

California Water Plan Update 2009
Plenary Session

Water, Energy, and Climate Change

October 22, 2007

John T. Andrew
California Department of Water Resources

Sacramento, California



Climate Change Impacts on California's Water Resources



- Reduced snowpack, impacting water supply and hydropower
- Earlier snowmelt results in increased flood control demand on reservoir space
- Higher water temperatures impacts ecosystem
- Sea level rise impacts the Delta, threatens levees and increases salinity
- Increased demand in all sectors

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Recommendation 10

State government must help predict and prepare for the effects of global climate change on our water resources and water management systems.

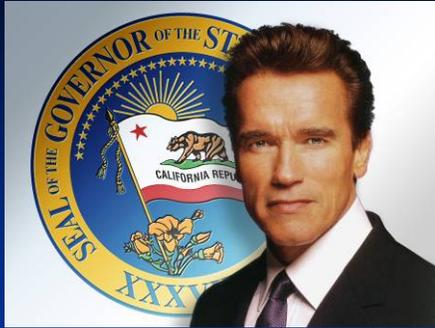
State government should work with and assist researchers to monitor, predict and prepare for the effects of global climate change on California's water systems and the environment.

DWR should develop alternative flow data to help State, federal, and regional planners test the potential effects of global climate change on different resource management strategies; and to help water facility operators test alternative reoperation strategies, including the State Water Project.

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Parking Lot Issues

- Integrate water and energy policy recommendations
- More on climate change impacts and responses
- More on energy cost impacts and water-energy relationship



