



**Office  
of Water**

# **Climate Change Policy and Guidelines for Achieving Appropriate Security of Urban Water Supplies in Country NSW**

**Sam Samra  
Senior Manager Water Utility Performance  
NSW Office of Water**

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Department of  
**Environment, Climate Change and Water NSW**

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# 1. Background

NSW Government's *Best-Practice Management Guidelines* (BPMG) are key driver for reform and performance improvement for country NSW Local Water Utilities (LWUs). Requirements include:

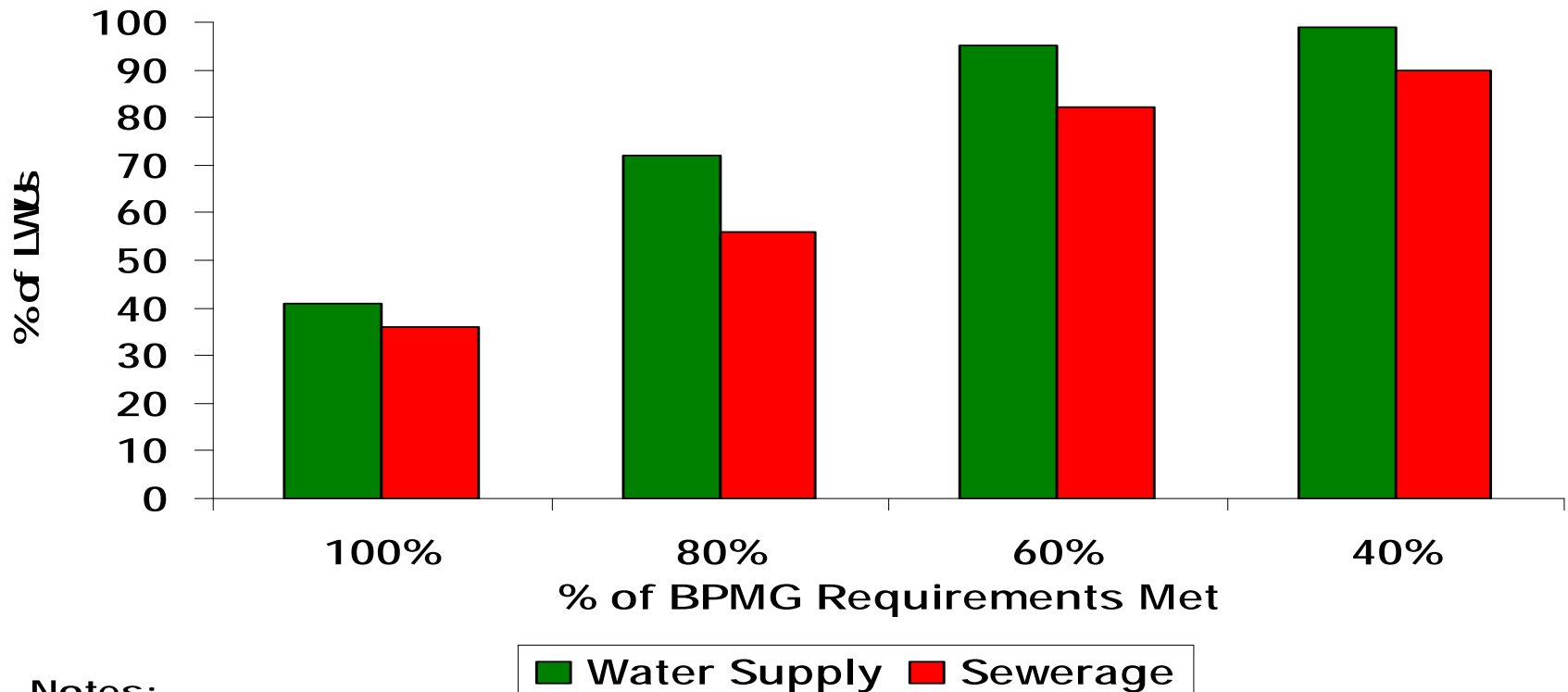
- Annual performance monitoring by each utility (since 1986);
- Current strategic business plan and financial plan;
- Regulation and pricing of water supply, sewerage and trade waste
- Demand management;
- Drought management;
- Integrated Water Cycle Management (IWCM)

