

Executive Summary

Next Steps to Ensure Water Security for the ACT Region

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

As the largest urban centre in the Murray-Darling Basin, with a population of 360,000 (including Queanbeyan), and as the seat of the Commonwealth Government, securing the water supply for the Australian Capital Territory (ACT) region is crucial.

Water security, i.e. having access to sufficient drinking water, was one of the key factors that determined the location of the ACT. This and the effective planning and management of water resources, has ensured that water supplies for the ACT region are more than adequate for the wet and average years and are generally sufficient during the short drought periods. Until recently it had been assumed that further significant upgrades of the supply infrastructure would not be needed until around 2023. However, despite the comprehensive planning, upgrades to supply infrastructure, and demand management initiatives that have been implemented in recent years, the extended period of unexpectedly low inflows has resulted in the need for the current review of the ACT region's long-term water security.

The ACT Government's Review Process

The Water Security Taskforce (the Taskforce) and its Advisory Panel were engaged by the ACT Government to provide advice on water security, in particular ACTEW's *Water2WATER* proposal and its July 2007 recommendations to the Government on *Water Security for the ACT and Region*. The findings of the Taskforce and its Advisory Panel and recommendations to the Government are summarised in this document and presented in more detail in the full report.

The report draws on information from ACTEW's reports, the community consultations, the multidisciplinary roundtable discussions and the independent studies undertaken on the *Water2WATER* proposal and other options.

Overview of Key Findings

Planning for water security for the ACT Region is complex due to uncertainty about how water availability and demand will be affected by future conditions. Of all the unknowns, it is considered that climate variability and climate change is the most significant. Given the level of uncertainty, the Taskforce and its Advisory Panel consider that it is necessary to take action now to protect long-term water security for the ACT region. It is not feasible to do nothing or to only undertake further studies, as this would expose the ACT region to a level of risk that, if realised, could result in significant financial and social costs.

Management of water supply and demand are both important elements of water security, therefore recommendations are made about both aspects. ACTEW currently has primary carriage of supply planning, with demand aspects being shared between ACTEW (Permanent Water Conservation Measures and Temporary Water Restrictions) and the ACT Government's Department of Territory and Municipal Services (Incentive Programs). In many jurisdictions, Governments undertake the policy role with water authorities implementing programs. The most effective mechanism for delivering demand management programs should be investigated, with a focus on achieving the water saving targets efficiently and providing one main contact point for customers/community members.

Given the uncertainty confronting planning for water security and the need to prudently invest in supply infrastructure, the Taskforce and its Advisory Panel supports a staged approach. This means some options should be committed to be constructed, while planning and design work for other options is advanced to the stage that they are ready to construct/implement, if required and according to prevailing circumstances.

In addition, an adaptive management approach should be continued as an essential part of any water security strategy. This should be applied to all aspects of work on water resource management undertaken by ACTEW and the ACT Government, and should include a regular review of the key assumptions.

Given the recent and likely changes at the local, regional and national level, it is timely for the ACT's key strategy for sustainable water resource management *Think water, act water* to be updated. Additionally, given the importance of integrating all aspects of water management there would be advantages in supporting the *Think water, act water* strategy with a water cycle management policy and program that could include supply and demand management, management of catchments, water quality management, wastewater, stormwater and cross-border issues.

Context

There has been a significant decrease in runoff to the ACT region's storages over the past six years (refer to **Figure A**), and inflows in 2006, in particular, were equal to the lowest on record. To meet demand, the region has significantly drawn on the volume of water in storage and it has been necessary for Temporary Water Restrictions to be imposed to reduce the rate of use and ensure that water continues to be available for essential human purposes if the drought continues.

