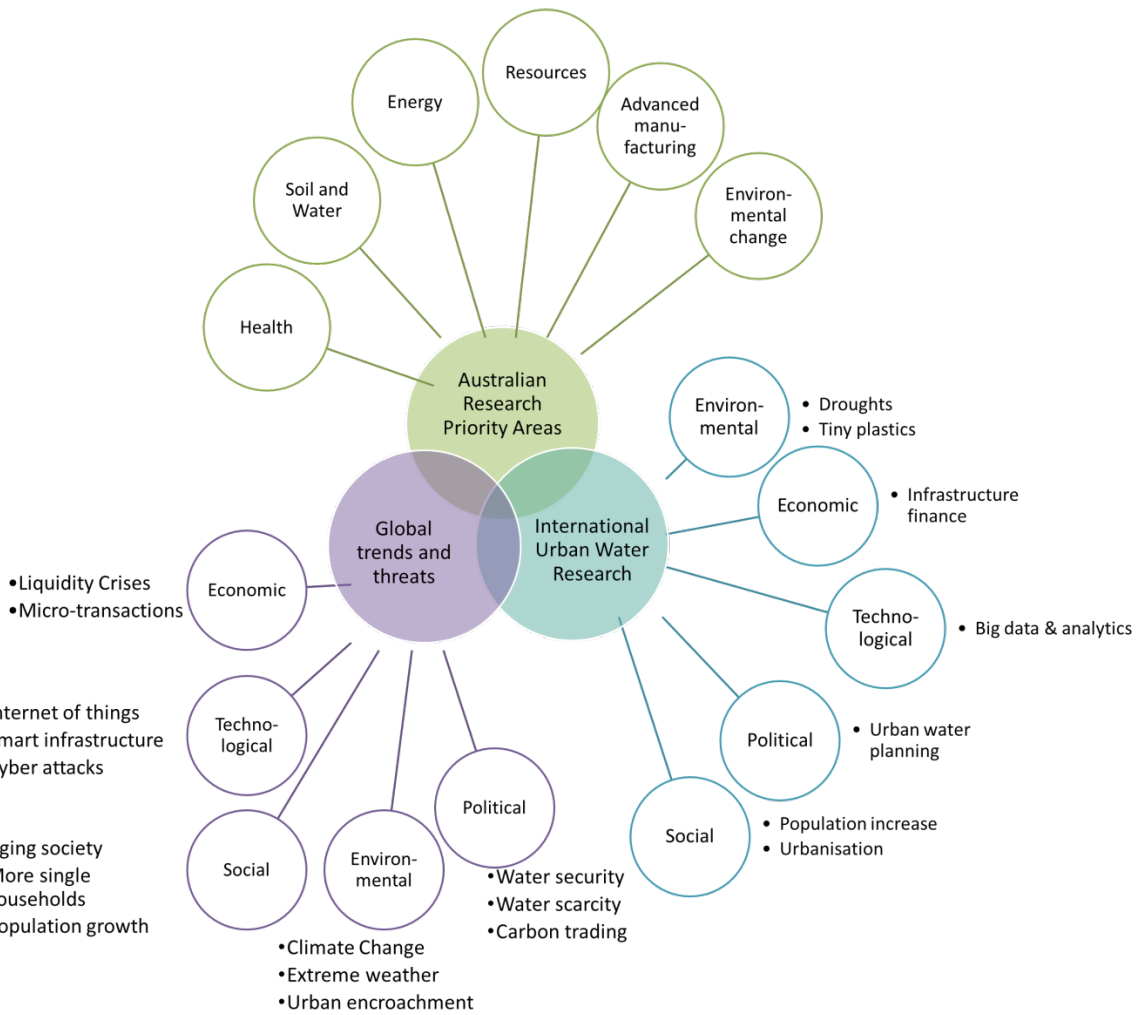


Figure 5: Overview of research fields relevant to the National Urban Water Research Strategy.

