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A Path Towards a “Climate Smart” Water Utility

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SNWA Basics

- Seven member agencies
- 90% of supply from Colorado River
- Withdrawal from Lake Mead
- Critical Intakes in Lake Mead
the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events
The Colorado River Basin is in a severe drought.

Lake Mead is at its lowest elevation since the reservoir was filled in the 1930s.
Need to look back and forwards to assess future drought risk

Source: Jeff Lukas, July 17, 2013 Western Water Assessment
Tree-ring reconstructed annual flows, Colorado River at Lees Ferry, 762-2005, with **20-year** running mean

**46 of 57 years were dry**

**Mid-1100s megadrought**

Source: Jeff Lukas, Western Water Assessment
Plan for Multiple Uncertain Futures

Probability Mead < 1050' at least once in a Certain Year

- Observed Hydrology
- GCM-Driven Hydrology

Loss of Intake 1

GCM-Driven Hydrology

Observed Hydrology

Projected using April, 2014 CRSS
What We Are Doing – Adaptation

- Reducing Demands
- Safe-guarding Access
- Securing temporary and long-term supplies
- Working with Colorado River partners
Reducing Demands

Thanks to these efforts, Southern Nevada consumptively used about **32 billion gallons** less water in 2013 than in 2002, despite adding 480,000 new residents and serving nearly 40 million annual visitors.
The SNWA is investing more than $800 million to protect the community’s access to Lake Mead.

- Replaces capacity in the event declining lake levels render Lake Mead Intake No. 1 inoperable.
- Accesses water of best quality (deepest part of lake).
- Construction began in 2008; scheduled for completion in 2015.

New Intake Site
Temporary water supplies will meet interim demands until more permanent supplies are developed.

- Arizona Water Bank
- California Water Bank
- Southern Nevada Water Bank
- Virgin and Muddy River Tributary Conservation and Imported ICS
- Brock Reservoir ICS
- Yuma Desalting Plant
- Extraordinary Conservation ICS
- Binational ICS
Groundwater Development Project alignment

A water supply separate from the drought-stricken Colorado River will be necessary if drought conditions worsen.

Southern Nevada currently uses less than 15 percent of the state’s permitted water rights to support 70 percent of its population and economy.

Maintaining the ability to draw upon this available, unallocated resource is critical to protecting 2 million residents and sustaining Nevada’s economy.

This resource would only be utilized if necessary, and would be managed in accordance with state and federal law.
Working Together

Since the onset of the drought, the seven Colorado River Basin states have been cooperatively addressing river issues:

- Coordinated operations of the system’s two major reservoirs
- Shortages (timing and quantity)
- River augmentation
- Environmental issues
The Water Utility Climate Alliances provides leadership in assessing and adapting to the potential effects of climate change through collaborative action. We seek to enhance the usefulness of climate science for the adaptation community and improve water management decision-making in the face of climate uncertainty.
To Bounce Forward – Climate Smart

- Recognize climate impacts are happening today
- Plan for uncertainty – multiple scenarios
- Invest in adaptation, while maintaining flexibility
- Collaboration is a path to success

Questions?
Managing in a changing climate

Bruce Rhodes
Manager, Water Resources Management
The Millennium Drought

Rainfall Deficiency
Oct 1996 – May 2010,
Source: Bureau of Meteorology

Water flow into Melbourne's main water supply reservoirs - annual totals (GL/year)

Long term average inflow
(1913-1995)
Pre Millennium drought
615 GL/year
500,000 acre ft

Short term average inflow
(1997-2009)
Millennium drought
376 GL/year
304,000 acre ft

500,000 acre ft
Climate Drivers – Australia:
Source: Land and Water Australia

NW Band, Front and Low Pressure
22 March 2007 (Av Rain 21mm)

Frontal rain
25 May 2009 (Av rain 11mm)
Rainfall Deciles (April – November)

Source: State of the Climate 2014, CSIRO, Bureau of Meteorology

Rainfall in the southwest of Western Australia has been very much below average to lowest on record.

Southern wet season (April–November) rainfall deciles since 1996. A decile map shows the extent that rainfall is above average, average or below average for the specified period, in comparison with the entire rainfall record from 1900. The southern wet season is defined as April to November by the Bureau of Meteorology.

Southeast Australia has experienced a decline in late autumn and early winter rainfall since the mid-1990s.
Changing trends in demand

Analysis of Melbourne Total per capita per day Metropolitan Consumption

- Total Annual Consumption
- Calendar Year Average per capita per day Consumption
Changing Context

Water Restrictions 2002 to 2010
Permanent Water Savings Measures
Change and in water use behaviours
Variable and changing climate
Integrated water cycle management (IWCM)
Liveability and affordability

475,000 ML or 384,750 Acre-ft
Estimated volume conserved in storage between Nov 02 – July 09
Climate Resilience Plan – Melbourne Water

Understand and manage risks
• We are continually improving our identification and management of climate risks to delivery of core services

Share and consolidate knowledge
• We are engaging internally and externally to enhance business, industry and community understanding of the science, risks and opportunities

Enhance response capability
• We are ensuring our decision frameworks, planning processes and recovery responses are robust against future climate uncertainty

Evaluate success
• We are reviewing our activities and incorporating our experience into future planning cycles
A vision for Melbourne’s water future

An integrated and resilient water system, which is planned and managed to support liveable and sustainable communities, protect the environmental health of urban waterways and bays, provide secure water supplies efficiently, protect public health and deliver affordable essential water services.