EXECUTIVE ORDER S-3-05

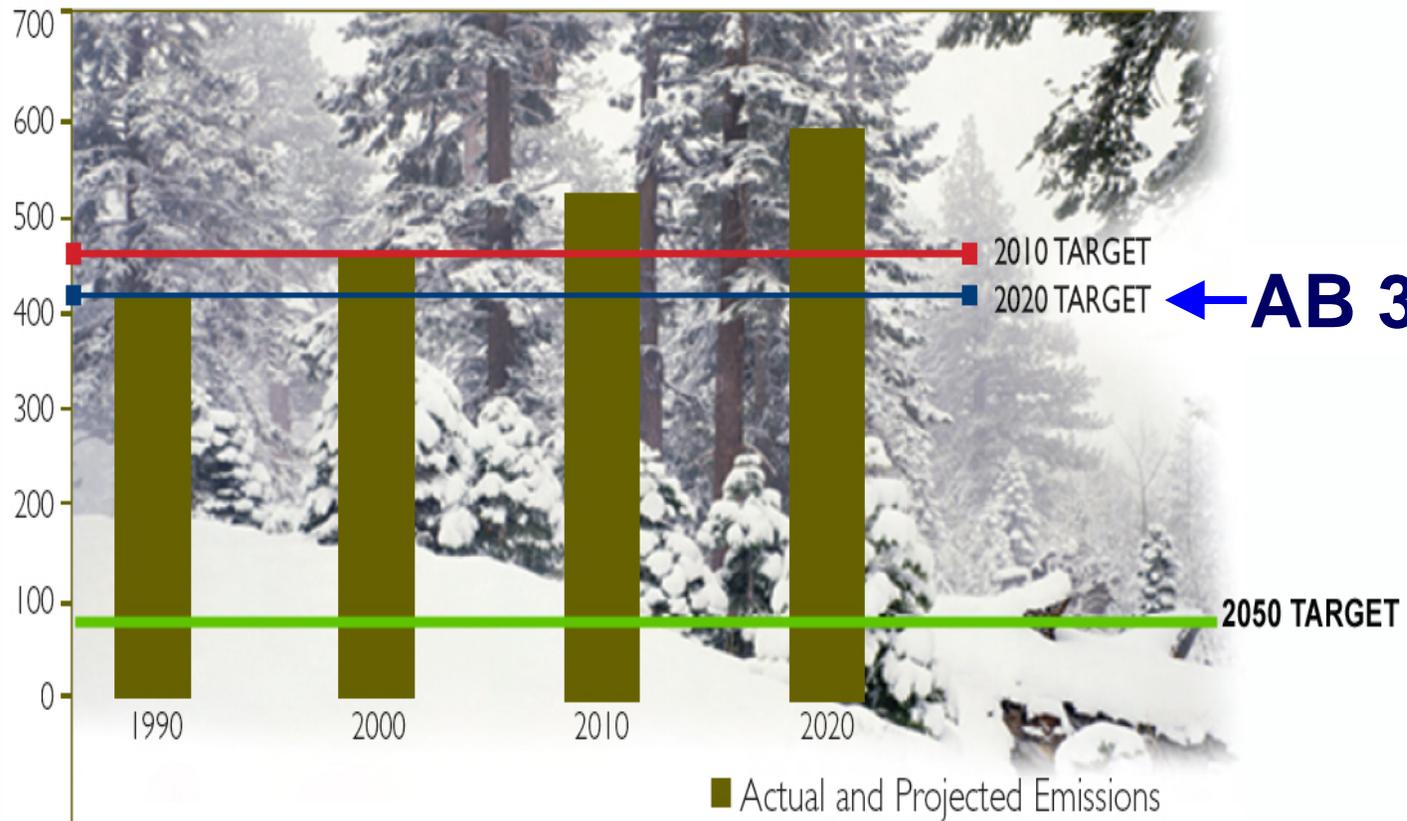
June 1, 2005

- Recognizes global climate change and its impacts on California.
- Establishes aggressive greenhouse gas emission reduction targets for the State.
- Requires biennial assessments of climate change impacts and the development of impact mitigation/adaptation plans.
- Requires the formation of an interagency team to implement the Governor's Order.

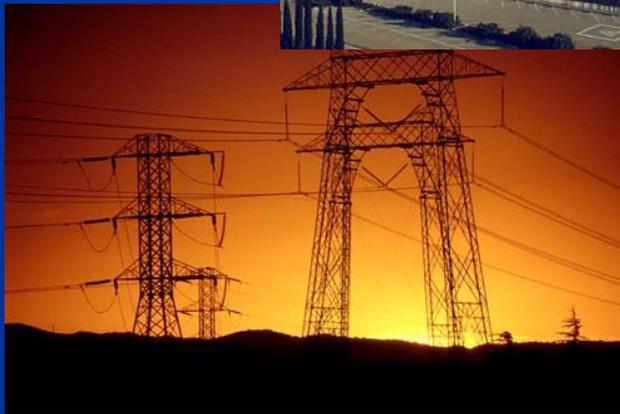
Assembly Bill 32

- ❑ Global Warming Solutions Act of 2006
- ❑ Reduce GHG emissions to 1990 levels by 2020 (30% reduction)
- ❑ Applies to Kyoto pollutants
 - CO₂, CH₄, N₂O, HFC, PFC, SF₆
- ❑ Detailed action schedule

