

Updated Climate Change Requirements for Proposition 1 Water Storage Investment Program July 2016

Purpose

This document describes staff's recommended approach for considering climate change in the California Water Commission's Water Storage Investment Program (WSIP) Regulations. It is organized into two sections: 1) a summary of recommended climate change requirements and 2) questions and answers describing how and why this approach was developed. Along with presentations and discussion at the July meeting, this document is intended to provide the Commission information so that Commission members can direct staff, during the July meeting, to proceed with a climate change approach in the revised draft regulations.

Summary of Recommended Climate Change Requirements

The Commission recognizes that climate change poses an ever-growing threat to the well-being, public health, natural resources, economy, and the environment of California, and that even under the best-case scenario for global emission reductions, additional climate change impacts are inevitable. In its *WSIP Program Goals, Objectives and Principles (July 2015)*, the Commission committed to implementing the WSIP consistent with Executive Order B-30-15 by factoring climate change into its investment decisions.

In January 2016, the Commission released draft regulations for the quantification of public benefits for an official public comment period. Following the close of the public comment period, Department of Water Resources (DWR) and Commission have developed a new approach to the climate change requirements in the proposed regulations in response to comments from Commission members and stakeholders.

The updated proposal will require project applicants to analyze the project benefits at two future points in time:

- "near future" or approximately 2030 and
- "late future" or approximately 2070.

At these future points, project applicants will monetize the benefits of their projects as compared to without-project conditions. In order to support these analyses, DWR and the Commission have developed the future conditions scenarios based on multiple global climate models as well as additional information related to future conditions.

Applicants will be required to quantify the physical and economic benefits of their proposed projects at the two reference points (2030 and 2070). Applicants will then interpolate the economic value of the

benefits between the 2030 (“near future”) and 2070 (“late future”) reference points. If a project will begin operations prior to 2030, applicants may use any of a variety of available historical datasets to characterize existing conditions in order to interpolate benefits between the start of operations and 2030. Applicants can also extrapolate benefits beyond 2070 if necessary. This will give applicants an estimate of the economic value of the benefits of their project for each year of the planning horizon. Applicants will then calculate the present value of the benefits by discounting the annual economic benefit over the project’s planning horizon and calculate the return on investment by dividing the present value of the benefits by the present value of costs.

Staff selected 2030 as the “near future” reference point because it is assumed that most projects would complete construction and begin operations in this timeframe. Staff selected 2070 as the “late future” point because it captures late century conditions for the 30-year period of 2056-2085 which is likely to be warmer than “near future” conditions. Uncertainties expand greatly with time; however, the “late future” reference point provides an indication of how the trajectory of public benefits might change as the climate continues to warm over the 21st century. Analysis of the climate conditions at 2070 is also consistent with currently available modeling tools that represent sea level rise conditions at 2070 (i.e., 45 cm of rise). Finally, the Department of Fish and Wildlife and State Water Resources Control Board has proposed to use the 2070 conditions analysis to assess the resilience of the project’s ecosystem and water quality benefits to the effects of climate change.

Applicants will also be required to provide a sensitivity analysis (quantitative or qualitative) describing how the public benefits of the project might change under more extreme climate conditions (wetter/moderate warming and drier/extreme warming). Sensitivity analysis is a technique used to evaluate how much the performance of a project changes as a function of an input assumption. In this case, applicants will evaluate how much the public benefits of their projects change as climate conditions become hotter/drier or not as hot/wetter. Because of the uncertainty about future climate conditions, projects that perform well across a wide range of conditions will be more resilient.

It should be realized that there are significant uncertainties associated with estimating future conditions and the further into the future, the greater the uncertainty. This is often characterized as a cone of uncertainty and includes variables such as climate, future water and land use, regulations, future water projects that will affect how an individual project performs, etc. Therefore the climate projections and the project performance under projected conditions should be considered illustrative not definitive or precise. These analyses allow the Commission to assess, in a comparative manner, the future risks and potential trajectories of benefits of each project and to make an informed funding decision on the projects.

Questions and Answers

How are these changes responsive to stakeholders who suggested that the January 2016 draft regulations didn’t adequately analyze late century conditions that would likely be hotter and drier?

The January 2016 draft regulations required project proponents to analyze their projects under future conditions estimated to be likely at 2050 and to assume that the economic value of benefits remains constant beyond 2050. The updated regulations replace the single analysis point (2050) and constant benefit assumption with two analysis points (2030 and 2070) that allow interpolation of benefits between 2030 and 2070 and extrapolation of benefits beyond 2070. The climate conditions used for the “late future” analysis point are drawn from global climate model projections for the period 2056-2085. This 30-year period was chosen because it captures late 21st century conditions that are likely to be considerably warmer than mid-century or “near future” conditions. Additionally, the sensitivity analysis will provide an understanding of project resiliency in uncertain future conditions.

