

Preparation for Climate Change

Synopsis

- The water industry is potentially significantly affected by climate change. Supply security may decline and there will be costs associated with adaptation to a climate change future
- Investment in research to make climate change projects more certain will be of great value, as will investigation of means by which the industry can adapt to climate change
- The Australian Water Association has a role in disseminating the results of this research and also in encouraging commitment to further research by governments.
- Precipitous decisions to invest in additional supply-side options (e.g. new dams, desalination) should be resisted. Decisions on new water supply options should only be taken in light of results of climate change-related research

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Background

The water industry is very susceptible to the impact of climate change. Over the past decade Australia generally has suffered one of the most significant droughts on record. The effect of this drought on some river systems is now verging on the catastrophic according to recent media reports. Practically, in urban areas extensive water restrictions have been put in place in all capital cities and governments have invested heavily in alternative water sources, especially desalination plants, subsidies for rainwater tanks and recycling. Restrictions and unanticipated investments in water supply security are potentially costly to the economy and individual consumers.

It is increasingly likely that this drought is characteristic of conditions much of Australia will face in future due to human-induced climate change. The Intergovernmental Panel on Climate Change’s (IPCC’s) 4th Assessment Report stated (Abstract from the *Background* to the report):

Warming is expected to be greater over land areas and the high northern latitudes and least over the Southern Ocean and North Atlantic Ocean. Increases in the amount of precipitation are very likely in high-latitudes, particularly in winter. Decreases predominate over subtropical land regions such as southern Australia, Southern Africa and the Mediterranean. Changes to tropical precipitation are more uncertain. Heat waves and extreme heavy rainfall is likely to increase in most regions and areas

affected by drought are also likely to increase. Tropical cyclones are likely to decrease in numbers, but be more intense.

The IPCC findings for projected climate change over Australia reflect the picture that has been evident for some time. Warming over Australia is likely to be larger than the surrounding oceans and, on average, comparable to the global mean. Warming will be less in the south, especially in winter. Precipitation is likely to decrease in southern Australia in winter and spring and is very likely to decrease in Southwestern Australia in winter. Rainfall changes in northern, central and eastern Australia are less certain”

Investments made in expansion of water supply could be better targeted if greater certainty could be created around likely future conditions under climate change influence. The 4th IPCC Assessment Report included a chapter dealing with Regional Climate Projections that represented a significant international effort toward downscaling climate change models to project regional conditions. Significant uncertainty remains, however. Furthermore, water industry response to regional climate change has only been investigated in a preliminary fashion. Further investment in such research should enable more targeted responses to be developed.

Issues

Likelihood of Human-Induced Climate Change and Need for Further Research

The science behind climate change is increasingly robust. Announcing the Australian release of the 4th IPCC Assessment Report, contributing author and CSIRO Group Leader, CSIRO Marine and Atmospheric Research, Dr Penny Whetton said “...there is a greater than 90% chance that temperatures are rising due to human activities. Human influences are also evident in changes to some types of extreme weather”. Dr Whetton also said that the “range of projected globally-averaged surface warming for the end of the 21st century is between 1.0 and 6.3 degrees Celsius. Warming over Australia will be similar to the global rate”.

Warming will not occur evenly across the country, nor will rainfall patterns change consistently. Research reported in the 4th IPCC Assessment report – which specifically included data and analysis on the regional impacts of climate change – suggests that sub-tropical and temperate Australia will experience a drying, while rainfall may increase in tropical areas. That having been said, there remains considerable uncertainty about the magnitude of these effects, the time of their likely onset and sub-regional variation. There is evidently a need for on-going research to reduce uncertainty where possible. The water industry’s interest in this research is clearly related to its medium- to long-term planning, in terms of both water supply security and its adaptation to changed climate conditions (e.g. the operation of systems).

The Australian Water Association has previously published the following observations of the likely impact of climate change in Australia on the operations of the domestic industry:

- **Reduced rainfall.** Global climate modelling coupled with rainfall-runoff-streamflow modelling shows a decrease in precipitation is magnified in reduced runoff available for surface storages. Past rainfall and river flow patterns are no longer a guide to the future, and dam yields and the sustainability of river systems must now be reassessed.
- **Increased average and summer temperatures.** Potential average annual temperature increases are projected to range from 0.3 to 1.0° C in 2020 and 0.6 to 2.5° C in 2050. There will be increased evaporative losses, increasing demands on water and adverse impacts on water infrastructure associated with reduced flows to sewers and drier soils, creating movement of pipes. Bushfires will be more frequent and probably more intense, which will reduce land cover, impact runoff quality and reduce yield during regrowth.
- **More extreme rainfall and wind events.** There will be impacts of greater storm events on sewerage and drainage systems. Stormwater infrastructure will have to cope with increased peak flows; there

will be increased infiltration to sewers and bigger overflows. Greater polluting discharges are likely during extreme rainfall events occurring after long dry periods. Asset management overall will be challenged.

Environmental Water Requirements

The water industry is investing significantly in extending water supplies and in accessing new water sources (e.g. desalinated water). While these efforts will improve the security of urban water supplies, increased need for environmental water (i.e. water to provide for the environmental flow requirements of rivers and estuaries) will, conversely, reduce security if environmental water needs increase in the face of climate change. Investment in research in environmental flow requirements will be vital in this context.

Research Priorities

Individual institutions and the industry generally have conducted research on climate change and its impacts. Research priorities include:

- The downscaling of general climate change models such that regional and sub-regional effects can be determined and greater certainty created
- Determination and continued monitoring of international-best practice with regard to climate change adaptation
- Analysis of the role of scarcity pricing as a tool to conserve water supplies in drought conditions
- Determination of the impact on existing assets of climate change scenarios and changes that might be made to operational requirements under these scenarios. Impact on the management of assets of more extreme climate conditions may be one of the biggest challenges facing utilities.
- The design criteria that should apply to water systems in future under climate change scenarios (e.g. more intense rainfall events may lead to reconsideration of stormwater system design criteria)
- Determination and adoption of 'no-regrets' policies (Those which when implemented will produce net benefits whether or not climate change occurs.)
- Risk analysis directed to determining risks arising from multiple, potentially cumulative factors
- The preparation of case studies of high-risk situations
- Analysis of the impact of environmental regulation to ensure no unintended consequences arise from its implementation under climate change conditions
- Analysis of future environmental flow requirements.

Summary of AWA's Position

The Australian Water Association will continue to provide a leadership role with regard to matters concerning climate change and the water industry. Specifically, AWA will continue to:

- Provide comment direct to governments concerning their responses to climate change
- Articulate an industry response to climate change to the community generally and governments specifically
- Encourage practitioners and governments to take into account the long-term impacts of climate change on water infrastructure and water management in future planning activities
- Encourage investment in research, particularly in the fields outlined above, and disseminate the results of that research to members



- Support member engagement in climate change and its impact on the water industry through the establishment of Specialist Networks dealing with *Sustainability* and *Preparing for Climate Change*

References

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