CA Emission Reduction Targets



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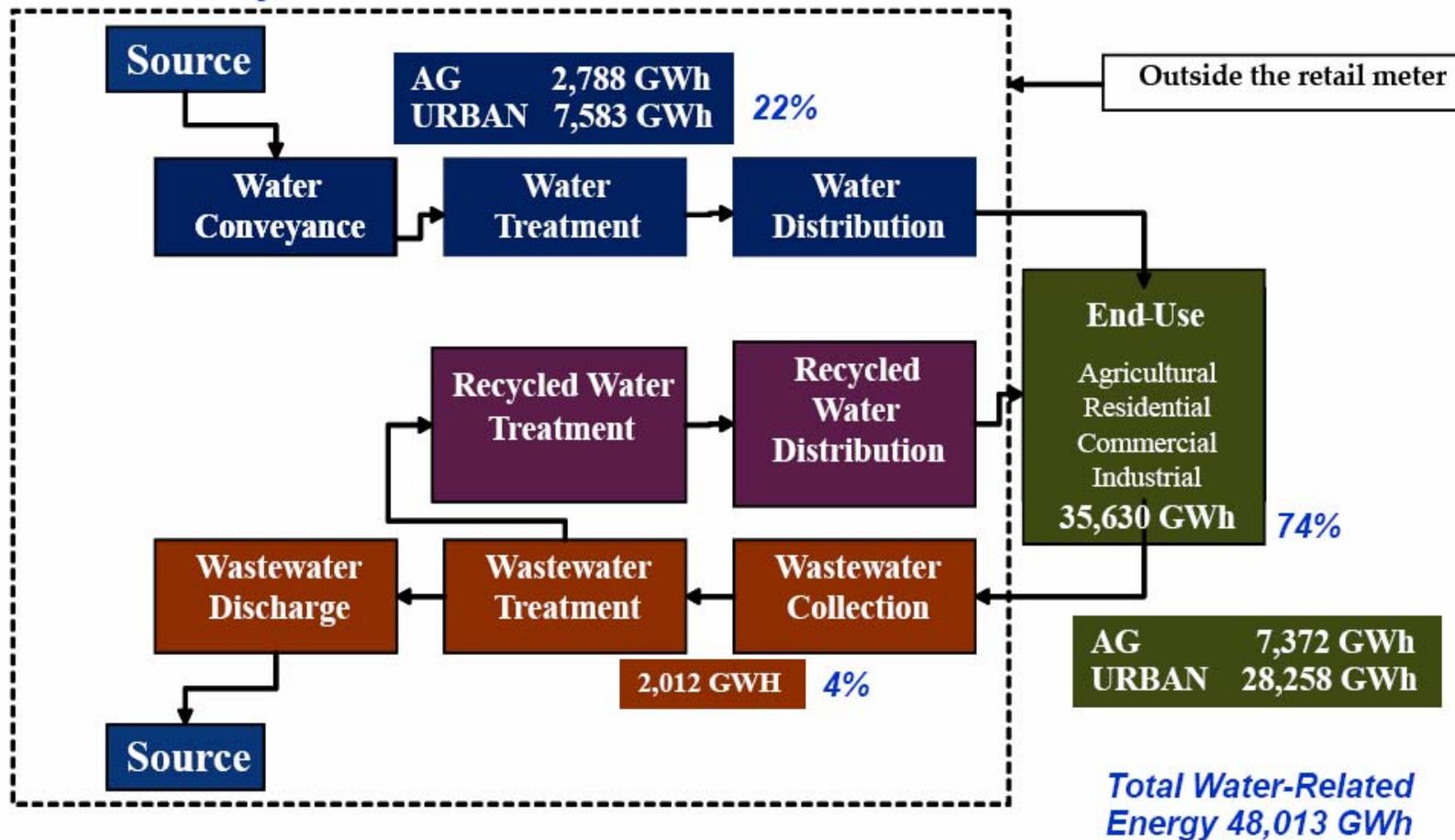


Future water management activities must carefully consider strategies to reduce greenhouse gas emissions

Framework The Water Use Cycle



Estimates adjusted Oct 2006



Where are the greatest near-term opportunities for significant energy benefits?