# 'Scale' of NSW Country Towns Water Supply and Sewerage

- Urban population served:
  - water 1.8m (97.9% coverage)
  - sewerage 1.67m (94.9% coverage)
- Annual revenue \$910 M
- Current Replacement Cost of water and sewerage assets \$18.8B
- 106 LWUs [97 water supply, 100 sewerage]
- Overall compliance with the 19 requirements of BPMG – 80%

# Compliance with BPMG

**% of LWUs that have met the percentage of BPMG Requirements shown at June 2008**



**Notes:**

1. The left bar above shows that 41% of LWUs have met all (100%) of the BPMG requirements for water supply.
2. The right bar above shows that 90% of LWUs have met at least 40% of the BPMG requirements for sewerage.



- IWCM involves a **30 year strategy** for water supply, sewerage and stormwater. A full range of scenarios must be evaluated on a rigorous Triple Bottom Line (TBL) basis, with extensive community involvement. Each LWU is required to review and update its IWCM strategy after 6 years.
- BPMG, 2007-08 *NSW Performance Monitoring Report, IWCM Guidelines and IWCM Information Sheets* – available on [www.dwe.nsw.gov.au](http://www.dwe.nsw.gov.au)



## 2. NSW Security of Supply Basis

45 LWUs have a surface water supply with a storage dam. Such dams have been sized on the NSW Security of Supply basis since mid1980s.

**Purpose of the NSW Security of Supply basis:** to ensure each utility's water supply storages have a **sufficient volume** of stored water for the utility to operate its system with only **moderate water restrictions** in the event of occurrence of droughts of similar severity to those in the 120 year historical record.

# Duration, Frequency, Severity of Water Restrictions

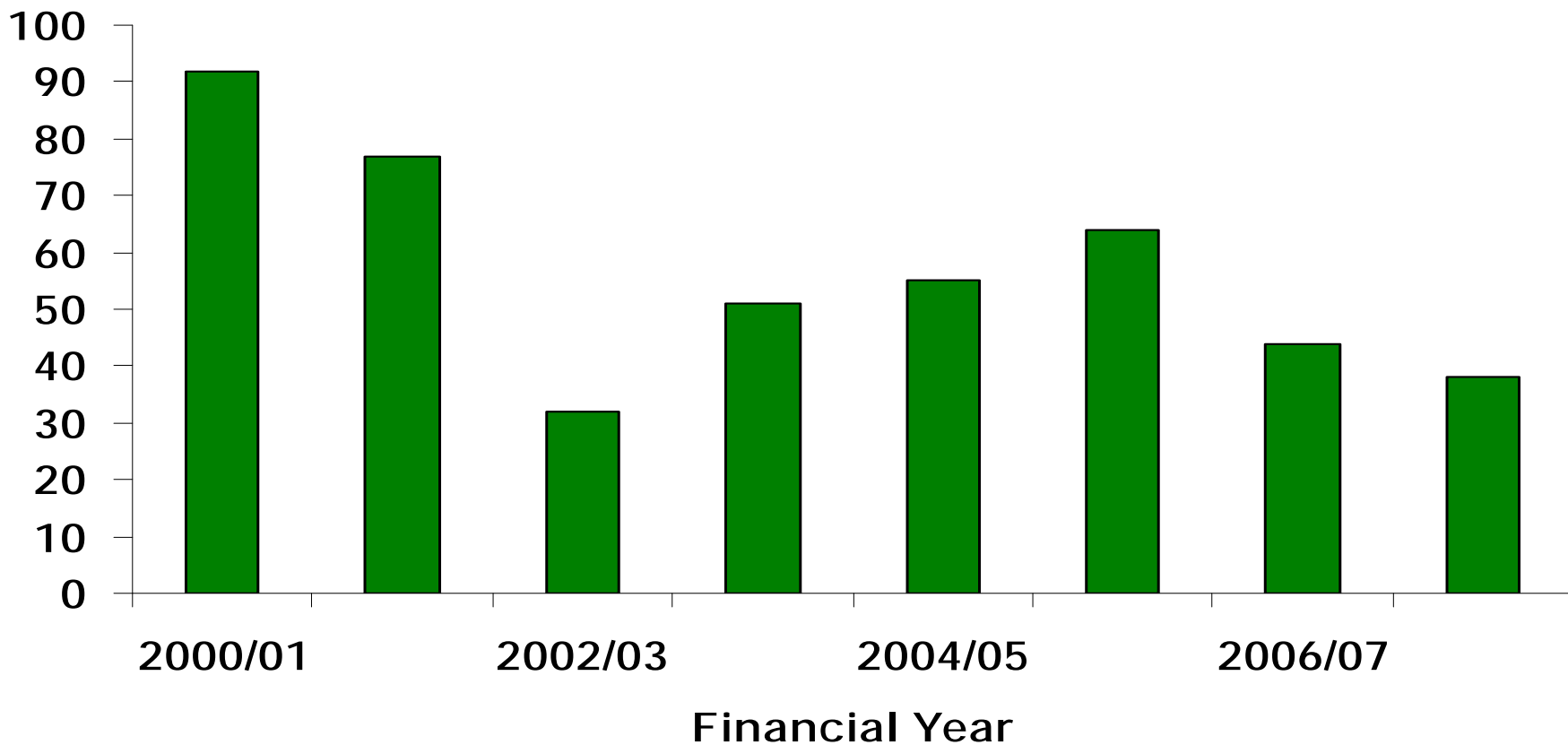
Under the NSW Security of Supply basis, (commonly referred to as the '5/10/20 rules') water supply headworks systems are normally sized so that:

- **Duration** of restrictions does not exceed **5%** of the time, and
- **Frequency** of restrictions does not exceed 1 year in 10 on average (ie. **10%** of years), and
- **Severity** - systems are able to meet 80% of the unrestricted water demand through a repetition of the worst recorded drought, commencing when restrictions are first imposed (ie. **20%** average **reduction in consumption** due to water restrictions).



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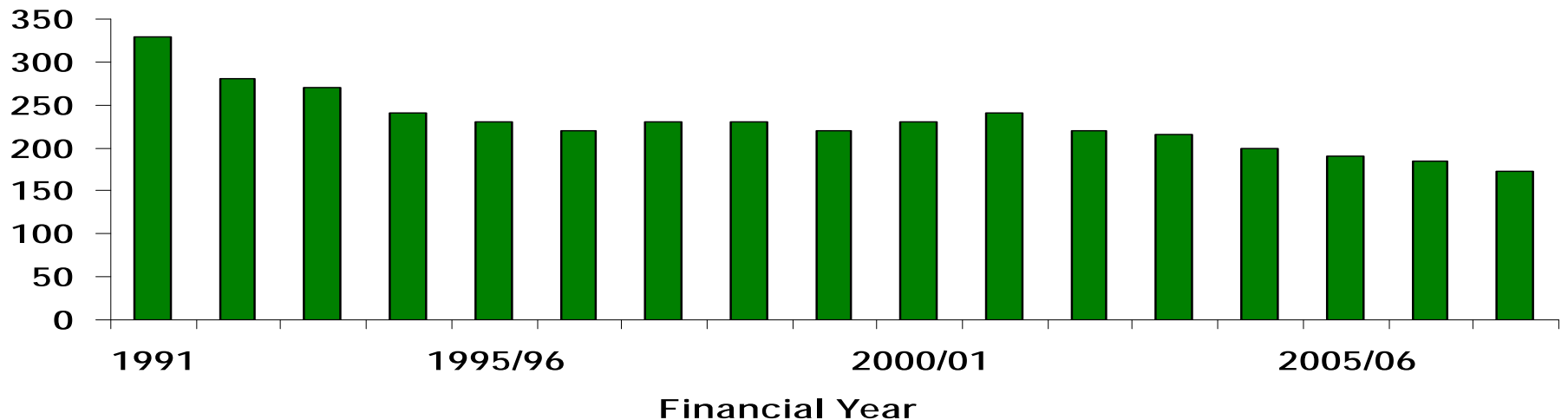
# % of LWUs that did not apply any Drought Water Restrictions



# Large Reduction in Residential Water Supplied per property (1)

There has been a **48% reduction** in the average annual **residential water supplied**/connected property in country NSW over the last 17 years (from 330 to **173kL/property**).