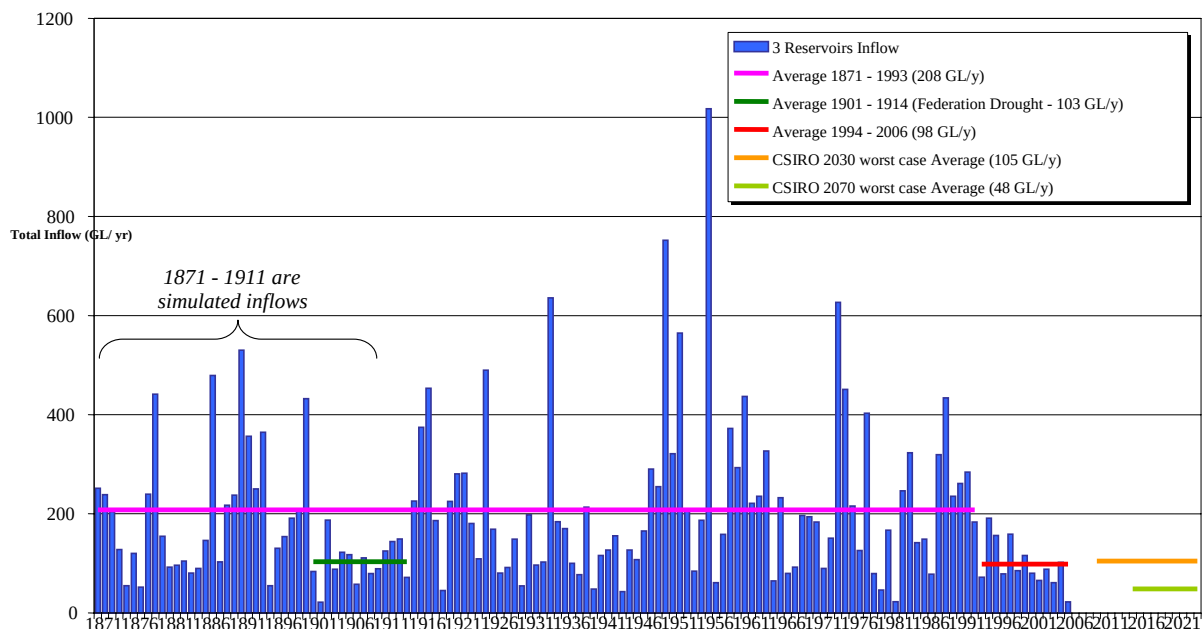


Figure A - Total runoff (or inflows) to ACT Storages 1871 – 2006, illustrating the average for the past six years, long-term trends, historical drought periods and the average inflows in scenarios modelled (courtesy ACTEW)

The recent dry period could signal the start of longer-term climate change. However, the extent and impact of climate change and climate variability remain largely unknown and could have a significant impact on water availability for the region. The challenge is to ensure that there is sufficient capacity to tide us over during prolonged drought periods and minimise the need for harsh Temporary Water Restrictions.

Under Stage 4 Water Restrictions, there could be potential loss of many millions of dollars and a significant number of jobs, the majority of which would be in the construction industry. In addition, the general community would also be significantly affected as the use of drinking water outdoors is banned, thereby affecting domestic gardens and most community playing fields and school grounds. However, the Government and ACTEW are currently undertaking planning to significantly reduce the impacts of Stage 4 Water Restrictions, should they need to be enforced.

It is within this context that ACTEW has undertaken its latest studies on long-term water security for the ACT region and made recommendations to the Government.

There is also a need to undertake more immediate measures to provide security for the short-term, in the event that the pressure on the region's water supplies is not eased by rainfall over the remainder of spring this year. ACTEW and the ACT Government have already taken a number of steps in this regard, such as infrastructure upgrades and demand management measures. Further short-term measures are proposed. While short and long-term planning needs to be considered separately, the role that short-term drought-response measures can play in helping to balance supply and demand for the long-term is important.

Any decisions on water security for the ACT region will have impacts on neighbouring jurisdictions both up and downstream, therefore it will be important that work continues to be integrated with partner governments at multiple levels. This includes work currently underway to finalise negotiations on a cap on water-use under the Murray-Darling Basin Agreement, and to secure tenure over Googong Dam.

ACTEW's Recent Water Security Studies and Recommendations

Early in 2007, ACTEW proposed its *Water2WATER* option, which involves enlarging the Cotter Reservoir from 4 Gegalitres (GL) to 78 GL and the purification and re-use of water from the Lower Molonglo Water Quality Control Centre.

As part of the associated community consultation program, more than 3,700 direct contacts were made with the public via a range of means. It was found that ACT and Queanbeyan communities appear to be open to the *Water2WATER* project proceeding, provided that there is an adequate response to the major issues raised, and a robust consultation process including all stakeholder groups is a core function of any future planning and approvals process. The main issues raised related to the health aspects of the Water Purification Plant and the need to consider other options.

Figure B illustrates the water and sewerage treatment processes for the ACT including ACTEW's Proposed Water Purification Plant. The ACT's total storage is 206 GL. Without restrictions the annual consumption is 65 GL. At present (late September 2007) total storage is 43% (88 GL).

