

Productivity Commission Inquiry into National Water Reform

Submission in relation to matters raised in the Inquiry's *Issues Paper*, March 2017

Summary

The Productivity Commission (PC) is undertaking an Inquiry into progress with the reform of Australia's water resource sector. The particular emphasis is to be "on the progress of all Australian governments in achieving the objectives, outcomes and timelines anticipated under the 2004 Intergovernmental Agreement on a National Water Initiative (NWI)." The Inquiry has also been asked to assess progress against the recommendations in the National Water Commission's (NWC) National Reform Assessment 2014.

This submission focuses on the urban water services component of the NWI and in particular on the Inquiry's Preliminary Framework of National Water Reform Priorities as presented in the PC's *Issues Paper* of March 2017.

The Inquiry's Preliminary Framework (reproduced here at Attachment 1) has focused on the outcomes that drove the original NWI 2004 agreement and more recently the 2014 Assessment. We contend that this initial focus is not wide enough to allow due consideration of new global drivers that have emerged in recent years.

This Inquiry provides an opportunity to broaden the national water reform agenda to embrace critical water resource issues that drive the resilience, liveability and ultimately the productivity of cities. The submission recommends an additional national water priority and relevant sub components related to integrated water cycle management (IWCM) in urban areas.

Background

In establishing the NWI in 2004 the Parties (COAG) agreed that the outcome for urban water reform was to:

- i. provide healthy, safe and reliable water supplies;*
- ii. increase water use efficiency in domestic and commercial settings;*
- iii. encourage the re-use and recycling of wastewater where cost effective;*
- iv. facilitate water trading between and within the urban and rural sectors;*
- v. encourage innovation in water supply sourcing, treatment, storage and discharge; and*
- vi. achieve improved pricing for metropolitan water*

The current PC's National Water Reform Inquiry's *Issues Paper*, in the section on Urban Water Services, invites submissions on:

- *What policy and institutional arrangements are needed in the urban water sector to improve the efficiency of service provision?*
- *What approach should be taken to price regulation in the urban water sector? Is there a need for greater consistency in price setting approaches across different jurisdictions? Do current pricing practices promote investor confidence?*
- *Is there a case to increase the involvement of customers in regulatory decision making, as is commencing in Victoria? If so, what is the best way to do this?*
- *How can the level of competition in the provision of urban water services be increased?*
- *Do water and wastewater services delivered to regional and remote communities, including Indigenous communities, comply with relevant public health, safety and environmental regulations? If not, what policy remedies might improve performance?*
- *Do the processes for determining public health, safety and environmental regulations applying to urban water providers promote cost-effective and targeted regulations? Do the various policy-making and regulatory bodies have clear roles and responsibilities?*
- *What is the importance of integrated water cycle management? Are roles and responsibilities in relation to this clear?*
- *How can demand management approaches such as water restrictions and water-use efficiency measures best contribute to the efficiency of urban water services?*

These questions are understandable in the context of the reform outcomes that the NWC developed in 2004. However, since these outcomes were crafted significant changes have occurred that have resulted in additional and broader drivers for our water reform priorities. The PC *Issues Paper* has listed climate change and population growth as current challenges. These challenges are widely understood and supported as a basis for determining national water reform priorities. However there are two strategic changes that have had significant implications for any new water reform priorities and need to be fully incorporated into the deliberations of the Inquiry:

1. The Australian Government's commitment to the UN Sustainable Development Goals and related Paris Agreement on emissions reductions.
2. A realisation that the liveability and resilience of urban areas are drivers of human wellbeing and economic prosperity – and that livability and resilience are, in many areas, directly related to water systems management - and that these outcomes can only be achieved if water planning is fully integrated with urban planning and design at the earliest phases of the planning processes.

1. Sustainable Development Goals

Clause 55 of the UN SDG Resolution¹ states that

“the Sustainable Development Goals and targets are integrated and indivisible, global in nature and universally applicable, taking into account different national realities, capacities and levels of development and respecting national policies and priorities. Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each Government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies. It is important to recognize the link between sustainable development and other relevant ongoing processes in the economic, social and environmental fields.” (our emphasis).