Scenario based planning Supply – Demand

Source: Melbourne’s Water Future 2014, Office Of Living Victoria

Source: Melbourne’s Water Future, DEPI 2013, Pg 23
Climate considerations and water management

- Climate variability, change, extreme events and baselines
- Scenarios for planning
- Hydrologic ‘stationarity’ and water supply demand balance
- Drought Response and water conservation in a changing climate
- Changes in other ‘systems’ (e.g. eco-systems, sewerage, drainage)
- Planning uncertainty (e.g. economic, demand, demographic)
- Managing Cumulative risks
Climate Change: Federal Actions and Association Perspective

October 10, 2014, WaterSmart Innovations

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Federal Climate Change Overview

• Federal climate policy / mitigation
• Federal adaptation efforts
• Federal scientific efforts
• What does it mean for utilities now?
Failed federal legislative attempts

- Cap and trade
- Carbon tax (with or without “dividend”)
- Other meaningful emissions reductions
Climate Action Plan

PRESIDENT OBAMA'S PLAN TO ADDRESS CLIMATE CHANGE

Reduce carbon pollution from power plants and build cars that burn less fuel.

Cut energy waste from our homes and businesses.

Help states and cities prepare for the impacts of climate change.

Lead global efforts to address climate change.

Wh.gov/Climate-Change

#ActOnClimate
EPA Clean Air Act CO$_2$ Authority

*Massachusetts v. EPA*(2007)  
CO$_2$ Endangerment Finding (2009)  
Transportation authority (ongoing)  
Power plants  
• Proposed rule for new facilities (2013)  
• Proposed rule for existing facilities (2014)  
  – Also known as the Clean Power Plan
Federal Policy - Adaptation

- Clean Water and Drinking Water State Revolving Loan Funds
- Updating flood maps
- Possible resiliency standards
- Interagency task force
- Agency adaptation plans
Federal Scientific Efforts

• National Climate Assessment provides an overall consensus picture

• Many specialized research and development projects elsewhere on resilience, impacts, and developing tools
What does it mean for utilities now?

• The Clean Power Plan is a big deal!
  – Potential cost >$230 million / year just to water utilities!
  – AWWA will be leading advocacy efforts to help direct energy efficiency funds towards water utilities to help offset up to $100 million / year
What does it mean for utilities now?

• Climate Mitigation:
  – Many of your customers are thinking about this. Know what you are doing, know what to tell them

• Climate Adaptation:
  – Start thinking about risk assessments and how you will incorporate climate into your long term planning, if you haven’t already
Summary

• Numerous federal efforts underway
• Expect changes in initiatives, regulations, and priorities
• Federal efforts only go so far

EPA climate regulatory initiatives:
http://www.epa.gov/climatechange/EPAactivities/regulatory-initiatives.html
Clean Power Plan Process

• EPA sets reductions of GHG emissions from power plants for each state for 2020 and 2030
• States have some flexibility to choose policies to meet these EPA goals
• Reduce GHG emissions from EGUs (30% reduction by 2030, from 2005 levels)
Building Blocks

• EPA offers States 4 Building Blocks
  1. Increase efficiency at power plants
  2. Use lower-emitting power plants more frequently
  3. Expand use of renewable energy sources
  4. Increase energy efficiency throughout the grid

• States can choose some or all of these for its plan, EPA projected optimal mix
Timing – Very fast

- June 1, 2015—EPA to finalize rule
- June 30, 2016—States to submit individual state plans, unless 1 year extension is granted for multi-state plans
- By January 2017, key state and Federal plans approved
- 2020—Interim CO₂ emissions performance goal met
- 2030 – Final CO₂ emissions goals met
Projected Contiguous US and Regional Retail Electricity Rates under EPA Clean Power Plan Option 1 (% Change from Base Case)

Source: EPA Analysis, compiled by PNG for AWWA
Current state EE funding (all sectors)

2013 Electric Efficiency Budgets ($ M)
Compiled by PNG for AWWA
Projection for 2020

[Map of the United States with states colored and labeled with numbers indicating projections.]

- < 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 250
- 250 - 300
- 300 - 350
- 350 - 400
- 400 - 450
- 450 - 500
- 500 - 550
- 550 - 600
- > 600
Opportunity

• Opportunity to gain back some costs through directed spending on energy efficiency (EE)
• $10 billion annual increase in spending for EE by 2020
• Builds on existing state rate-payer EE funds
• Just 1% (equal to electricity use) would be $100 million for water utilities, plus the chance to do the right thing
Why Water Utilities?

• Use a **lot of Electricity**
• Routine Operations Maintenance and capital projects **reduce energy use or energy intensity**
• Utilities offer “gold standard” for energy efficiency projects:
  • **Monitored** by trained staff
  • Often capital projects that are **permanent**
  • Operate **24/7**
Next Steps

• AWWA will be conducting federal and state outreach and advocacy in priority states, with materials available to AWWA members in all states
• In addition to policy challenges, need to reinforce:
  - Availability of internal efficiency opportunities
  - Electricity savings of water loss, conservation, and other water utility programs
QUESTIONS?

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