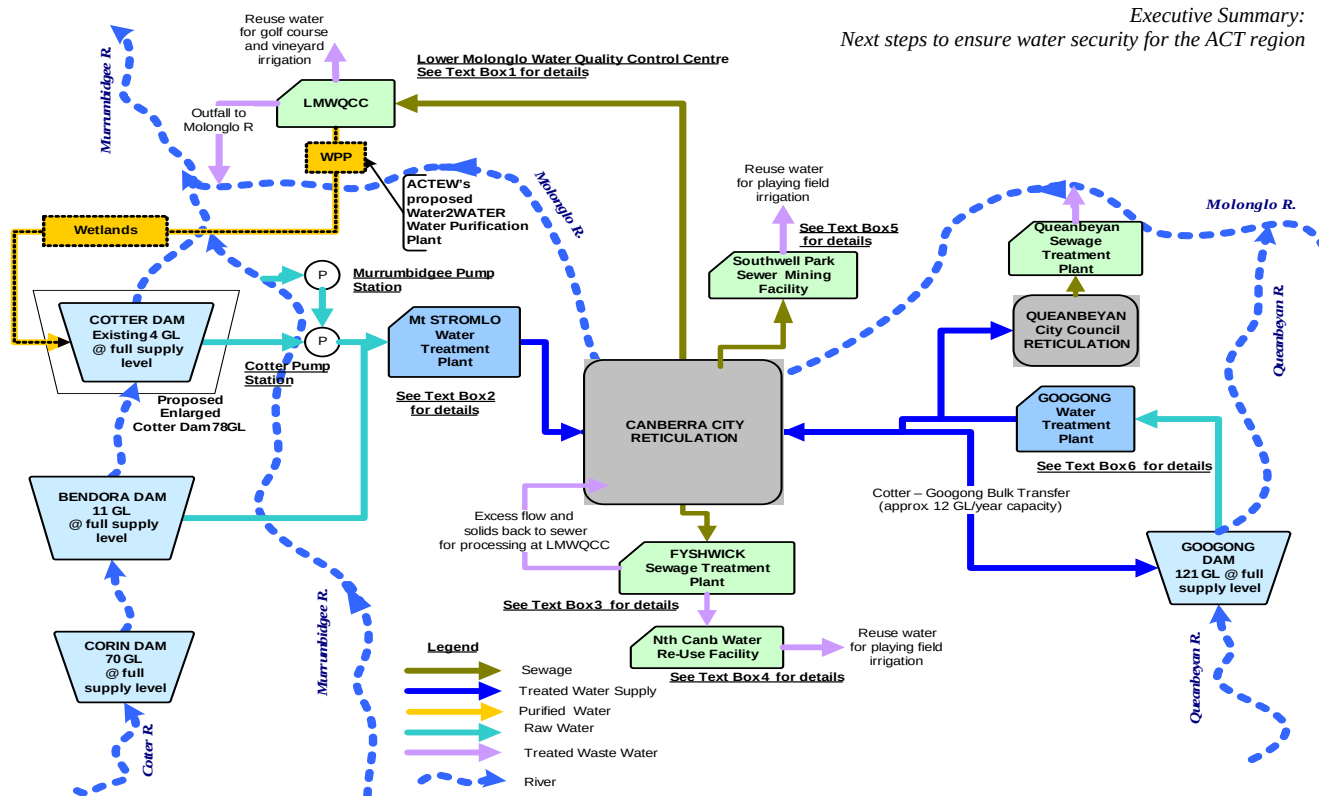


Figure B - Water and Sewerage Treatment processes for the ACT showing ACTEW's Proposed Water Purification Plant (courtesy of ACTEW)

In parallel with its work on the *Water2WATER* proposal, ACTEW also reviewed a range of broader water security options, including those considered viable during its study of *Future Water Options* in 2004 and 2005. In its July 2007 report *Water Security for the ACT and Region*, ACTEW recommended that the ACT Government agree that ACTEW should:

1. immediately commence the detailed planning and construction of an enlarged Cotter Dam to 78 GL;
2. add to its capacity and operational flexibility to extract water from the Murrumbidgee River by undertaking the work necessary to proceed to construction of a pumping capability near Angle Crossing, which could also be used to transfer additional flows released from Tantangara Dam if such flows become available;
3. obtain additional water from a source not largely dependent on rainfall within the ACT catchments through either:
 - a. the Tantangara transfer option; or
 - b. the Water Purification Scheme.

ACTEW is to advise the Government on which option is preferred for the future by December 2007 after determining whether satisfactory legal and commercial arrangements can be made to transfer water to the ACT via the Tantangara Dam, including the establishment of an ACT water cap, and after more detailed examination of the Water Purification Scheme, especially further analysis of salt management options; and

4. Assess how any additional energy used may be offset through measures such as carbon offsets (such as planting of trees) or renewable energy capacity.

These recommendations drew on an assessment of water availability that was based on six key assumptions. These are:

1. Climate change and climate variability in line with CSIRO's worst-case scenario for 2030 has already occurred.
2. Bushfires will re-occur and have an impact on inflows and water availability.
3. The ACT and Queanbeyan population will continue to grow to 500,000 by 2032, as proposed in the Canberra Spatial Plan high population growth scenario. In addition, an allowance is made to service additional areas in NSW such as Yass, Murrumbateman or Goulburn (up to 26,400 persons by 2030).
4. The Government's water conservation targets will be met (25% reduction in per person water consumption by 2023).
5. Environmental Flows will be delivered according to ACT Government guidelines.
6. ACTEW will meet its service obligations to customers, by acceptable levels for the duration, frequency and severity of water restrictions during times of drought.

ACTEW's six key assumptions are considered to be conservative, particularly in aggregation. The Water Security Taskforce and its Advisory Panel agrees that whilst a prudent planning approach is wise, it is important to keep the findings in context with the broad range of possible futures.

In addition to the options recommended, ACTEW also assessed a broader range of options, including Tennent Dam, desalination of seawater, groundwater storage and extraction, stormwater harvesting, rainwater tanks, greywater use (at the household level), water mining (greywater use at the local level for watering of parks, gardens and sports fields etc), other non-potable reuse (at the larger scale, via a separate reticulation system), cloud seeding and accelerated demand management.

The available information indicates that all of the options incorporated within ACTEW's recommendations are viable from a technical perspective. Whilst there are some health and environmental issues that will need to be carefully managed, these are unlikely to prevent any of the options proceeding. Of the full range of water supply options examined, the Water Security Taskforce and its Advisory Panel agree that the options short-listed by ACTEW in its recommendations are the appropriate options to be progressed further. However, it is important to note that the options recommended are all long-term, and even combined will not provide recovery from the current drought in the immediate future.

A simple schematic illustrating the location of ACTEW's key recommendations, relative to existing infrastructure is shown in **Figure C**, and the key characteristics of each of these recommendations is summarised briefly below.