We note that many of the SDGs are relevant to both developing and developed countries and in this respect urban water management can make a significant contributes to economic prosperity (SDG 8 and SDG 9); improved health (SDG 3); social inclusion”(SDG 5 and SDG 10); the liveability and sustainability of our cities (SDG 11) and environmental sustainability (SDG 13, SDG 14, and SDG 15)².

Current Australian policies and guidelines for water management will ensure that urban areas in Australia will achieve many of the SDG 6 targets (such as SDG 6.1, universal and equitable access to safe and affordable water and sanitation) **but achieving SDG 6.5 (integrated water management)³ and SDG 6.6 (protecting and restoring water-related ecosystems) is still very much work-in-progress.** This submission contends that, consistent with Australia’s SDG obligations, national water reform priorities should be developed that incorporate these SDG in particular into national water policies and strategies.

¹ Resolution adopted by the General Assembly on 25 September 2015 70/1. Transforming our world: the 2030 Agenda for Sustainable Development.

² John Thwaites – 2016, IWA World Congress, Keynote Address

³ SDG 6.5 states “By 2030, implement integrated water resources management at all levels..”

The Monash Sustainable Development Institute has analysed the interrelationships between SDGs and for the purpose of this Inquiry is making a high level recommendation that the SDG 6.5 (Integrated Water Resources Management) be the organising centrepiece of a new reform priority. That is:

It is recommended that the Inquiry's Reform Framework (see Attachment 1) include a new national water priority:

that Integrated water management strategies (IWMS) be set as a requirement by all governments, to be incorporated across all urban planning activities.

Furthermore, within the Inquiry's Framework a first sub-component of this new priority should be:

- **All IWMSs to take full account of their interrelationships with (and the national obligations and responsibilities for) the delivery of relevant interrelated SDGs**

(Note we are recommending that this new Priority replace the sub-component in the Inquiry's Preliminary Framework that "*water services providers consider IWCM in their planning*".)

Australia's climate change commitments

As part of its commitment to the SDG Agreement, Australia has a responsibility to "take urgent action to combat climate change and its impacts" (SDG 13). More specifically:

"13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning."

This commitment was strengthened by the Paris Agreement signed by 194 countries including Australia that covers emissions reduction, adaptation and finance and commits to limit global warming to well below 2 deg. C above pre-industrial levels. The Agreement came into force on 4 November 2016.

The water sector has a major part to play in achieving these objectives. Urban water systems produce significant amounts of GHG emissions, indirectly influencing around 13% of Australia's electricity and 18% of Australia's natural gas use in the

average case. The new national water reform outcomes and priorities therefor need to broaden the scope of “efficiency” measures to include energy efficiency of water corporations.

However, potential efficiency gains in the urban water sector go beyond just the “core business” that water corporations have direct control over. The total energy used by water corporations to store, treat, deliver water to customers and then subsequently collect, treat and dispose of waste water from properties *is less than 10% of all energy used* in the total urban water cycle. There are 3 areas of urban water system management that can provide significant reductions in GHG emissions - i) the management of water use in residential households; ii) water use in industrial and commercial properties⁴; and iii) water for use in cooling urban areas.

i. The use of water in residential households

Within the total *urban water cycle*, commercial, industrial and residential customers account for around 90% of energy use - *of which residential use may account for nearly 40%*.

In relation to water related energy use, by far the biggest contributor to GHG emissions can be the heating of hot water – which in some cases can account for up to 50% of household GHG production.

Water corporations have some ability to inform and perhaps influence the consumption patterns of their residential customers, but it is not their primary responsibility. National whole-of-government federal and state leadership is necessary to drive significant gains in these areas, involving collaboration between water corporations, energy utilities, government agencies and the private sector.

ii. the use of water in Commercial and Industrial properties

The energy component of water used in commercial and industrial uses can be as high as 50% of the energy used in the total urban water cycle. Because of the wide range of uses of such water more work is required to identify where efforts should be directed to maximize reduction of GHG emissions. However, strong leadership driven from the national water reform agenda could deliver significant gains in the form of lower customer costs and delivering on the national GHG commitments.

iii. The use of water to minimise urban heat stress (as an alternative to the use of air conditioners in heat waves)

Heat waves have already significantly impacted human health (through increased

⁴ See for example, S Kenway, S. J., Lant, P. & Priestley, A. 2011 [Quantifying the links between water and energy in cities](#). Journal of Water and Climate Change 2 (4), 247–259.

rates of morbidity and mortality due to heat related stress), the lifespan and operation of critical infrastructure and the environment. CSIRO and Bureau of Meteorology predict the number of days over 35°C in Melbourne per annum may increase from an average of 11 days (from 1981 to 2010) to 13 days by 2030. Under these circumstances the use of air-conditioning will increase significantly.