¹ <http://www.science.gov.au/scienceGov/ScienceAndResearchPriorities/Pages/ThePriorities.aspx>

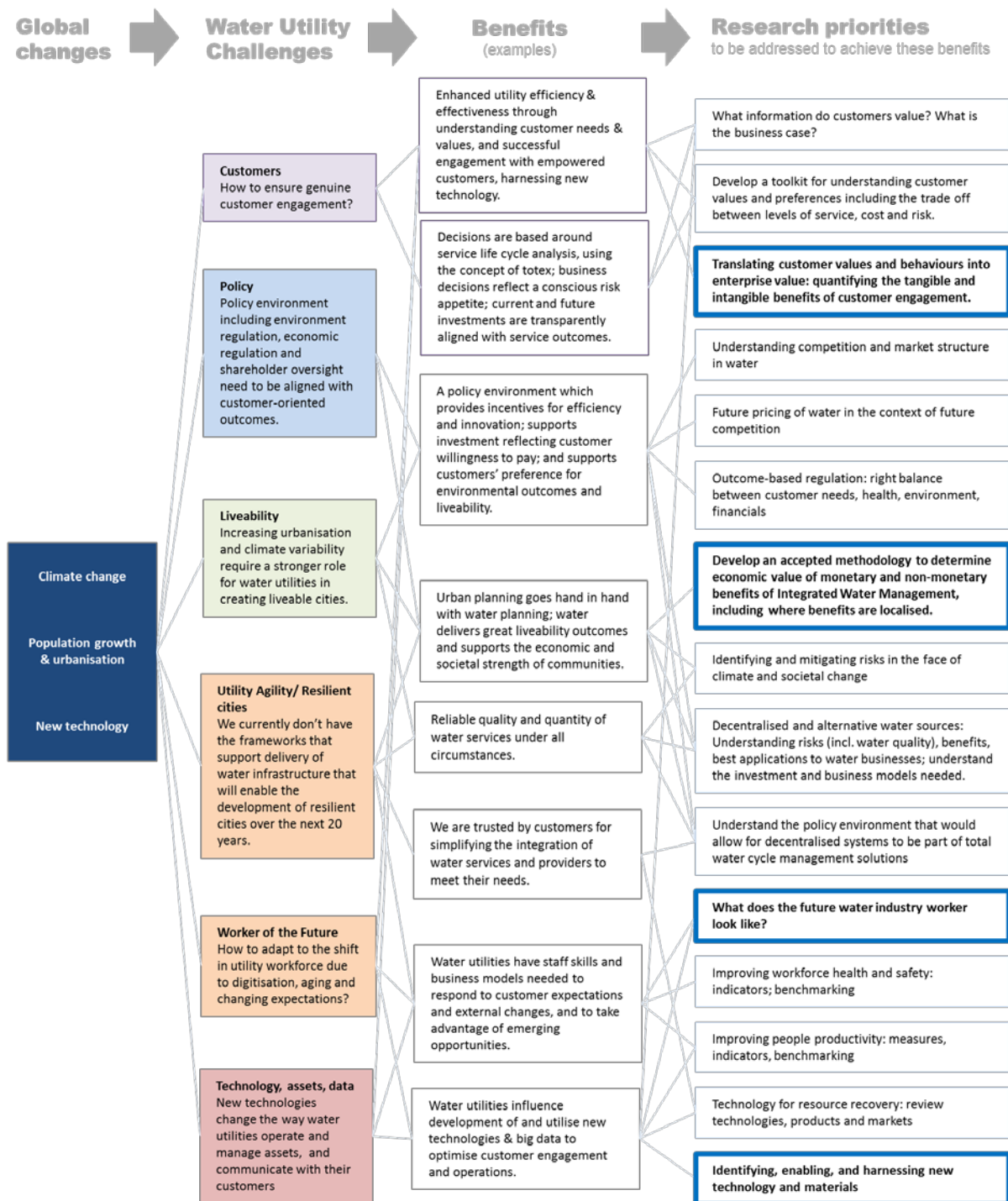


Figure 6: Future urban water challenges, benefits of resolving them and research projects to address these challenges.