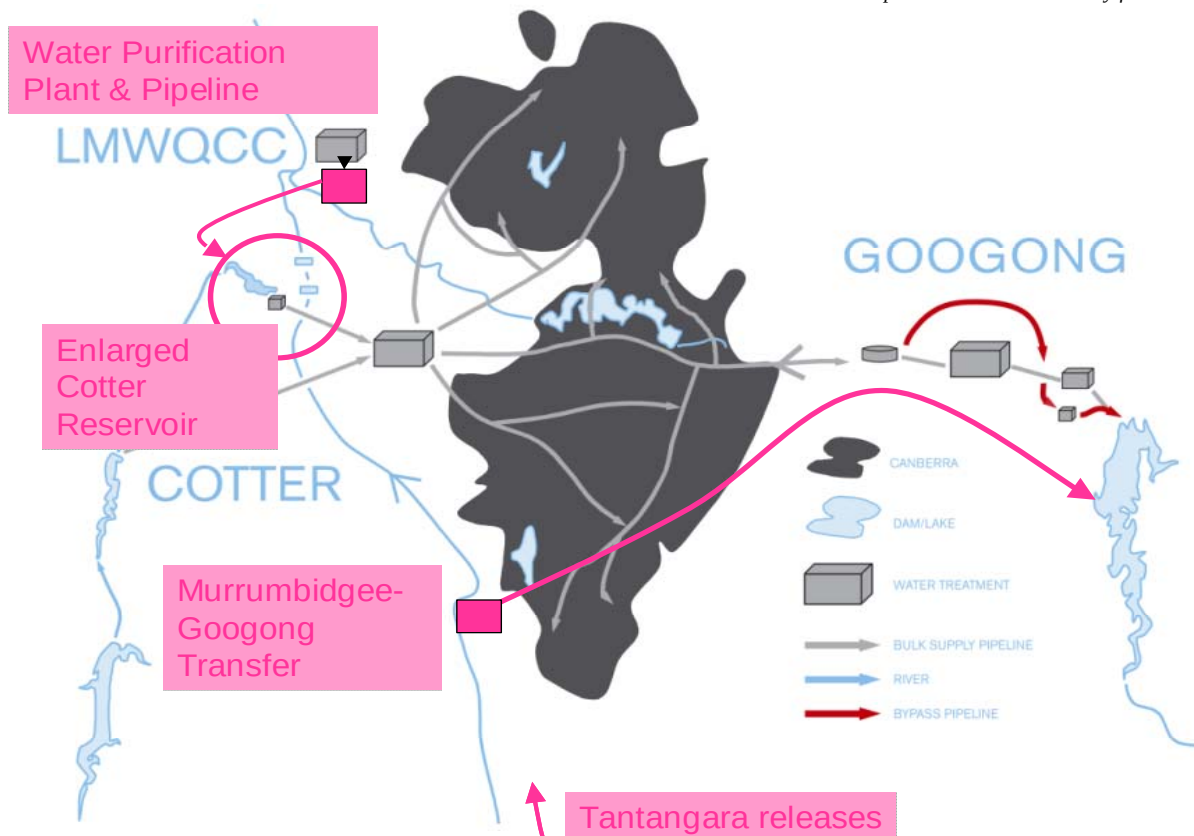


Figure C - Schematic illustrating ACTEW's four recommendations (note that this represents the Tantangara option if water is to be transferred via the Upper Murrumbidgee) (courtesy of ACTEW).

ACTEW's Recommendation 1: Enlarged Cotter Reservoir

Alternatives for enlarging the Cotter Reservoir were examined as part of a pre-feasibility study undertaken as part of the *Future Water Options* review in 2005. A new Cotter Dam with a capacity of 78 GL was recommended on the basis of the hydrological assessment and environmental issues. Some geotechnical and environmental challenges exist. However, it is anticipated that these can be addressed through careful design, construction and operation.

Increase in Storage Capacity:	74 GL (from 4 GL to 78 GL)
Yield*:	72 GL (ACTEW, 2007e, p40)
Supply rate:	To be increased from 100 ML/day (up to 36 GL/year, but constrained by storage capacity and operation) to 180 ML/day (equivalent to average daily consumption, or up to 65 GL/year).
Capital Cost:	\$145 million
Operating Cost:	\$1 million/year
Estimated Incremental Cost to Consumer	\$70/year
Timeframe:	3 to 5 years + time to fill

*This is the yield for the whole water supply system, including the enlarged Cotter Reservoir, under the CSIRO 2030 climate change scenario.

ACTEW's Recommendation 2: Increase abstraction from the Murrumbidgee River

This option, referred to as the Murrumbidgee-Googong Transfer (or MGT) is likely to require the construction of:

- either a small weir on the Murrumbidgee River or a submerged pump (similar to that at Cotter pump station) from which water can be extracted;
- a pumping station adjacent; and
- a pipeline to the Googong Reservoir.

This option is an expansion of what ACTEW refers to as the Angle Crossing option whereby water is transferred from the Murrumbidgee River, at a location near Angle Crossing, to Googong Reservoir. Recent work undertaken by ACTEW since it submitted its July recommendation to the Government has indicated that other sites in the south of the ACT, such as Point Hut Crossing, may also be suitable. The final details selected, including extraction site, infrastructure sizes and pipeline alignment will have an impact on the final capital and operating cost.