A more low-energy way of managing the increase in urban heat stress is the development of cooler and greener houses and local urban precincts by the use of water sensitive city planning and design (by the adoption of water sensitive city approaches that lead to more green spaces in public and private domains, increased canopy cover, increased soil moisture all of which lead to lower temperatures in urban areas).

A good deal of work has been undertaken and continues to be researched to document the scale and benefits of these heat island mitigation measures⁵. Suffice to say that Monash Sustainable Development Institute would welcome the opportunity to provide further evidence to the Inquiry on the scale and scope of the opportunities outlined here.

It is recommended that the proposed new national water priority on IWCM (See Page 4)) contain two additional sub-components related to supporting out SDG and Paris Agreement obligations:

- **That Federal and state governments require and empower all IWCMs to take full account of opportunities to drive greenhouse gas reduction opportunities in all components of the water cycle. This requirement is to cover those emission reduction options that are the direct responsibility of the water sector and those that can be achieved only by the water sector collaboration with other parties.**
- **That state governments require water corporations under their control to set appropriate targets and pathways to achieve GHG emission reductions consistent with Paris Agreement obligations.**

⁵ Newton, P., Bertram, N., **Tapper, N** and J. Handmer, 2017 “Climate change and Australian cities.” Chapter 12 in Tomlinson, R. and Spiller, M. (eds) *A Metropolitan Reform Agenda in Australia*, CSIRO Publishing, accepted for publishing April 2017

and also

Jamei, E. and **N. Tapper**, 2017 “Water sensitive urban design for urban heat mitigation.” Chapter 11 in Sharma, A (ed) *Water Sensitive Urban Design*, IWA (International Water Association)

2. The importance of IWCM strategies that integrate water systems planning with urban planning processes.

The Inquiry's *Issues Paper* states that

“households and businesses are increasingly using more decentralised urban water services such as local collection and treatment of wastewater and stormwater for reuse. Proponents argue that these ‘integrated water cycle management’ approaches can reduce the impact of droughts on urban water supply, and improve urban amenity or ‘liveability’. In some cases they will offer water that is lower cost than existing sources, and in other cases they will be higher cost. However, assessments of whether they should be adopted in a given case can be complicated because some of their benefits are difficult to quantify.” (our emphasis)

Within the Inquiry's Preliminary Framework IWCM is given only conditional endorsement as a sub-component of the Water Services priority:

- *water service providers **consider** integrated water cycle management in their planning. (our emphasis)*

The *NWC Urban Water Futures 2014* also makes reference⁶ to the role of urban IWCM, although with significant caveats:

Mechanisms for encouraging effective engagement across the ‘interfaces’ between different aspects of integrated water cycle management or with the wider urban planning system can be resource intensive and add to the time required to make key decisions. Engagement structures to ensure that decisions makers consider the full costs and benefits of their decisions (particularly if they do not bear those costs or capture those benefits) are not well developed and are complex to create.

Balanced against the potential gains from greater coordination and engagement, however, is the need for water businesses to have a clear focus on core business. As WSAA has indicated, the industry has a key role in delivering on liveability, but in developing its role, it should also ‘maintain focus on its primary function which is to supply safe and reliable drinking water and sewerage services’. In a similar vein, other submissions suggested that efforts to achieve more integrated approaches to urban liveability

⁶ NWC 2014, Page 26

outcomes should be focused on where they are likely to yield the most significant benefits at lowest cost. In this regard, they suggested that the most cost-effective application of integrated water cycle concepts is in new residential developments and growth areas, due to the significant costs of retrofitting existing infrastructure.