**AVERAGE ANNUAL RESIDENTIAL WATER SUPPLIED  
(kL/connected property)**



# Large Reduction in Residential Water Supplied per property (2)

As there already has been a 48% reduction in water use, it will now be much more difficult to achieve a 20% reduction to the current water consumptions than it was 20 years ago.

It is therefore proposed to base **future planning** in NSW on being able to achieve an average of **10% reduction** in consumption through a repetition of the worst drought, ie. “**5/10/10 rules.**”



## 3. Future Climate and Runoff Projection for NSW Database (1)

Warming of the climate system over the past century, particularly the last few decades, is evident.

In 2007 the Intergovernmental Panel on Climate Change (IPCC) and Commonwealth Scientific and Industrial Research Organisation (CSIRO) released climate change projections for Australia which were at a Global Climate Model (GCM) scale (roughly around 200 km x 200 km grid).

# Future Climate and Runoff Projection for NSW Database (2)

The NSW Office of Water (NOW) has extended the work on the Murray Darling Basin Sustainable Yields project to provide Year 2030 rainfall, evapotranspiration and runoff **projections for all of NSW** “*Future climate and runoff projections (~2030) for NSW and ACT*” database. This data is based on the IPCC SRES A1B medium global warming emission scenario and 15 global climate models.

The NSW database provides 112 years of daily hydrometeorological data (1895 to 2006) for a **5km x 5km grid** and a report on the database is available at [www.dwe.nsw.gov.au](http://www.dwe.nsw.gov.au)



## 4. Pilot Study for 11 NSW Water Supplies (1)

A **Climate Change Steering Group** has been formed by NOW to oversee a climate change pilot study for 11 urban NSW water supplies and development of NSW Guidelines for LWUs on assessing the impact of climate change on the secure yield of their water supplies. The Steering Group involves:

- Peter McLoughlin (National Water Commission)
- Jai Vaze (NOW/CSIRO)
- Peter Cloke (Department of Services, Technology and Administration - commissioned to carry out the pilot study)
- Sacha Moege (LGA and SA)
- Wayne Franklin (NSW Water Directorate)
- Sam Samra, Mike Partlin, Peter Ledwos (NOW)



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# Pilot Study for 11 NSW Water Supplies (2)

Work is nearing completion on the pilot study for 11 NSW urban water supplies using daily datasets from the above NSW database to assess the potential impacts of climate change on the secure yield of each water supply. The secure yield is being determined on the basis of the daily data sets for the 112 years of historical hydrometeorological data and for each of the 15 global climate models.