In this new environment the industry would welcome co-ordinated Government programs for the advancement of research and innovation in the water industry, in addition to programs which encourage cross-sectoral collaboration for public benefit. The water industry underpins the liveability of Australian cities and regions, and co-ordinated programs to address technology gaps and encourage research to progress through the innovation pathway to application would assist the industry to:

- maintain its current position as a water industry leader and country to invest in research and innovation
- contribute to the industry's ability to respond to future challenges and opportunities and
- maintain the liveability of the cities and regions of Australia

2.0 Response to Challenges

Key messages

- Australia is currently considered one of the world leaders in water management, with a reputation for innovation specifically in areas of integrated water management, water security, managing ageing infrastructure and asset management.
- Australia has been successful in attracting international talent, investment and collaboration in urban water research and innovation due to its reputation, in addition to the liveability of our cities and regions.
- Individual utilities, the water industry collectively and the Australian Government each play a role in contributing to research, science and innovation and facilitating the adoption of and improved ways of delivering benefit to the community.
- To build on the success of the industry, maintain the reputation of Australia as a world leader in water management and continue to attract international talent, investment and collaboration in relation to urban water research, individual utilities, the urban water industry and the Australian Government must work together to progress research and innovation in the urban water sector and maintain the liveability of our cities and regions.

2.1 Moving more firms, in more sectors, closer to the innovation frontier

Enhancing the liveability of our cities particularly in response to global challenges impacting on Australia such as climate change, population growth and urbanisation and new technology, is both a challenge and opportunity for Australia and important for attracting and retaining skilled workers and investment in innovation. Retaining liveability and a skilled and adaptable workforce will require a coordinated approach across many sectors.

Studying strategies and incentives that international innovative countries and companies use to drive innovation may help identify options which can be effectively adopted in the Australian context. This can be progressed by:

- Individual utilities collaborating with individual organisations who have successfully deployed innovation strategies to benefit the organization and/or its customers.
- Industry bodies such as WSAA and WaterRA collaborating with international water industry bodies and industries where research and innovation is successfully adopted either through the nature of the industry or collectively for the benefit of the industry as a collective.
- Government reviewing successful international strategies for national science and innovation and fostering collaboration and transfer of knowledge across sectors, particularly where these strategies have resulted in improvements to the public, whether economic, environmental or social.

Successful adoption of innovation is more likely when all organisations across the value chain are involved, including developers, manufacturers, suppliers, consultants, end users and the community. This enables innovations to be tailored throughout development to best meet the end user needs, thus increasing the likely uptake of innovations.

Industry convergence was identified as a trend and is reflected as an urban water industry requirement to effectively deliver sustaining liveable cities and regions across Australia. Integrated planning and industry convergence presents an opportunity for cross-sectoral innovation, however many of the existing research and innovation programs are often sector specific. Opportunities to encourage cross-sectoral collaboration could assist with increased management capability and risk appetite. The Australian Government is likely to be best placed to facilitate this collaboration. A

specific example of cross-sector collaboration to resolve a water industry issue where Australia is currently a global leader is in managing ageing buried infrastructure (refer to Box 1 below).

Box 1: Partnerships between the Australian urban water sector and other sectors

The water industry in Australia has over \$160 billion invested in buried infrastructure (predominantly pipes) which must be managed and replaced to prevent breaks or pipeline failure. Breaks and failures can have significant consequences to the community and potentially industry through loss of service in addition to consequential damage. Buried infrastructure is designed to last for up to 100 years, which, in Australia, collectively costs approximately \$1.6 billion to maintain and replace.

Extending the life one year can therefore result in savings of up to \$1.6 billion and prevent asset failures impacting on communities and businesses. Current knowledge relating to evaluation of future life expectancy of buried infrastructure is in its infancy.

Over the last 5 years, the Australian water industry has spent over \$10 Million investigating technology and innovations to better understand and predict the remaining life of a specific type of buried infrastructure and intends to invest additional funding over the next few years to investigate other types of buried assets and options to predict and extend their life.

The solutions in this area will involve the use of:

- Digital technology to detect present conditions and likely failure points
- Smart sensors
- New materials
- Robotics
- Automation of data analytics
- Use of new technologies (such as fiber optics) for sensing and transfer of information in real time

Several sectors are involved in supporting the water industry through this endeavor. These include:

- University research organisations and DATA61 (a CSIRO initiative).
- Suppliers and manufacturers of structural pipe lining materials
- Smart sensor technology providers
- Data analytics companies
- Smart control providers

Australia is leading the world in this area. Successful delivery of this program would not only provide significant savings and therefore benefit to the economy, but also has the potential to provide a platform to develop internationally valuable expertise. The Federal Government could assist in progressing the longer-term bold, high-impact initiatives which would strengthen the opportunity for the international community to view Australia as a centre of excellence in this area, with commensurate opportunities for Australian suppliers, manufacturers, researchers and consultants.