The NWC and PC recognise the potential role of IWCM but have not promoted it as a major plank of urban water reform because IWCM is “resource intensive” and “time consuming”; “complex to design and evaluate”; and may be appropriate for application “only in greenfield development “. All of these conclusions need closer examination.

By not embracing IWCM and water sensitive city (WSC) principles⁷ as a major priority in its review the Inquiry would be ignoring a considerable body of new theory **and practice** in IWCM that demonstrates the delivery of efficiency savings and productivity improvements in many forms.

IWCM and associated water sensitive city planning approaches are now central to the planning frameworks of key policy and planning institutes at both global and local levels, as illustrated in the following sections.

a. The UN definition of urban water security.

The National Water Commission refers to the ‘urban water sector’ as the institutions responsible for (or impacting) the supply of a reticulated water or wastewater system and associated services to large cities.⁸

Within this context the definition of urban water security usually relates to the ability of water supply system to provide a level of supply to meet demand at a prescribed statistical confidence level.

However, the United Nations has adopted another definition of water security that takes a broader view of water in a whole-of-catchment context:

Water security is defined as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.

Water security encapsulates complex and interconnected challenges and highlights water’s centrality for achieving a larger sense of security, sustainability, development and human well-being. Many factors contribute to

⁷ For explanation of WSC principles see Brown,R., Rogers,B.,Werebeloff. L.(2016).Moving toward Water Sensitive Cities. CRC for Water Sensitive Cities

⁸ NWC. (2014). Urban Water Futures, P1.

water security, ranging from biophysical to infrastructural, institutional, political, social and financial – many of which lie outside the water realm. In this respect, water security lies at the centre of many security areas, each of which is intricately linked to water. Addressing this goal therefore requires interdisciplinary collaboration across sectors, communities and political borders, so that the competition or potential conflicts. The post-2015 process must incorporate a goal and related targets for achieving water security, as this will address multiple priority development areas under consideration: conflict and fragility; environmental sustainability; growth and employment; health, hunger, food and nutrition; inequities; energy; and of course, water. It is safe to state that investment in water security is a long-term pay-off for human development and economic growth, with immediate visible short-term gains.⁹ (our emphasis)

It should be noted that in 2014 the NWC did recognise that a broader role for water authorities was emerging when it reported that:

The evolving boundaries of the urban water sector, and greater interactions between natural and manmade systems, present both challenges and opportunities. Nexus issues between water, food security, urban planning and energy are emerging as priorities, and liveability outcomes are shaping new urban water partnerships and changing the nature of the urban water sector.

Based on the need for the water industry to work in close collaboration with the urban planning sector **it is recommended** that the proposed new national water priority on IWM (See Page 4) contain a **fourth** sub component:

That federal and state governments require all IWCMSs to adopt a broad definition of water security that embraces the definition developed by United Nations.

b. International Water Associations Principles for Water Wise Cities

In October 2016, at the World Water Congress in Brisbane, the International Water Association launched a set of Water Wise Principles¹⁰. The Principles had been developed over a nine year period at five major world conferences. The principles have now been formally endorsed by nineteen cities and organisations¹¹.

⁹ UN-Water Analytical Brief on Water Security and the Global Water Agenda, 2013

¹⁰ www.iwa-network.org/projects/water-wise-cities

¹¹The cities who endorsed the IWA Water Wise principles are: Brisbane, Dakar, Kampala, Lyon, Kaohsiung, Kunshan, Shenzhen, and Sydney. The water utilities who endorsed are: HOFOR – Greater Copenhagen Utility, Melbourne Water, South East Water, and City West Water and Yarra Valley from Melbourne, and Waternet –the Amsterdam water and energy utility. In addition, WaterAid also officially endorsed as a means to support their work with developing Cities, and the following industry leaders endorsed the principles as being aligned with their work: Arcadis, Arup, Ramboll, Schneider Electric, Suez, Veolia, and Xylem.

The Principles present 5 building blocks for implementation, which enable 4 levels of action. The five building blocks include developing a shared water vision and set of outcomes within the city as a first step on the path to becoming a “water-wise city”.