O'Shaughnessy Dam

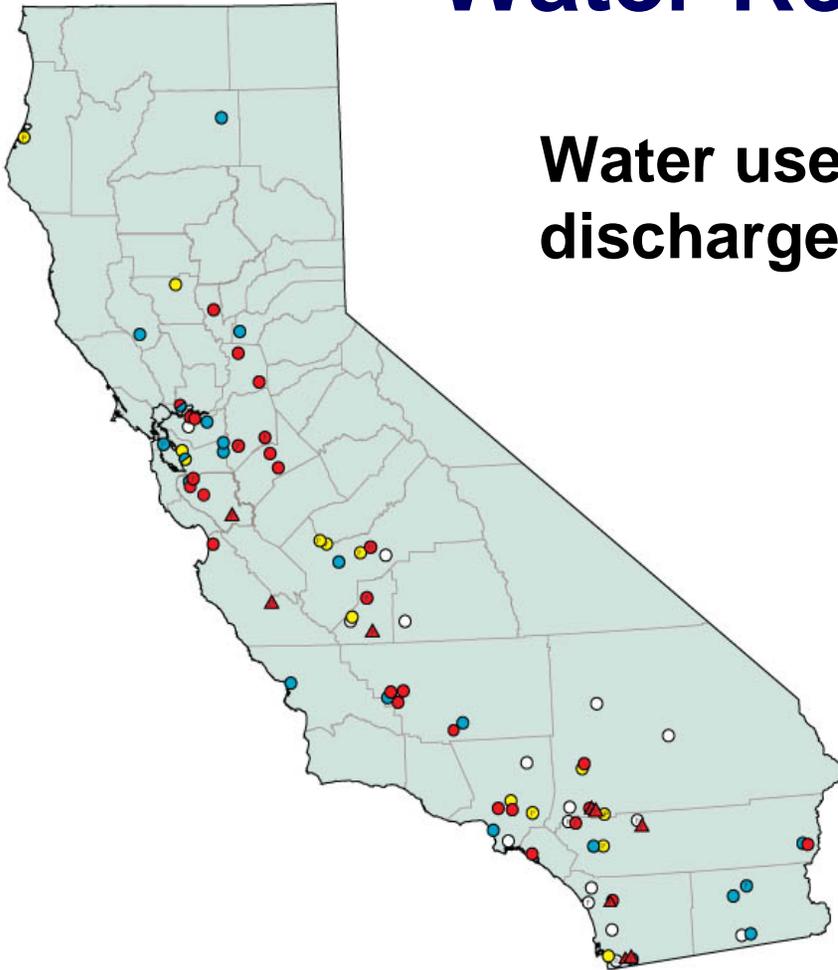




Water Related Impacts

Water use and wastewater discharge by power plants can:

- Reduce fresh water available to current and future water users (residential, commercial and other users)
- Alter marine and aquatic ecosystems
- Degrade surface and groundwater resources