Ensuring skills of the current and future workforce support firms in their ambition to realise Australia's vision to be a "top tier" innovation nation requires foresight into what skills are required by individual organisations, industry as a sector, and national skills needs. Analysis of current skills, identification of gaps and collaboration with training institutions to pair training courses with skill needs will be required. Investing in the workforce of today and the future so all participants in current and future work have the necessary skills to drive innovation and adapt to change will also be required. Stable investment may also result in improved retention of skilled staff within Australia so Australia doesn't lose talented people when funding dries up. Analysis of skills requirements would be most effective when undertaken by each of the contributors to research and innovation, including individual utilities, industry organisations and the Australian government.

Regulation of essential services (such as water supply and sewerage services) can unintentionally encourage water utilities to become risk averse. Regulation has also been viewed by the urban water industry as both an inhibitor and driver of innovation. The lack of coordinated goals in the urban water sector has led to inconsistent regulation with different outcomes across the nation. Individual utilities or regulation for a particular state can either improve or inhibit regulation.

Inhibition of innovation within the water industry has been cited as result of prescriptive regulation where the focus of industry is on compliance. An example of a change to a specific prescriptive regulation which has resulted in the development and implementation of innovative solutions is the Queensland Department of Environment and Heritage Protection voluntary market based mechanism for nutrient management (refer to Box 2). This regulation has enabled regulators and water utilities to look holistically at an issue and seek less expensive solutions with greater benefits to the region.

Box 2: Outcomes based regulation removing barriers to innovation

Environmental regulation of sewage treatment plants has traditionally focused on prescriptive environmental regulatory targets for parameters such as nutrients. Investments in sewage treatment plants are often driven by environmental regulations.

The environmental regulations in Queensland are the responsibility of the Queensland Department of Environment and Heritage Protection. The Queensland Department of Environment and Heritage *voluntary market based mechanism for nutrient management* offers an alternative investment option for regulated point source operators to manage their water emissions requirements.

The move from prescriptive sewage treatment plant discharge requirements to outcomes based regulation enabled Queensland Urban Utilities (QUU) and Unitywater to consider, evaluate and implement alternative approaches to meeting environmental requirements. QUU and Unitywater used the nutrient offset mechanism to invest in waterway improvements in lieu of more costly nutrient removal upgrades at sewage treatment plants. The Unitywater project is in development, the QUU project is being delivered as a pilot project for the *voluntary market based mechanisms for nutrient management policy*.

The QUU project has achieved the required nutrient reduction outcome (the regulatory outcomes based requirement), in addition to environmental benefits (reduced greenhouse gas emissions, improved biodiversity and stream cooling), community benefits (including direct benefits to riparian land holders), and drinking water quality benefits (the improved area resided within a drinking water catchment with water quality issues resulting from the channel erosion and sediment entering the river), thus resulting in greater value to customers and the community than a traditional sewage treatment plant upgrade. The pilot project will continue to run until 2019 and includes detailed monitoring and assessment to ensure outcomes are delivered.

Three highest priority responses for the Australian Government to address challenge 1 include:

- Investing in resources (jobs, facilities and human capital) and collaborative opportunities which aim to commercialise innovations and develop a more agile workforce.
Consideration could be given to encouraging this investment through:
 - Promoting pathways to commercialisation
 - Providing company tax incentives for organisations and/or industries who are investing in jobs focused on translating research into commercial outcomes
 - Developing incentives for provision of training and opportunities for enhancing employee agility to respond to new challenges and opportunities. This may help ensure current and future workforce have necessary skills, in addition to enticing international expertise and talent to Australia
 - Provide funding or tax incentives for the establishment and maintenance of facilities to develop and test new innovations. This will reduce a barrier to commercialization, potentially reduce time to market, and may facilitate collaboration between sectors
 - Provide co-investment funds or tax incentives for start-ups which are aligned with national strategic innovation priorities. Such incentives may span the initial few years of a start-up where cash flow is limited and product development is occurring
 - Provide incentives and/or partner with existing innovative leaders to co-invest in start-ups, incubators, accelerators and clusters of innovation activity to enhance knowledge sharing, cross-sectoral collaboration and marketing of Australia innovation. This may include incentives for international industries with proven success in commercialising technology to invest in Australian start-ups, potentially resulting in greater access to international markets and transferring innovation management knowledge to Australia
 - Providing tax incentives to undertake social and economic research to ensure innovations are developed with the end user and economic benefit in mind, with a consistent approach used to evaluating economic benefits and costs.
- Learning from success
 - Identifying international organisations in different sectors who are successful innovators and/or government innovation programs, document their methods and provide tools to implement approaches where they are transferable or can be adapted to Australian conditions
 - Encouraging organisations and industry groups to attract innovative companies to work with companies or industries either through the product development lifecycle or through knowledge, culture and skills exchange, particularly in relation to driving successful innovation.
- Outcomes based and consistent regulation
 - Identifying where changing regulation has encouraged a short-term focus to innovation and a disincentive for long-term investment, particularly for step-change research and innovation
 - Identifying and implementing regulatory change as a driver of long-term, strategic innovation with broad public benefit.

2.2 Moving, and keeping, Government closer to the innovation frontier

Culture is a significant driver or inhibitor of innovation. The Australian Government sets the national culture and appetite for innovation through setting strategic priorities, developing enduring incentives where there is broad public benefit and leading by example. Industry culture can assist with driving innovation and research that benefits industry, however individual utility culture is variable and can be influenced by the regulatory environment.

Urban water utilities are primarily public sector entities that are both influenced by government and influencers of the community and industry. The urban water industry is also a sector that works with Commonwealth and State science agencies to respond to challenges. Some utilities have their own innovation programs, however this is largely dependent on the culture of the organisation, degree of executive support, regulation and risk appetite. Those utilities that do have their own in-house technology development programs may make their technologies commercially available to others or share their knowledge with the industry.

Budget cuts, restructures, changing priorities and a lack of adoption of research, science and innovation within individual utilities, the industry and of Commonwealth and State science agencies can lead to a loss of talented staff, demoralisation of staff and the necessity to “chase” grant funding, which can divert resources from fulfilling the strategic role of aligning research to strategic priorities across all organisations. Lack of enduring support for and acknowledgement of scientific findings translating from research into policy and strategy can also be a disincentive for investment in science innovation and for people considering careers in STEM related industries given the transient nature of support and lack of employment security.

Government and public sector utilities have also been seen to inhibit innovation through existing procurement processes which incentivise tried and true responses. Utilities tend to be fast followers rather than adopters of new technologies, particularly in regional and rural areas. A holistic innovation approach for government, the urban water industry and public sector utilities, where the entire organization, industry and government bodies are involved in innovation, particularly those responsible for procurement, may overcome this issue and encourage knowledge transfer and acceptance of new innovations. Funding pilot scale programs which are closer to the technology adoption phase may also assist with reducing risk and therefore increasing the appetite of adopting new technologies or innovations.

In order to keep Government, the urban water industry and individual utilities close to the innovation frontier, an understanding of emerging opportunities and challenges and the community views and values are critical. This will assist in prioritizing funding at the utility, industry and Government level achieve the greatest investment value for the utility and its community, the water industry, and the Australian people respectively. To best understand how to prioritise investment, research into both community values and economic value where no market exists is required. These areas are not currently covered by the research tax incentive.

Urban water utilities, the urban water industry and Government also develop and collect data which, if made publically available, may be useful for other businesses, industries and countries to use, particularly in relation to undertaking research and developing innovative solutions to problems or opportunities.