Increase in Storage Capacity:	N/A (although performance of Googong Reservoir is improved)
Yield:	10 to 20 GL
Pump and Pipe Capacity:	Up to 100 ML/day (up to 36 GL/year, but likely to be constrained by river flow, quality and storage capacity)
Capital Cost:	\$70 million
Operating Cost:	\$2 million/year
Estimated Incremental Cost to Consumer	\$30/year
Timeframe:	3 years

ACTEW's Recommendation 3a: Tantangara

The Tantangara option involves:

- purchasing water from irrigators downstream of the ACT;
- storing this water in the Tantangara Reservoir (this occurs via a reduction in the amount of water that Snowy Hydro are required to release for the purposes of irrigation in Murrumbidgee and/or Murray river systems each year); and
- transferring that water from Tantangara to ACT storages or supply network.

Increase in Storage Capacity:	N/A (although performance of Googong Reservoir could be improved, depending on transfer alternative selected)
Volume purchased:	20 - 25 GL
Supply Rate:	Will depend on transfer alternative(s) selected: existing ECGBT, upgraded ECGBT, MGT or pipe to Corin
Capital Cost*:	\$38 million (purchase water on the market)
Operating Cost*:	\$3.4 million/year (annual opportunity costs)
Estimated Incremental Cost to Consumer	\$50/year
Timeframe:	1 year plus (subject to negotiations)

*Note that the capital and operating costs are for the purchase and transfer of water only, and do not include the costs of transferring the water to the ACT storages, e.g. via the Murrumbidgee-Googong Transfer option.

ACTEW's Recommendation 3b: Water Purification Scheme

ACTEW concluded that safe drinking water can be produced by a Water Purification Scheme (WPS) that could be staged to initially produce 25 ML/day (about 9 GL/year), and then upgraded to 50 ML/day (about 18 GL/year). The scheme recommended would provide highly treated water from the Water Purification Plant (WPP), which could be introduced through a wetland environmental buffer prior to discharging into the enlarged Cotter Reservoir. The blended water would then be further treated and disinfected at the Mt Stromlo Water Treatment Plant (WTP).

Increase in Storage Capacity:	N/A (although the Expert Panel on Health (EPoH) recommends that the WPP only go ahead if the Cotter Dam is also enlarged, which would increase storage capacity by 74 GL, see next section in this summary)
Yield*:	Small WPP + enlarged Cotter Reservoir - 76 GL (ACTEW, 2007e, p40) Large WPP + enlarged Cotter Reservoir - 74 GL ⁺ (ACTEW, 2007e, p40)
Supply Rate (discharge into Cotter Reservoir):	Small WPP - 25 ML/day (9 GL/year) Large WPP - 50 ML/day (18 GL/year)
Capital Cost**:	Small WPP - \$181 million (with brine discharge to river) Large WPP - \$274 million (with mixture of brine discharge and crystallisation)
Operating Cost**:	Small WPP - \$10 million/year Large WPP - \$23 million/year
Estimated Incremental Cost to Consumer	Large WPP - \$180/year
Timeframe:	3 to 5 years

*This is the yield for the whole water supply system, including the enlarged Cotter Reservoir and the WPP, under the CSIRO 2030 climate change scenario.

⁺ACTEW 2007e notes that the inconsistency between the expected yields of the two WPP is because the modelling has been optimised to avoid Stage 4 restrictions as a priority to avoiding Stage 1 restrictions.

The larger WPP is better able to achieve this than the smaller WPP, however yield is based on the level of service against both levels of restrictions, and therefore results in a lower yield figure.

****Note that the capital and operating costs are for the WPS only, and do not include the costs of enlarging the Cotter Reservoir. The EPoH has advised that the WPS should not proceed without the enlarged Cotter Reservoir.**

Funding for some components of these options is currently being sought from the Australian Government's Water Fund via the National Water Commission. In parallel, funding was sought to further investigate the option of storing surface water in nearby groundwater aquifers in NSW.

Findings from Independent Studies

Health

The Expert Panel on Health (EPoH) in its report, *Public Health and Safety in relation to Water Purification for Drinking Water Supplies* (July 2007), concluded that from a public health perspective it is feasible to proceed with the Water2WATER proposal providing its recommendations are adopted. Two significant recommendations were that the technology to be used in the Water Purification Plant be a dual membrane (reverse osmosis) system only, and that the Cotter Reservoir be enlarged prior to the Water Purification Plant becoming operational. The proposed dual membrane (reverse osmosis) technology was considered the best available to protect the quality of water produced. The prerequisite for the Cotter Reservoir to be enlarged was to create an additional barrier and dilution mechanism to protect the water quality. Other recommendations made by the EPoH focused on the need for monitoring to be undertaken and additional information to be supplied before a final decision is made to proceed with the Water Purification Plant. It was also recommended that community consultation and engagement be incorporated into, and inform, all stages of future water security initiatives.

Environment

The eWater CRC's report, *Indirect Potable Use and Expansion of the Cotter Reservoir, ACT* (August, 2007), concluded that:

While there are a number of significant environmental risks associated with the Water2WATER proposal, it is our scientific judgement that these risks can be satisfactorily mitigated using known technologies and protocols. If all risk mitigations identified herein are agreed and fully included in the project design, construction and operations, we are of the opinion that the residual environmental risks are acceptable and should not, on their own, prevent the Water2WATER project from proceeding (p6).

The report also presented risk mitigation actions including those needed to protect endangered fish species in the existing Cotter Dam and to manage brine issues associated with the Water Purification Plant.