The 4 levels of action are:

- Regenerative water services for all.
- Water sensitive urban design
- Basin connected cities
- Water wise communities

Importantly the Principles were developed to align with the UN Sustainable Development Goals on water (SDG-6) and cities (SDG-11) and provide IWA members with a comprehensive framework within which many of the other SDGs closely interlinked with water can be delivered at a city level.

c. The Victorian Government’s Water for Victoria Plan

Most state governments have adopted some form of policy framework and guidelines around IWCM¹². The most recent integrated water policy is the Victorian Water Plan, *Water for Victoria*

The Victorian *Water for Victoria* policy states

The government’s approach to urban water management links all aspects of the water cycle and water services planning, and aligns this with land use planning.

To achieve this the Water Plan prescribes “a systematic approach to integrated water management planning by:

facilitating integrated water management forums to identify and prioritise places that would most benefit from a place-based plan—in Melbourne these will be based on five waterway catchments and in regional areas on the boundaries of the regional urban water corporations

requiring the development of place-based integrated water management plans, with water corporations leading the development of these plans, unless it makes sense for another organisation to do so

supporting the development of agreements between participants about who is responsible for actions

requiring water corporations to incorporate integrated water management in all their planning, including urban water strategies, and the strategies prepared by

¹² See WSAA. (2014) Occasional Paper 29 – Urban water planning framework and guidelines

*Melbourne Water for water, sewerage, waterway health and flood management.*¹³

The Minister for Water subsequently reinforced this intent by requiring urban water corporations in Victoria to clearly articulate in their key strategic business plans the objectives that will deliver resilient and liveable cities and towns.

The new Victorian approach contains three critically important aspects of IWCM:

- i. The requirement that place-based liveability and resilience outcomes¹⁴ be developed with all stakeholders at the outset of the planning process. These outcomes are
 - Safe, secure and affordable supplies in an uncertain future
 - Effective and affordable wastewater systems
 - Effective stormwater management protects our urban environment
 - Healthy and valued urban landscapes
 - Community values reflected in place based planning
- ii. Within the framework of water sensitive city planning approaches, the integrated but unconstrained consideration of all water system options to meet the required outcomes (*from* centralised assets such as desalination plants *to* neighbourhood of lot-based water systems; *from* large water sensitive urban design features that provide flood mitigation *to* smaller scale WSUD features that provide ecological improvements from biofiltration processes and public health benefits from urban heat mitigation.
- iii. Explicit consideration of agreements between participants about who is responsible for actions

As already mentioned, the Inquiry's *Issues Paper* has reported on comments from stakeholders that "*assessments of whether they (IWCM strategies) should be adopted in a given case can be complicated because some of their benefits are difficult to quantify*". To address this issue *Water for Victoria* commits the Victorian government to supporting the implementation of integrated water management planning by:

*working with water corporations to develop a common economic evaluation framework, which can account for different planning scales, local conditions and the multiple benefits of proposed investments*¹⁵.

¹³ Victorian Department of Environment, Land, Water and Planning. (2016). *Water for Victoria, Water Plan*, P93.

¹⁴ Ibid Figure 5.1

In this respect the Cooperative Research Centre for Water Sensitive Cities is responding to stakeholder and CRC Partner calls to develop a new economic evaluation framework to identify and quantify economic and community values of investment in water sensitive practices and systems.

The CRC evaluation framework will provide:

1. A tool to assist in the identification and monetisation of non-market or intangible benefits from various types of investment in water-sensitive cities. It will cover benefits related to ecology, water quality, recreation, aesthetics, and urban heat (affecting mortality, health, power costs, economic productivity and comfort).
2. A comprehensive tool specifically designed for conducting benefit-cost analysis of investments in water-sensitive cities, integrating non-market benefits, market benefits, bio-physical effects, behaviour change, risk and uncertainty, time delays, and costs (including up-front and maintenance costs).
3. Advice on finance models and policy approaches to foster investment in water-sensitive cities where benefits are not necessarily captured by those who bear the costs.