Three highest-priority responses that Government may consider to address this challenge are as follows:

- Leading by example. Government culture is reflected in the policy and regulatory landscape impacting on businesses and their appetite for innovation. To lead by example, government could consider:
 - Developing an innovative and collaborative culture across all sectors of government
 - Promoting examples of where science and innovation has been used to develop evidence based policies and funding is aligned with delivering towards achieving strategic targets for the good of the Australian people
 - Encouraging collaborative planning between different government departments to reflect the convergence of industry and the need to collaborate to address future challenges and remain a leader in emerging markets.
 - Developing bi-partisan long-term strategic direction for strategic innovation and research priorities to encourage which may encourage more disruptive innovation as opposed to incremental innovation
 - Including social and economic research incentives in the research and development tax incentives
 - Public sector efficiency targets may also be introduced to incentivise innovation, particularly where innovation can be attributed to goals established in policy. The Water industry once had water efficiency goals included in the National Water Initiative, and it was during this period that the market responded to water efficiency goals through developing water efficient appliances, educating the community and industrial and commercial sector water efficiency.
- Engagement with communities to understand the broader economic value proposition as a reflection of public sentiment, and incorporate this in innovation priorities, incentives and funding. This may be achieved through:
 - collaboration between sectors with clearer liveability targets to foster collective innovation, knowledge sharing and cross-sectoral efficiency gains
 - including a greater cross section of industry representatives, SME's and end user representatives on panels deciding on grant funding.
- Reducing Government impediments. This may be achieved by
 - incorporating innovation requirements in procurement
 - removing regulation which unnecessarily inhibits innovation
 - incentivising innovation through changes to taxation, introduction of targets and grants which align with strategic innovation priorities and where Australia has or can have a competitive advantage
 - Providing greater access to data and information
 - Considering regulation which requires greater publication of information which may be useful to other sectors or businesses to progress research and innovation.

2.3 Delivering high-quality and relevant education and skills development for Australians throughout their lives

Australian water utilities and the Australian water industry has a history of collaborating with the research sector to deliver further education opportunities and exchange knowledge between utilities and the research sector.

The Australian water industry has been successful at linking research students with industry and vice versa, particularly in the traditional STEM disciplines. Some research institutions run an active PhD, MSc and Honours program linking research students to the water industry. Examples include WaterRA, ICE Warm, and the CRC for Water Sensitive Cities.

Research questions generally originate from a utility who provides co-funding and guidance to the student, thus ensuring the research is applicable to solving an industry question (problem or opportunity). This also ensures the student has some industry experience and a higher likelihood of finding a job on graduation. Sometimes a student can be embedded within a utility for a few days a week through the period of study which fosters ideas exchange and enhances the probability of translating the research outcomes into the organisation.

During more affluent times, some utilities were prepared to sponsor staff members to undertake further studies, including a Masters or a PhD where the subject related to an area of research identified as a need for the organisation. The utility contributed up to 2 days of work time per week for the student to work on a research or innovation project that was directly related to the organisation. Incentives in leaner times may result in a greater likelihood of progressing such opportunities.

WSAA recognises that the skills of today's workforce may not be best equipped to respond to the risks and opportunities of the future. The ability of new entrants to the workforce, in addition to the existing workforce developing and maintaining skills which are relevant to the changing environment will be critical to harness new and innovative technologies, processes and systems.

WSAA is currently working with the Australian water industry to identify the water industry's workforce skills of the future and develop responses to address notable capability gaps. Other international water industry bodies have also become involved in the work being led by WSAA on behalf of the urban water industry.

To date, the work has identified that key enablers to address water industry capability gaps include:

- Leadership – change management, strategic planning, learning mindset, communication and culture
- Network skills, technical skills, engineering general operations, risk management, innovation, knowledge management
- Data analytics, digital literacy, the Internet of Things (IOT)
- Delivery models
- Entrepreneurship (internal/external) – innovation
- Customer Service Focus
- Partnerships and collaboration.

It is not just new entrants to the industry who should be considered when contemplating education and skills development, this is very much a necessity for all employees to thrive in a rapidly changing environment. As people progress through their careers, there is need for flexible and easy access to education and training, re-skilling and up-skilling.

The delivery of high-quality and relevant education and skills development for Australians is likely to be enhanced if training institutions, including the University and TAFE sectors, understand

industry training requirements and aligning courses to meet their needs. This will require greater collaboration with government, the water industry, individual utilities and the university sector.