Energy

Australasian Emissions Trading Forum (AETF) Consulting's report, *Offsetting Emissions from Future ACT Water Options* (September, 2007), indicated that energy considerations are unlikely to change the relative ranking of water security options presented by ACTEW. Full offsetting of

operating emissions is included in ACTEW's cost estimates, and adds less than 10% to the total energy costs. The present value of the cost of offsetting additional greenhouse gas emissions over the life of the combined options was generally in the range of \$1 to \$3 million, whilst the average annual expenditure for offsetting is in the range \$0.6 to \$1 million. This is small compared to the capital and ongoing operation and maintenance costs of the water security infrastructure options. However, members of the Advisory Panel have commented that these costs are based on an assumption of a carbon price of \$30/tonne that may be too low if there is a national policy to accelerate the reduction of emissions.

AETF also flagged that, whilst the carbon market is yet to be established, the NSW/ACT Greenhouse Gas Abatement Scheme (GGAS) and the Commonwealth Greenhouse Friendly Scheme (GF) provide potential ways to voluntarily offset carbon emissions in the meantime. The level of greenhouse gas emissions associated with *construction and embodied* energy was also considered. The conclusion reached was that these were comparatively insignificant, are inherently difficult to quantify and are likely to be accounted for in manufacturing processes and therefore further off-sets could be double counting.

Scenario Planning

The Institute of Sustainable Futures (ISF) report, *ACT Scenario Planning for Water Security* (September, 2007), highlighted the value of demand management in slowing the drawdown of storage during the current drought, reducing the time in water restrictions, and providing gains for water security in the both the short and long-term. It also highlighted the advantages of developing 'readiness' options i.e. those that are planned so they can be implemented if circumstances warrant, as opposed to committing to construct projects that may not be needed if assumptions are not realised or circumstances change. 'Readiness' options offer flexibility when there is uncertainty. This staging approach, although offering benefits, was recognised as potentially adding additional costs or time. If additional time is incurred due to staging a project this may lead to more time in water restrictions.

It was also recognised that the extent of risk would be dependant on the option being considered. Risks not associated with climate; in particular sovereignty and tenure were flagged. ISF felt that it would be vital to undertake further work on assessing the cost of restrictions in a way that reflects community attitudes, including the community's experience of the recent restrictions.

Review of Financial Implications

The ACT Department of Treasury reviewed the financial implications of the individual options proposed in ACTEW's Water Security Program. In doing so, it noted that quantifying the costs and benefits of long-term major capital works such as those associated with the options presented is an uncertain process. Actual costs can vary considerably from estimates and benefits are subject to climatic outcomes, which even over the long-term are unpredictable.

Treasury tested the sensitivity of the net economic benefits calculated by ACTEW for the individual options to:

- the risk aversion factor applied by ACTEW to Stage 4 Water Restrictions, which has the effect of considerably increasing the economic benefit of avoiding time in Stage 4 restrictions; and

- the capital costs associated with the various options increasing by a 30% contingency (which is within the bounds of accuracy of the cost estimates provided by ACTEW for the enlarged Cotter Reservoir).

After the sensitivity testing, only the Tantangara and enlarged Cotter Reservoir options remained positive in terms of net economic benefit. The other options, including the Water Purification Plant (both the smaller and larger options) and the larger new Tennent Dam proposals are marginal or negative in terms of net economic benefits.

Given the information available and the uncertainty of the cost and benefit data presented, Treasury considers that in the short-term it is worth pursuing the option of enlarging the Cotter Reservoir.

Whilst the Tantangara releases option appears worth pursuing if the rainfall patterns of the past 12 months were to continue, Treasury considers it to be a high risk option because of the lack of information and experience in relation to water trading.

Demand Management

The Department of Territory and Municipal Services (Sustainability Policy and Programs Unit) provided information on demand management programs (including Water Efficiency (Incentives) Schemes, Water Sensitive Urban Design, grey-water re-use systems and general schemes for using non-potable water outdoors). Indications are that these programs, pricing, restrictions and the effect of the existing Permanent Water Conservation Measures, have together reduced the use of drinking water by approximately 13%, which is already in excess of the *Think water, act water* target of 12% by 2013. Furthermore, estimates indicate that continuation of the existing and recently funded programs should meet the target of 25% by 2023.

Some demand management initiatives can be cost-effective compared to supply options, and demand management can provide both short and long-term benefits. Given the current and likely situation, it is recommended that the current demand management programs are continued and that consideration is given to extending the existing Permanent Water Conservation Measures.

Significant changes are occurring to reduce the demand on potable water through an increase in the use of reclaimed water. These changes will assist in achieving the target of increasing the use of reclaimed water from 5% to 20% by 2013.

ActewAGL have been undertaking pre-feasibility work on the application of Smart Meters in the ACT. Indications are that the metering of water, electricity and gas is on the cusp of transformation. Smart metering is more than the installation of a meter; it involves an array of support infrastructure and systems. It therefore cannot be readily deployed and is expensive. It does, however, offer the customer the opportunity to control their water/energy/gas use, especially in periods of restrictions. In the future, when in drought, households with Smart Meters may be allocated a quantity of water without any restrictions on how it should be used. The householder would be able to choose to water their garden by reducing their indoor water consumption. At present this flexibility is not available, for example under Stage 4 Water Restrictions all outdoor watering with potable water is banned unless an exemption is granted.