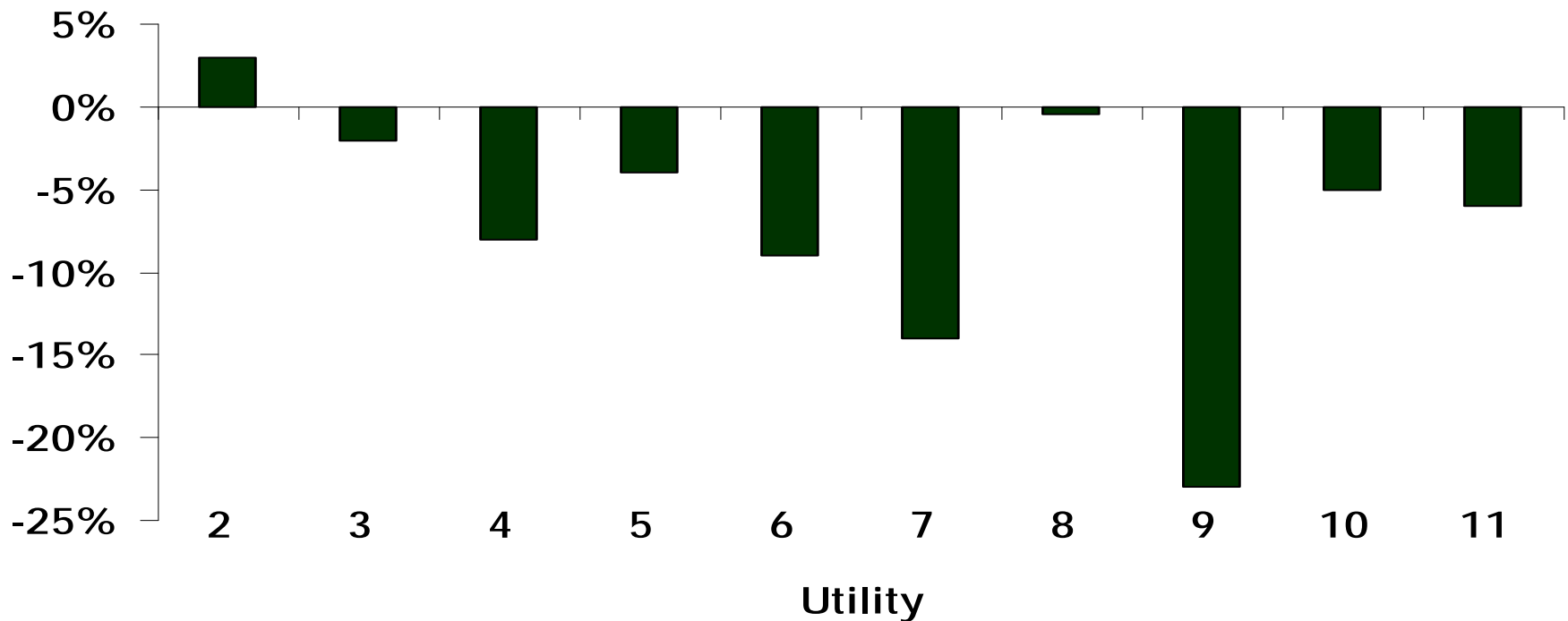
At this stage, it is proposed to determine the percentage change in the Year 2030 secure yield for each utility as the ratio of the median secure yield (on the basis of the 5/10/10 rules) from the 15 global climate models divided by the secure yield (5/10/10 rules) for the historical data.

For the global model that provides the second lowest secure yield, the frequency, severity and duration of restrictions required in order to obtain the secure yield identified for the median model is being determined to ensure the utility will be able to cope with such droughts. For example, this could require water restrictions to be applied say 40% of the time, compared to only 5% of the time under the 5/10/10 rules.