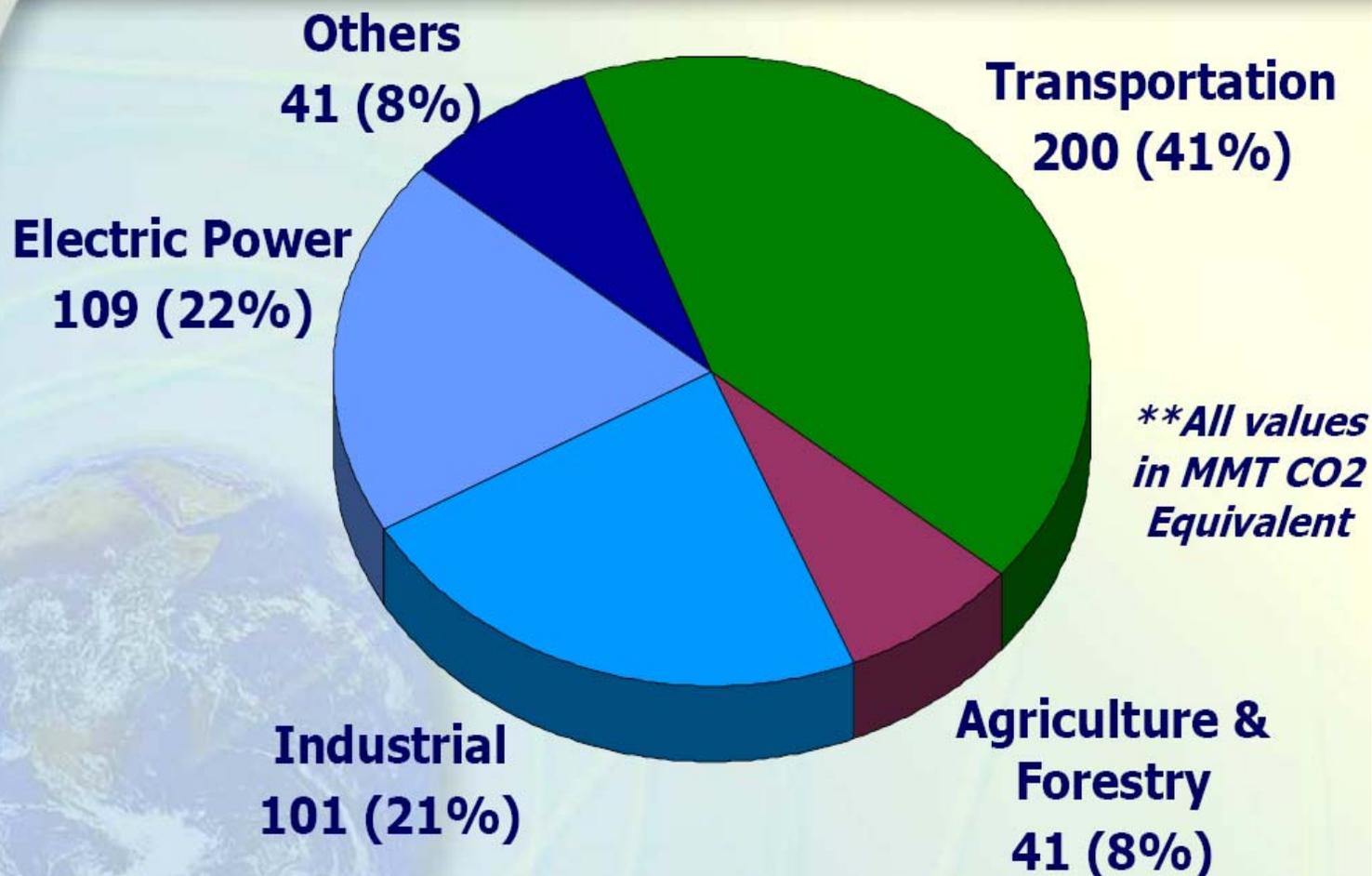
Common Energy-Water Tradeoffs

| | | | |
|------------|------|---|---|
| Energy Use | More | <p>Seawater desalting</p> <p>Wastewater reuse</p> <p>Conjunctive use</p> <p>Wastewater treatment</p> <p>Large dam removal</p> <p>Drip irrigation-SW</p> <p>Fish screens</p> | <p>Water treatment</p> <p>Pumping</p> |
| | Less | <p>Water conservation</p> <p>Crop yield improvements</p> <p>Solar generation substitution?</p> <p>Hot water conservation</p> | <p>Shade trees</p> <p>Evaporative cooling</p> <p>Reforestation</p> <p>Biofuels Production?</p> <p>Shale oil Production?</p> |

Less 0 More

Water Use or Environmental Impact

Sources of California's Climate Change Emissions in 2004



Source: California Energy Commission; Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004

New IPCC Findings



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Climate Change 2007: Impacts, Adaptation and Vulnerability

Working Group II Contribution to the
Intergovernmental Panel on Climate Change
Fourth Assessment Report

Summary for Policymakers

This Summary for Policymakers was formally approved
at the 8th Session of Working Group II of the IPCC,
Brussels, April 2007

Corrections made as of 13 April 2007.

Note: text, table and figures given here are final but subject to checking and copy-
editing and editorial adjustments to figures

Drafting Authors:

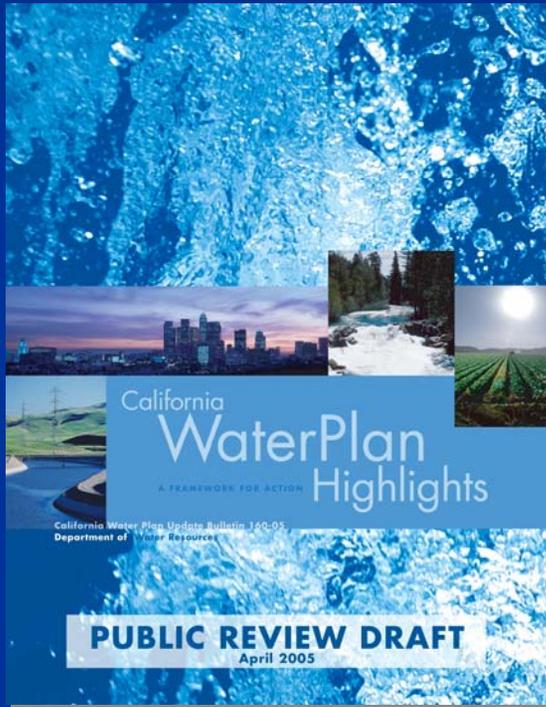
Neil Adger, Pramod Aggarwal, Shardul Agrawala, Joseph Alcamo, Abdelkader Allali, Oleg Anisimov, Nigel Arnell, Michel Boko, Osvaldo Canziani, Timothy Carter, Gino Casassa, Ulisses Confalonieri, Rex Victor Cruz, Edmundo de Alba Alcaraz, William Easterling, Christopher Field, Andreas Fischlin, B. Blair Fitzharris, Carlos Gay Garcia, Clair Hanson, Hideo Harasawa, Kevin Hennessy, Saleemul Huq, Roger Jones, Lucka Kajfež Bogataj, David Karoly, Richard Klein, Zbigniew Kundzewicz, Muzari Lal, Rodol Lasco, Geoff Love, Xiaofu Lu, Graciela Magrin, Luis José Mata, Roger McLean, Bettina Menne, Guy Midgley, Nobuo Mimura, Monirul Qader Mirza, José Moreno, Linda Mortsch, Isabelle Niang-Diop, Robert Nicholls, Bela Novaký, Leonard Nurse, Anthony Nyong, Michael Oppenheimer, Jean Palutikof, Martin Parry, Anand Patwardhan, Patricia Romero Laukao, Cynthia Rosenzweig, Stephen Schneider, Serguei Semenov, Joel Smith, John Stone, Jean-Pascal van Ypersele, David Vutughan, Coleen Vogel, Thomas Wilbanks, Poh Poh Wong, Shaohong Wu, Gary Yohe

IPCC Secretariat, c/o WMO, 7bis, Avenue de la Paix, C.P. No. 2300, 1211 Geneva 2, SWITZERLAND
Phone: +41 22 730 8238/8254/8284 Fax: +41 22 730 8025/8013
E-mail: IPCC-Sec@wmo.int Website: <http://www.ipcc.ch>

- Confirms impacts we are already witnessing
- Emphasizes the importance of adaptation
- Impacts dependent upon both climate change and adaptive capacity
- Recommends a portfolio approach

Framework for Action

Sustainable & Reliable Water in 2030



Vision

Initiatives
for
Reliability

Foundational
Actions for
Sustainability



Resource Management Strategies

Reduce Water Demand

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Improve Operational Efficiency & Transfers

- Conveyance
- System Reoperation
- Water Transfers

Increase Water Supply

- Conjunctive Management & Groundwater Storage
- Desalination –Brackish & Seawater
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – CALFED
- Surface Storage - Regional/Local

Improve Water Quality

- Drinking Water Treatment and Distribution
- Groundwater/Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Urban Runoff Management

Practice Resource Stewardship

- Agricultural Lands Stewardship
- Economic Incentives (Loans, Grants, and Water Pricing)
- Ecosystem Restoration
- Floodplain Management
- Recharge Areas Protection
- Urban Land Use Management
- Water-Dependent Recreation
- Watershed Management

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Water, Energy, and Climate Change

- Consider how strategy implementation may adversely affect energy (e.g. higher consumption)
- Consider how strategy implementation will benefit energy (e.g. new generation or lowers consumption)
- Consider if/how climate change causes new challenges for achieving the potential benefits and/or implementation of a strategy
- Consider if/how climate change provides new opportunities for implementation of the strategy

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Climate Change Goals

- Coordinate with Governor's Climate Action Team and next CAT report update
- Coordinate with DWR climate change matrix team
- Quantitatively incorporate climate change into scenarios
- Assess energy implications of water management strategies
- Recommend climate change adaptation strategies for California water management

For More Information

California Water Plan Update 2005

www.waterplan.water.ca.gov

*Progress on Incorporating Climate Change into Management of
California's Water Resources*

www.baydeltaoffice.water.ca.gov/climatechange.cfm

John T. Andrew, P.E.
Executive Manager for Climate Change &
Chief, Special Planning Projects
California Department of Water Resources
(916) 651-9657
jandrew@water.ca.gov