Risk

The level of risk that the community, the Government and ACTEW is prepared to accept will have a significant impact on the need to implement further initiatives to strengthen water security. The issue of what is the appropriate level of water security cannot be answered on purely technical, engineering, economic or scientific factors. These are, however, very important to understand in making an informed decision. Simplistically, if a low level of risk is desirable then a higher level of investment will be needed and vice versa. Given the severe consequences of Stage 4 Water Restrictions the Taskforce and its Advisory Panel believe that the risk of such restrictions should be minimised.

In making the following recommendations, it is assumed that, within the context of climate change and climate variability, it is prudent to strive for a low level of risk while taking into account the effect of increased infrastructure on the cost of water for consumers. Planning for a low level of risk may mean that an asset may be infrequently used. From a purely financial perspective this is undesirable and such an asset is sometimes referred to as being stranded. However, this same asset could also be considered to provide sound insurance. For example, prior to 2003 the Googong Reservoir had not been heavily used and was considered by some to be a stranded asset. However, after the 2003 bushfires, the ACT region would have faced a very severe water crisis without it. The insurance provided by the Googong Reservoir proved to be valuable.

Next Steps to Ensure Water Security for the ACT Region - The Recommendations of the Water Security Taskforce and its Advisory Panel

As previously stated the Taskforce and its Advisory Panel consider that both supply and demand are important aspects of water security, therefore specific recommendations are made regarding each aspect.

Supply

Regarding supply options, the Taskforce and its Advisory Panel recommends that:

1. **The Cotter Reservoir be enlarged by 2011.** In doing this, the relevant recommendations made by the Expert Panel on Health (EPOH, 2007) and the eWater CRC (Jones *et al.*, 2007) must be addressed, and ACTEW be requested to:
 - a) commence detailed planning and design immediately, including a detailed risk assessment to ensure that all potential risks can be adequately managed;
 - b) commence the development of a fish (and biota) management strategy to protect important fish species (and other biota) in the Cotter Reservoir;
 - c) secure all relevant approvals as soon as possible;
 - d) develop and implement best practice construction and operational management plans, in accordance with their normal practices; and
 - e) ensure that the community is informed of progress.

It is recommended that Government:

- f) agree to the relevant land being made available for the construction, with this and the associated infrastructure becoming ACTEW's responsibility;

- g) request the relevant Government Department(s) to investigate the development of enabling legislation to expedite construction of the enlarged Cotter Reservoir; and
 - h) request the Environmental Protection Authority to review the environmental flow guidelines requirements for an enlarged Cotter Reservoir.
2. **The Murrumbidgee-Googong Transfer (MGT) be progressed** and ACTEW be requested to:
- a) continue detailed design and secure the relevant approvals to achieve the MGT, with an extraction point to be determined as part of this process (and in doing so, broadens the support it gave to ACTEW in June 2007 for progressing the Angle Crossing option);
 - b) undertake a health risk assessment in close consultation with ACT Health as part of the detailed design to determine whether there is a need to upgrade the Googong Water Treatment Plant. This should include hydraulic modelling of Googong Reservoir;
 - c) report to Government, on a regular basis, on progress on the above; and
 - d) seek the approval of the ACT Chief Minister, Treasurer and Deputy Chief Minister to commence construction once all approvals are secured.
3. **Arrangements for the Tantangara option be progressed**, to secure additional water from a source not largely dependent on rainfall within the ACT, and to this end ACTEW is to:
- a) pursue commercial negotiations; and
 - b) undertake further investigations of alternative(s) to optimise the transfer of water from Tantangara to ACT storages.
- In addition, it is recommended that:
- c) ACTEW be given support to secure needed water rights;
 - d) the relevant Government Department(s) pursue the needed inter-governmental negotiations and any ACT legislative changes required as a priority; and
 - e) ACTEW and the relevant Government Department(s) work collaboratively and report to Government on a regular basis on progress on the above.
4. **Further consideration is not given to the Water Purification Scheme until the completion of further extensive analyses**, which address the relevant recommendations made by the Expert Panel on Health (EPOH, 2007) and the eWater CRC (Jones et al., 2007), including those foreshadowed by ACTEW. Detailed design of the Water Purification Plant should also be progressed and then a review of the need for additional infrastructure undertaken before a decision is made to progress to construction. In addition:
- a) the Cotter Reservoir must be enlarged prior to the scheme becoming operational;
 - b) only a dual membrane (reverse osmosis) Water Purification Plant is to be considered;
 - c) a demonstration plant is to be constructed and monitored with the community able to tour the facility and be provided with information on its operation. Water from the demonstration plant is to be used, but not as part of the ACT's drinking water supply;
 - d) the issues of brine management (including disposal) and the need for a wetland need to be resolved; and

- f) the relevant Government Department(s) and ACTEW investigate using water from the purification plant for specific purposes other than supplementing drinking water. This is aimed at creating long-term business and industry opportunities. Report to Government on a regular basis on progress on the above.
- 5. **Additional greenhouse gas emissions associated with the operation of the water security projects are voluntarily offset**, and that ACTEW and ActewAGL further investigate how such offsets should be obtained (within the context of the energy and emissions market).