Highest priority responses Government may consider in response to this challenge include:

- Tailoring education to meet future industry needs. Greater collaboration between industry and education sectors can result in greater alignment of education and training to meet the needs of industry. Government may also identify skills requirements of the future based on input from all industry sectors and work with the education sector to address the future skill requirements. The outcome will likely be to enhance the employability of people undertaking training, in addition to positioning industry to better respond to challenges and opportunities. Increased collaboration between industry and education sectors may also result in additional people and idea exchanges between sectors. Research sector incentives to provide high-quality and relevant education and skills development may be awarded based on results driven outcomes such as employability of graduates, application of skills in the workforce
- Encouraging agile learning. To enable an agile workforce, consideration may be given to future skills requirements and tailoring courses to meet existing and future needs, in addition to shifting from applied approaches to learning towards subjects and/or courses which strengthen skills in analysis, strategic thinking, communicating to a broad range of audiences, logic, customer engagement and entrepreneurship. Learning opportunities should be targeted to meet the needs of people at different stages of their careers to promote life-long learning.
- Industry/individual organisation incentives for human capital investment. Encouraging industry to invest in their employees where related to achieving strategic, research and innovation priorities may result in more employees engaging in training and development and a more agile workforce. This may focus on STEM areas initially, but potentially broader areas of study/knowledge adoption which will enable enhanced workforce agility and adoption of innovation. Industry incentives may be achieved through:
 - Incentivising research institutions to adapt courses to meet the changing skills requirements of industry in addition to subjects which improve agility such that students graduate with relevant workforce skills and/or have opportunities to learn new skills throughout their careers, thus adapting as skill requirements change
 - Increase industry incentives to enable their workforce to continually improve through training and education that aligns with priority innovation areas and emerging opportunities
 - Incentivising training in relation to non-traditional skills for the sector such as entrepreneurship, innovative leadership, networking and knowledge management. Consideration could be given to greater linkages with both university and TAFE sectors to deliver a broader range of skills to the workforce which may lead to a greater rate of adoption and commercialisation of innovations. Incentives may need to be considered for employers, training institutions and employees
 - Incentivising collaboration within and between industries to encourage innovation, cross-sectoral learning and learning of non-technical skills to enhance adoption of innovations.

2.4 Maximising the engagement of our world class research system with end users

Partnerships and collaboration between research institutions and all elements of a value chain maximise the engagement of the research system with end users and increase people, idea and facility exchange and adoption of new innovations.

Adoption of Innovation in the water industry has been particularly successful when developed through ARC linkage grants, which are seen as an excellent way to bring university researchers and industry together to achieve practical outcomes. The ARC linkage grants can, however, be limited in relation to industry involvement, funding cycles, extended project durations from concept to delivery and limited accountability of delivery outcomes.

To enhance the success of ARC linkage grants, consideration of including industry members on the evaluation or review panel for awarding of grants, in addition to developing ARC linkage rules that focus on translating Australian innovation into commercial outcomes. Government programs for industry to address technology gaps and turn science into application would also be of great benefit, particularly if there was a creation and development pathway for technology similar to the CRC Linkage program methodology.

Australian urban water utilities are increasingly recognising the benefits of collaboration with the research sector. Some utilities have partnered with universities to foster exchange of knowledge to benefit research partner and utility partner alike. An example of this is the collaboration between Hunter Water and the University of Newcastle (Box 3).

Box 3: Partnerships between urban utilities and the research sector

Hunter Water and the University of Newcastle recently signed an MOU to launch a research partnership to tackle the challenges of the growing community and take advantage of the opportunities presented by technology change and advances in service delivery to meet the needs of the future community. The partnership is one that focuses not only on traditional STEM capabilities, but also areas of emerging importance for maintaining a customer centric utility, including social science, the environment and information technology. Hunter Water will share expertise in the areas of resilience, economics and learning, in addition to resources.

The outcomes of this partnership are expected to build the capacity and sustainability of the region, draw on the knowledge, skills and capability of both the University and Hunter Water, and work to safeguard water – a vital resource for the region.

Another example of the water industry engaging with the research sector and start-ups to improve the commercial viability of new innovations is the example of Sydney Water who assisted a start-up, Abyss solutions, to refine their service of underwater surveying and data analytics for asset assessment to increase the likelihood of commercial uptake of their product (refer to Box 4). The unusual element in relation to this project is that funding largely came from a global venture capital fund, with a small stake held by a Telstra start-up accelerator.