The processes and tools required to undertake IWCM strategies are, as outlined above, more complex than the conventional “supply-demand” strategies that respond to average conditions across a city. But the evidence is mounting that the community-wide benefits of tailoring solutions to meet specific regional or local needs can be significant – providing a new society-wide perspective to efficiency and effectiveness. **Attachment 2** provides a short selection of projects that demonstrate how, by embracing the complexity of IWCM processes, innovative and efficient solutions can be developed that address the challenges and obligations established by the SDGs and other policy initiatives set out in this submission.

In other words, instead of an approach that provides for “water services authorities to consider IWCM in their planning”, a new water reform priority should be that water authorities must undertake IWCM in their planning, following a process¹⁶ that

- Engages citizens and stakeholders to determine the unique liveability¹⁷ and resilience outcomes desired in a particular area
- Reviews what role water plays in delivering these outcomes
- Identifies how water planners can best collaborate with urban planners and other sectors to most efficiently achieve these outcomes
- Identifies the best water solutions for the circumstances – whether they be

¹⁵ Ibid,P95

¹⁶ See Ferguson, B., Frantzeski, N., Skinner, R., Brown, R. (2012), Melbourne’s Transition to a Water Sensitive City. Monash Water for Liveability.

¹⁷ For more detailed discussion on liveability factors see Johnstone, Phillip, , et al. (2012), Liveability and the Water Sensitive City. CRC for Water Sensitive Cities and Victorian Dep. Of Sustainability and Environment.

centralised or “decentralised” options, or structural or non-structural (planning, regulatory, pricing, etc) options.

It is therefore recommended that the new national water priority on IWM (proposed on Page 4) contain a fifth sub component:

- ***That federal and state governments accept that different cities (and different parts of any particular city) have varying bio-physical and socio-economic characteristics and, as a consequence, require IWCMs to embrace such differences and develop solutions appropriately.***

Further Information on this submission

This submission has been prepared by Monash Water Sensitive Cities, a business unit of the Monash Sustainable Development Institute (MSDI).

The aim of the submission has been to present the Inquiry with high level recommendations in response to the Inquiry’s March 2017 *Issues Paper*. Whilst we have provided some key references to support our recommendations there is a wealth of research experience and practice to justify our positions and we would welcome the opportunity to provide further information and advice on these matters should the Inquiry wish.

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ATTACHMENT 1: Recommended Preliminary Framework – national water reform priorities

From Table1, Productivity Commission’s National Water Reform *Issues Paper*, March 2017.

Water resources management

Priority: Property rights for water are clear and secure

Clear and secure property rights are important to provide entitlement holders with certainty to encourage long term investment. They are crucial to the establishment and functioning of water markets and an important component of sustainable environmental management. Property rights should:

- include all available water sources (as far as practicable)
- be legally recognised
- be explicit – outlining the maximum extraction volume allowed to be taken and the relationship between allowable extraction and water availability in any season
- be separate from land title and tradeable.

Priority: Processes for determining allocation and sharing of water are transparent, inclusive, and cost-effective

Water planning processes are important, including because they identify the share of water for consumptive and environmental purposes. Water planning processes should:

- be timely, transparent and open
- be based on best available information
- involve communities and stakeholders
- be adaptive
- manage uncertainty.

Priority: Water is able to be traded to its highest value use

Water trading enables water to move to its highest value use within a water system, providing the driver for greater productivity. For individual entitlements holders, it provides a business tool to enable them to respond to changing climatic conditions/circumstances. In order to achieve this

- trade should be enabled for all water systems where this offers net benefits
- any restrictions on trade need to be appropriate and efficient
- costs and delays of trading should be minimized
 - water market participants should have access to timely and accurate information
 - trade should be underpinned by adequate measurement, monitoring and water accounting systems.