Demand Management

Regarding demand management options, the Taskforce and its Advisory Panel recommends that:

- 6. **Demand Management Incentive Programs be continued** to achieve the *Think water, act water* targets of a reduction in per person consumption of mains water by 12% by 2013 and 25% by 2023; and an increase in the use of reclaimed water from 5% to 20% by 2013, and that the relevant Government Department(s) and ACTEW investigate and report to the Government on:
 - a) the most effective mechanism for delivering demand management programs with a focus on achieving the targets efficiently; and
 - b) accelerating and expanding existing programs, particularly for the commercial sector and those activities that re-use water.
- 7. **The extension of Permanent Water Conservation Measures be investigated** by the relevant Government Department(s) and ACTEW:
 - a) review the existing Permanent Water Conservation Measures and trial the revised arrangements when the current water restrictions are lifted;
 - b) review the existing water restrictions scheme in conjunction with a) above; and
 - c) seek community views in designing the enhanced Permanent Water Conservation Measures and review existing water restrictions, and canvas the community's willingness to pay to avoid extreme levels of water restrictions, and/or support for enhanced water conservation measures to avoid extreme levels of water restrictions.
- 8. **The metering of water be improved** in the ACT by ACTEW and ActewAGL being requested to implement a **pilot smart metering program** in the ACT, for commencement in 2008/09. The pilot program should measure changes in consumption and community attitudes and the community should then be informed of the results. If successful, a citywide program should be designed and costed, and cost recovery options identified.

It is noted that a mandatory requirement that all new multi-residential properties install unit meters will be introduced from February 2008. This initiative is strongly supported.

In addition to the above specific supply and demand recommendations, the Water Security Taskforce and its Advisory Panel recommend that:

- 9. **The *Think water, act water* Strategy be updated**, and the relevant Government Department(s) develop a supporting water cycle management policy and program to effectively integrate all aspects of the resource including the management of catchments,

supply and demand, quality and quantity issues, wastewater, stormwater and cross-border issues.

10. Progress in implementing the Water Security Program be monitored, and that:

- a) the Chief Executive's Water Group (a high level cross-Government and ACTEW group) oversee the Program and regularly report to Government; and
- b) **the community is kept informed and engaged**, for example, by public information programs, fostering public discussions and routinely reviewing information on the Government water website. This is to be done jointly by Government and ACTEW.

Conclusions

In simple terms, Recommendation 1 will increase the capacity of the Cotter Reservoir from 4 GL to 78 GL, which will increase total storage capacity for the ACT Region by 35%. It will “make a small bucket bigger” and significantly increase the total yield of the water supply system. This dam is located in a productive catchment that is already being managed for the provision of drinking water. It is the least costly dam option (half that of building Tennant Dam), all the land needed is held in public ownership and it is understood that the environmental issues can be managed.

Recommendations 2 and 3, the Murrumbidgee-Googong Transfer and Tantangara options provide mechanisms to “fill” Googong Reservoir, “a half empty bucket”. The Googong catchment has recently had low inflows, which limit the amount of water that can be drawn from the storage. These recommendations will allow Googong to be topped up in average conditions, which will provide greater water security during drought periods. Both these options would diversify the source of water supply, by drawing on water from the Murrumbidgee and Tantangara catchments, which currently provide a very minor contribution to the region's water supply. Such diversity is important in the event that bushfires, climate change or even a technical malfunction limits the supply of water from any given catchment. In addition, the Murrumbidgee-Googong Transfer option will also provide increased flexibility in system operations. While there are substantial potential benefits associated with these options, there are risks associated with the Tantangara option due to the need to establish inter-jurisdictional and commercial agreements.

Recommendations 3, 6, 7 and 8 are focused on “being water smart”. This is achieved by securing water from sources other than from the ACT's water catchments (the Water Purification Scheme is least subject to fluctuations in climate and therefore provides the greatest reliability) or by using water more wisely through demand management programs, which have the potential to slow the drawdown of water storage and can be implemented quickly.

Recommendations 5, 9 and 10 are designed to support the achievement of the other recommendations.

Together, the recommendations should increase the long-term security of water supply to the ACT region by increasing storage capacity, enhancing the diversity of our water sources, increasing flexibility for the management of the water supply system and further progressing demand management initiatives.

An approach is proposed whereby it is recommended that a commitment is made to proceed with

the construction to enlarge the Cotter Reservoir, whilst other options, the Murrumbidgee-Googong Transfer and Tantangara options, are recommended to be progressed to the stage where they are ready to construct/implement before a final decision is made regarding commencement/implementation. At the final decision stage, consideration should be given to the circumstances prevailing at the time. As the Tantangara option will involve securing inter-jurisdictional support and negotiating satisfactory commercial arrangements it does pose challenges. If these cannot be met it may be necessary to further consider the Water Purification Plant. However, as stated in Recommendation 4, this should only be done following further extensive analyses.

There are merits in being able to monitor a demonstration Water Purification Plant for a period of time, and allowing the community to be involved in this process through having a supporting visitor's centre, before a final decision is made regarding construction. However, a demonstration plant is very expensive. If a demonstration plant is progressed its water should not be combined with Canberra's drinking water but it should be used productively (e.g. for irrigation).

The recommendations have been designed to be comprehensive and allow a staged adaptive management approach to be pursued. This approach provides flexibility in the decision-making process but also allows expediency in starting construction/implementation, if the situation warrants.