# Pilot Study for 11 NSW Water Supplies (3)

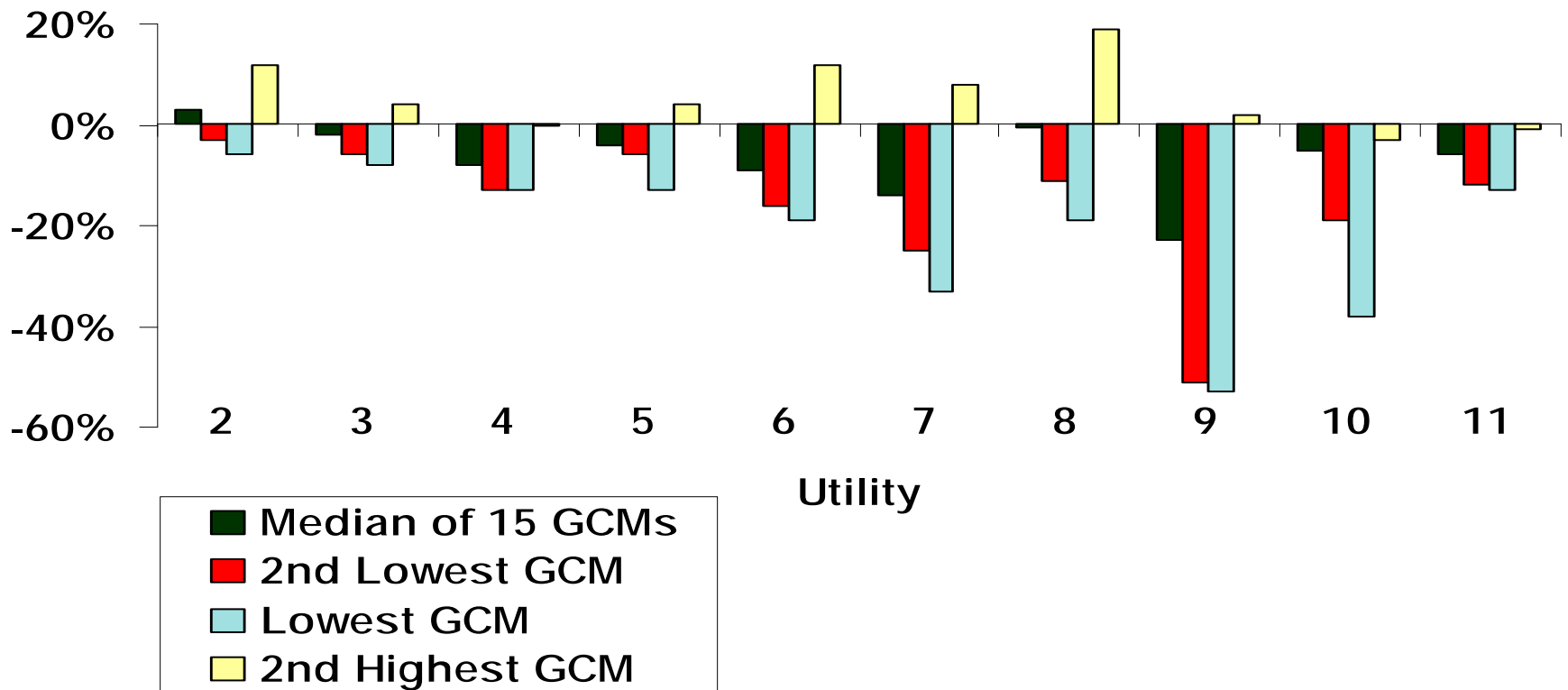
**% Change in the Secure Yield for the Median of 15 Global Climate Models compared with the result for the Historical Data Set**





# Pilot Study for 11 NSW Water Supplies (4)

% Change in the Secure Yield for the Global Climate Models (GCMs) shown compared with the result for the Historical Data Set



## 5. NSW Guidelines on assessing the impact of climate change (1)

NSW Guidelines on assessing the impact of climate change on secure yield will be developed as part of the NSW requirements under the updated *Best-Practice Management of Water Supply and Sewerage Guidelines*. The Climate Change Steering Group will also oversee development of the new NSW Guidelines.

## NSW Guidelines on assessing the impact of climate change (2)

As previously noted, BPMG require each LWU to prepare a comprehensive 30-year IWCM Strategy. The IWCM strategies will need to include assessment of the secure yield of the utility's water supply on the basis of the above NSW Guidelines.

The results of the pilot study are now being reviewed to identify any opportunities for reducing or simplifying the required analysis.

Following further consultations, guidance material on climate change will also be provided for the 46 LWUs which rely on groundwater or receive an untreated bulk water supply from a State Water Dam. The remaining 6 LWUs are reticulators, receiving a bulk supply from another LWU.



## 6. Conclusion

1. A sound basis has been developed for LWUs to assess the impact of climate change for the Year 2030 on the secure yield of their urban water supply.
2. The draft results for the 10 case studies carried to date indicate that the impact on secure yield will range from an increase of 3% to a reduction of 23%. The median impact is a 5.5% reduction in the secure yield.
3. NSW Guidelines for LWUs will be developed along the lines carried out in the pilot study. A consultation draft of the NSW Guidelines is planned for release in February 2010.