Priority: Environmental management is efficient and effective

Sustainable management of water environments is a critical component of water resource management, underpinning the integrity of property rights and the functioning of water markets. Sustainable management of water environments may entail:

- providing a share of water for the environment and dealing with over-allocated systems where agreed
- ensuring there are appropriate institutional and regulatory arrangements for efficient environmental water use
- integrating catchment management and other complementary resource management activities. compo

Water Services

Priority: Rural and urban water services are provided efficiently

Efficient delivery of infrastructure services has a direct effect on the availability and cost of water. It is important that appropriate incentives are in place to ensure that those entities delivering water provide a reliable service, meet relevant standards and plan for the future. Among other things, it is important that:

- the security, quality and cost of water services are balanced in accordance with consumer preferences
- institutional and regulatory arrangements are adaptive and create clear roles and responsibilities for policy makers, regulators and services providers
- prices are cost reflective and there are limited cross subsidies in pricing regimes
- public health and environmental impacts are managed efficiently and in accordance with community expectations and standards

- water service providers consider integrated water cycle management in their planning. **It is recommended this component be deleted and replaced with the new priority as proposed below.**

New Priority Recommended in this submission:

Priority: Integrated water cycle management strategies (IWCMs) be set as a requirement by all governments, to be integrated across all urban planning activities.

- All IWCMs to take full account of their interrelationships with (and the national obligations and responsibilities for) the delivery of relevant interrelated SDGs
- Federal and state governments require and empower all IWCMs to take full account of opportunities to drive greenhouse gas reduction opportunities in all components of the water cycle. This requirement is to cover those emission reduction options that are the direct responsibility of the water sector and those that can be achieved only by the water sector collaboration with other parties.
- State governments require water corporations under their control to set appropriate targets and pathways to achieve GHG emission reductions consistent with Paris Agreement obligations.
- *Federal and state governments require all IWCMs to adopt a broad definition of water security that embraces the definition developed by United Nations.*
- Federal and state governments accept that different cities (and different parts of any particular city) have varying bio-physical and socio-economic characteristics and, as a consequence, require IWCMs to embrace such differences and develop solutions accordingly.

ATTACHMENT 2 – Some case studies to illustrate the range of possible IWCM applications

Integrated Water Cycle Management comes in many forms and scales and can involve the public and private sector in range of different roles. The aim is to provide the most appropriate water system solutions to meet unique local or regional long term needs as efficiently as possible.

The following examples have been chosen to illustrate a number of different IWCM applications. In presenting these case studies we have not provided an evaluation of the projects. The over-riding point to make about each example is that the solutions being delivered would not have emerged if traditional planning approaches had been followed – in these circumstance business-as-usual approaches would not have driven these innovative outcomes.

We would welcome an opportunity to present a larger range of IWCM projects with a more systematic evaluation of their merits.

1. *Aquarevo* is the result of a collaboration between South East Water (Victoria) and Villawood Properties. It is a good example of innovative use of IWCM principles and a range of emerging technologies. For more information see

<http://southeastwater.com.au/CurrentProjects/Projects/Pages/Aqrmauarevo.aspx>

2. Melbourne Water's *Our Dandenong Creek* project is an example of IWCM delivery significant savings (deferral of a \$90M sewer upgrade) and a more effective outcome (community engagement and good science leading to identifying and targeting the issues that have the biggest impact on the health of the waterway, rather than just relying on a regulatory standard containing 1 in 5 sewer spills). For more information see

<https://www.melbournewater.com.au/whatwedo/projectsaroundmelbourne/dandenong-creek/pages/enhancing-dandenong-creek.aspx>

3. *Central Park* in the Sydney is an example of where opening up supply to new private sector business models and third party competition can lead to innovation and improved community outcomes. For more information see

<https://flowsystems.com.au/communities/central-park-plus/>

4. Yarra Valley Water's (Victoria) *Waste to Energy Plant* is an example of where exploiting the water-energy nexus and linkages between the liquid and solid waste streams (public and private) can achieve a positive business case. It also illustrates that IWCM is about more than just a closed water cycle. For more information see <https://www.yvw.com.au/about-us/major-projects/waste-energy-facility>

5. The Water Corporation's *aquifer recharge program* in Western Australia is an example of establishing a cost effective portfolio of supply sources to respond to the challenges of climate change and growing demand. For more information see

<https://www.watercorporation.com.au/water-supply/our-water-sources/groundwater-replenishment>

6. Melbourne Water's *Western Treatment Plant Future Land Use Plan* is an illustration of generating more economic value from water industry assets through considering a broader range of opportunities, benefits and costs. For more information see

<http://www.awa.asn.au/documents/024%20GEIsum.pdf>