WATER SERVICES
ASSOCIATION OF AUSTRALIA

WSAA SUBMISSION

Inquiry into current and future impacts of climate change on housing, buildings and infrastructure

August 2017

Water Services Association of Australia response to Senate Inquiry into current and future impacts of climate change on housing, buildings and infrastructure

The Water Services Association of Australia (WSAA) is pleased to provide a submission to this inquiry. 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. In particular, we have provided comment in relation to the following parts of the Terms of Reference:

a) recent and projected changes in sea level rises, and storm surge intensity;

b) recent and projected changes in temperature and precipitation;

c) recent and projected changes in extreme weather, including heatwaves, bushfires, floods, and cyclones;

e) the impact of these changes on the vulnerability of infrastructure in coastal areas;

f) the impact of these changes on water supply and sewage treatment systems;

g) the impact of these changes on transportation, including railways, roads and airports;

h) the impact of these changes on energy infrastructure, including generators and transmission and distribution line

l) the impact on financing and insurance arrangements for housing, buildings and infrastructure

m) the adequacy of current state and Commonwealth policies to assess, plan and implement adaptation plans and improved resilience of infrastructure

What are the impacts?

Water utilities, and the communities they serve, face a diverging and unpredictable future driven by climate change and global warming. The traditional methods for estimating probabilities of extreme, climate-related events are failing, and new approaches for understanding and managing risks are necessary. There is an opportunity to better estimate this risk, with finer scale climate projections becoming available and new tools and approaches to support impacts and adaptation assessment.

Most Australian and New Zealand water utilities have already experienced stresses caused by climatic extremes. Major disruptions have included water shortages in southern and inland Australia, major bushfires, cyclones and extreme rainfall in the north and flooding on the east coast. As global temperatures continue to rise, urban and rural water utilities are faced with the risk of increasingly severe and frequent disruptions to service provision, rapidly increasing costs and degraded and stranded assets.

'Natural disasters' such as floods, droughts and bushfires have been more frequent and extreme. Records are broken every year. The 2006–2016, for example, the 11-year mean temperature was 0.56

°C above average–the second-highest on record. Seven of Australia's ten warmest years have occurred since 2005.

Reduced rainfall in many parts of the country pose challenges around security of supply. In Perth, for example, there is reliance on desalination and groundwater supplies as inflows to surface water storages continue to drop.

Extreme weather events such as intense rainfall, heatwaves, lightening strikes and resulting floods and fires can impact infrastructure (roads, assets) and interrupt essential services such as power and telecommunications. Other risks to the water industry assets include increased rates of corrosion that can shorten asset life, inundation from floods or storm surges, and impacts from fires.

From a public health perspective, there is alarming evidence related to mortality and morbidity increases during heat wave conditions. Water utilities have been working with local and state government agencies to investigate the role the water utility can play in reducing the impacts of urban heat islands. Research to date shows that the provision of irrigated green open space and other green infrastructure is one mechanism that can have a significant impact on localised air temperatures. The economics of this approach are favourable when using alternative water sources such as recycled water or stormwater. The water industry is exploring the ability to influence some aspects of urban planning by engaging with the development industry to identify approaches that benefit all stakeholders.

There is uncertainty around the extent and frequency of extreme events and climate change. Investment decisions water utilities face have costly implications for both current and future generations. In an environment of uncertainty, decisions made are not without risk. These risks for the water industry include:

- Changing available volumes and seasonal variability of surface water
- Increased runoff from higher than average rainfall
- Increased risk of pipe corrosion and odours
- Extreme wind gusts that exceed the design standard of structures
- Climatic uncertainty reducing reliability of modelling
- Increasing frequency and length of peak demand periods during very hot days and drought
- High ambient temperature events exceeding the design standard of structures or equipment
- Increased risk of events that can adversely impact water quality e.g. saline intrusion, flooding, bushfires, algal blooms
- Threats to infrastructure from sea level rise and storm surge intensity in coastal areas
- Increased pipe failures due to changes in soil structure and stability
- Increased risk of severe bushfires potentially damaging assets, impacting site access and quality of runoff where catchments are burnt
- Increased risk associated with adverse impacts on other services e.g. supply of chemicals needed for treatment and electricity
- Increased risk of flooding impacting low lying assets and access
- Health and safety risks to staff during extreme events including, but not limited to, heat and fatigue
- Increased stress on the community from acute water shortages, floods and coastal inundation, and heat island effect.

WSAA's Occasional Paper 27 Climate Change Adaptation and the Australian Water Industry (2012) provides detail on the potential impacts of climate change on the water industry. This paper highlights the impacts the Australian urban water industry is facing due to climate change and how the industry had adapted at that time.

What is the water industry doing?

The urban water industry understands the need to plan for uncertainty and to be agile and flexible in its approach to planning for climate change and extreme events. In response to some of these challenges, WSAA and its members have developed tools and guidelines to assist. One of these is the Climate Change Adaptation Guidelines (2016) for the Australian Water industry.

WSSA's Climate Change Adaptation Guidelines provide the Australian and New Zealand water industry with consistent, clear and practical guidance in building climate resilience across all aspects of a water utility business. The Guidelines draw upon the experience of the water industry, identify current best practice and provide clear principles to guide the industry forward in a pragmatic and defensible approach to adaptation.

Other examples of water industry activities designed to help assess the potential risks of climate change on infrastructure and operations include:

AdaptWater™ – A climate change adaptation tool

AdaptWater™, is a web-based climate change adaptation and asset-planning tool. The tool provides centralised hazard mapping, identifies climate change impacts, and quantifies costs of adaptation approaches. This assists an organisation the communication of the impacts and costs of climate change to a range of internal and external stakeholders.