Box 4: Start-up innovations and the urban water industry

Sydney Water worked with Abyss solutions as a start-up client to help guide and shape a new innovation which help Sydney Water manage their assets and reduce workplace health and safety risk.

Abyss solutions remote underwater sensors and data analytic capability is addressing a global water industry problem of assessing underwater asset conditions, identifying potential risks and assessing the risks of these assets. The service provides enhanced ability to manage assets and risks prior to significant and costly failures.

The technology enables identification of damage to underwater infrastructure far earlier than the current method of scuba-diving engineers could. This innovation reduces workplace health and safety risks associated with sending people to inspect underwater assets, increases the ability to identify and resolve asset risks long before they become a significant concern, and can reduce the time associated with inspections and analysis of risk.

According to their website, the Abyss Solution founders were involved in various fields of research which spanned “Marine Robotics, Civil and Geotechnical engineering, Optical sensor technology, data analysis and economics”.

To address this challenge Government may consider increasing the funding for programs which engage with all elements of the value chain such as ARC linkage grants and CRC programs and across the three horizons of research, from short-term improvements to blue sky research.

2.5 Maximising advantage from international knowledge, talent and capital

The Australian water industry recognises the value of international knowledge exchange. WSAA has engaged with international water industry bodies and developed partnerships to leverage funding and exchange of knowledge across international boundaries. The Australian water industry has both led and contributed to international collaboration in research and innovation in the water sector as individual utilities and as an industry. This remains critical to leveraging value of industry members, facilitating talent and capital flow across the water sector, and developing potential future markets for innovative goods and services generated through collaboration.

Australia is currently an attractive destination for researchers due to the climate, security and lifestyle. It is also seen as a global leader in some key areas, including water security, managing ageing assets and integrated water management.

Barriers to maximising advantage from international knowledge, talent and capital include barriers to travel, particularly internationally.

It is therefore important to maintain or improve the elements which attract talent and capital flow to Australia, whilst improving on the elements for which we have less existing advantage and which inhibit opportunities to best access international knowledge, capital and talent.

Highest priority responses for Government to address this challenge include:

- Maintaining and investing in the liveability of our cities and regions. This can include undertaking community research into the aspects that they value, what they would like their future regions to look like and incentivising research and innovation which meets future needs
- Identifying areas of competitive advantage where Australia is able to respond to global challenges and encourage international co-investment and/or collaboration. Additionally identifying areas where Australia can improve and increasing funding for innovation and science related travel or reducing impediments,
- Identifying areas where Australia has less advantage and co-investing or encouraging collaboration with global leaders.

2.6 Bold, high-impact initiatives

The cyclical short-term nature of policy and government incentives has resulted in a greater instance of incremental innovation and lower instances of high-impact initiatives.

Changing business, industry and government priorities and accompanying regulatory or policy change incentivises short-term innovation rather than longer-term strategic investment in potentially game changing innovation. Recent examples of this within the urban water industry include climate change and recycled water policies. Both topics are influenced by National, State and local government agendas, with drivers changing with political cycles.

Outcomes focused regulation which reflects community values can enable innovation and involvement of regulators in the innovation process so they can better understand new innovations and are more likely to be accepting of them.

Areas and initiatives which would achieve greatest impact and are burning platforms for Australia include climate change, the water-energy-food nexus, building resilience, long-term sustainability and liveability of our cities and regions. Each of these areas spans multiple sectors, are long-term issues and require collaboration to achieve significant outcomes.

Options Government may consider to address this challenge include:

- Working through examples of what collaborative research and innovation programs in national priority areas may look like, including targets, resources and sectors to be involved
- Developing long-term bi-partisan strategic priorities for research, science and innovation based on national priorities and delivering sustained greater public good to the Australian population
- Provision of sustained support for research initiatives in order to develop the in-depth expertise which takes research into innovation, and persuades potential students that there is a long-term career ahead of them and therefore it is worthwhile to invest their time in undergraduate, postgraduate and postdoctoral research. This may also lead to attraction of best international researchers and retention of Australia's best research and innovators, reducing the likelihood that they will look for opportunities overseas where the research climate is less changeable.

3.0 Contact Details

WSAA welcomes the opportunity to discuss this submission further.

If there are any details you wish to follow up on please contact:

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