The tool is designed to quantify the risks of climate change and extreme events, and perform cost benefit analysis of proposed adaptation options. It can quantify the impact of climate hazards on water supply and sewerage assets, and calculate the risk to the utility in both financial and non-financial terms. As well as producing graphical representations, the tool can compare adaption options, enabling the prioritisation of options.

AdaptWater™, is already being used to improve Sydney Water's knowledge of system resilience of individual assets - from small sections of pipe to multi-million dollar treatment plants. By implementing various methods and tools, the national water services sector is determining how exposed the organisation's asset base is to climate change risks. This risk cost is expected to double by 2100 due to the projected increased frequency of extreme weather events, sea level rise and increasing population.

Mt Crosby Flood Resilience Projects

The Mt Crosby East Bank Pump Station is one of South East Queensland's most critical water assets providing water for over one million people every day. The Pump Station was constructed in the late 1800's, at the beginning of the industrial revolution in Australia and is still in continual use today. Recent experience in 2011 and 2013 has shown that the Pump Station is susceptible to flooding.

Seqwater has taken to address the operational weaknesses exposed by the 2011 and 2013 flood events. The organisation has also planned to move its water treatment plant at Mt Crosby East Bank to higher ground to manage the risk of damage from flooding. The first stage of the project involves moving critical electrical systems to higher ground. The second stage will involve moving the entire Pump Station to higher ground. Works will cost $40m and $250m respectively, over the next 10 years.

The importance and urgency of the flood resilience projects has been reinforced as understanding has grown around climate change and the likely impacts of flooding in South East Queensland. Consistent with projections of a 2-degree increase in temperature by 2050, and a 4-degree increase by 2100, the likelihood of the Pump Station flooding will contract from a 1:200 year event today to a 1:125 year event by 2050 and 1:87 year event by 2100. This is equivalent to more than a doubling of the probability of a significant flooding event occurring within the lifetime of Mt Crosby.

Incorporating rainfall projections into stormwater infrastructure design

Following severe storms and flooding in the region in 2005, Tauranga City Council developed future heavy rainfall scenarios incorporating the impacts of climate change. The Council used the New Zealand Ministry for the Environment's Climate Change Effects and Impacts Assessment as a basis for its methodology. The study predicts many more heavy rainfall events by 2055. The findings have been fed into design criteria for new and upgraded stormwater infrastructure. Specifically, infrastructure must now be able to withstand a one-in-ten-year flood, as opposed to one-in five-year floods previously. For more detail see: http://www.mfe.govt.nz/sites/default/files/taurangacity-council.pdf

Scenario planning – Water Forever 50-year water security plan

In the mid-1990s the Water Corporation in Western Australia published its 50-year water plan–Perth's Water Future. By the late 1990s, it was clear that using historical inflow records to predict future reservoir inflows had failed. A radical re-think of the approach to water security was needed.

Under Water Forever, the Water Corporation abandoned the traditional approach of using historical records to estimate the probability of future reservoir inflows. Instead, its water planners developed high, moderate and low demand projections and combined these with dry, average and wet climate futures. The three scenarios were then used to determine the mix of responses for each scenario to ensure water security for the Integrated Water Supply Scheme.

Each response is a complex mixture of demand management, de-rating of non-performing reservoirs and groundwater schemes, new water sources such as seawater desalination, indirect potable reuse of treated wastewater, and others. For more detail see Water Forever.

What needs to happen?

Prescribed levels of service for utilities are based on local or regional regulatory criteria, with impacts on prices typically approved by State economic regulators. A national plan of action, clarifying the role of government and enabling flexibility in response to changing demands would be welcomed. To be successful, however, engagement at a State level with economic, health, water supply and environmental regulators is necessary. WSAA suggests the most effective vehicle for such engagement is through COAG. A move to a Commonwealth strategy must ensure that local needs are strongly considered.

While a number of utilities have developed their own strategies, effective adaptation requires the ongoing collaborative efforts of everyone. Cross-sector collaboration is extremely important to understand the consequential impacts of climate change and integrate these impacts into planning. From the perspective of water, impacts on other critical infrastructure sectors can have severe effects on the resilience of the water industry and its ability to continue to provide services to customers. While water may be a State-based activity, some sectors, such as electricity, operate across State boundaries. A Federal and State government coordinated and cross-sectoral approach to understanding interdependencies of sectors would likely be of greatest benefit. A review of government's role in facilitating collaboration and helping to simplify the complex relationships and networks in the climate change portfolio would be another key area for Federal involvement.

Works to build resilience and reduce potential impacts on infrastructure as well as minimise operational risks associated with climate change requires significant capital investment. This investment is sought on an as needs basis through pricing submissions at a State level. Commonwealth funding in these areas would be of assistance, as would targeted requirements for resilience. Any projects deemed to be of national significance should be undertaken in consultation with the local agencies along with the provision of adequate funding.

The challenges we face in a climate of uncertainty are significant. Ongoing research and scenario planning is essential to help inform decision-making. Robust and on-going climate research must be in a form suitable for hydrologic and hydraulic models (e.g. for environmental flow modelling and forecast), water supply modelling, flood modelling, evaporation and evapotranspiration rates, and even water supply demand modelling.

New approaches and areas of research must continue in order to provide decision-makers with practical information required to build resilience in infrastructure. This will require investment in scientific research to reduce uncertainty and help better understand the local and long-term consequences of climate change.

References

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