How are these changes responsive to stakeholders who suggested that the January 2016 draft regulations were too onerous and would be costly for applicants because they would need to conduct additional analysis with climate change that is not required for their California Environmental Quality Act (CEQA) documentation?

CEQA does not explicitly require any evaluation of future conditions with climate change and thus provides a poorly defined analysis standard. However, the Commission, in compliance with Governor Brown’s Executive Order B-30-15 and AB 1482, is responsible for ensuring that state investments under WSIP consider climate change and continue to provide value to the state throughout the projects’ useful lives. In an effort to meet these requirements, provide consistent data and assumptions for all projects, and at the same time minimize the effort required by applicants, DWR and the Commission have substantially upgraded the information that will be provided to applicants upon which their analysis will be done. DWR and the Commission will provide all applicants with the following tools for the “near-future” and “late-future” reference points and two additional “highly-challenging” climate scenarios:

- A full gridded dataset of temperature and precipitation across the state
- Full runoff projections across the state and streamflow projections within the Central Valley
- A full CalSim-II model study including inputs, model codes and outputs for without-project conditions
- DSM2 model study including inputs, model codes, and outputs for without-project conditions

Because DWR and the Commission will be providing complete models and datasets of climatological, hydrologic, and hydraulic conditions at each reference period as well as complete without-project conditions at each period, applicants will need only to add their project operations to the provided models and rerun it with the provided input assumptions.

When will these new tools and datasets be available to applicants?

DWR anticipates all tools, data, and reference documents related to the “near future” and “late future” reference points will be available for use by applicants by September 1st, 2016. Additional tools, data, and reference documents that can be used (though not required) for sensitivity analysis of the “highly challenging” scenarios will be provided by January 2017.

How will applicants implement these regulations and how long will it take to complete analyses?

Because DWR and Commission will be providing complete models and datasets of climatological, hydrologic, and hydraulic conditions at each reference period as well as complete without-project conditions at each period, applicants need only to add their project operations to the provided model and rerun it with the provided input assumptions. Consultations with experts who perform this work suggest that it should take 2-4 months to complete the with-project modeling including all post-processing of results. This should leave applicants with no less than 6 months to complete their application after finishing the climate change modeling efforts.

How were the “near future”, “late future”, and “highly challenging” scenarios chosen and why aren’t applicants required to evaluate more scenarios or a specific stress test scenario?

There is tremendous uncertainty about future conditions –not just climate, but land use, water use, technological innovation, regulations, economic values, etc. —that uncertainty grows as we attempt to estimate conditions further into the future. DWR and Commission have attempted to bracket this uncertainty and explore a range of outcomes.

The “near-future” and “late-future” scenarios are drawn from the ensemble of 20 global climate projections selected by the DWR Climate Change Technical Advisory Group (CCTAG) (www.water.ca.gov/climatechange/cctag.cfm) as being the most appropriate projections for California water resource evaluation and planning. The 2030 and 2070 climate conditions were specifically selected to take advantage of existing tools for modeling Delta conditions at 15 and 45 cm of sea level rise which are the levels of rise expected for 2030 and 2070 (National Research Council, 2012). 2030 is also the time period at which most projects are expected to have completed construction and begin operating. 2070 provides a reference point far enough into the future to explore increasingly severe changes in climate and a second reference point to allow interpolation and extrapolation of changes in project benefits over time. The “highly challenging” scenarios were chosen in order to explore the potential lower likelihood of extreme outcomes of climate change and to evaluate the robustness of proposed projects to hotter-drier and cooler-wetter conditions. Because of the uncertainty about future climate conditions, projects that perform well across a wide range of conditions will be more resilient. Additional scenarios of climate change were not considered necessary as the two reference period scenarios and two “highly challenging” scenarios provide adequate (though imprecise) information about how changes in climate will affect project operations and resulting public benefits. Additional scenarios would likely add little meaningful information for decision-making. A specific stress-test scenario was not included and was deemed unnecessary because the provided scenarios already include highly stressful multi-year periods which can be evaluated to understand project performance under extremely constrained conditions.

How are these regulations consistent with other State policies, regulations, plans, and research?

Consistency across State agencies and activities has been a point of emphasis throughout the regulation development process. Further, the WSIP grants can help achieve several of the Safeguarding California Plan¹ Water Sector Strategies including: prepare California for hotter and dryer conditions and improve water storage capacity, Diversify local supplies, and support regional groundwater management for drought resiliency. The climate change analyses described in this fact sheet will also ensure that the WSIP application process meets the Safeguarding California Strategies of “mainstreaming climate consideration into water management” and “reducing Sacramento-San Joaquin Delta climate change vulnerability.

The scenarios used for the WSIP application analysis are built on the work of the DWR Climate Change Technical Advisory Group (www.water.ca.gov/climatechange/cctag.cfm). The California 4th Climate Change Assessment (CCA4) analyses (<http://resources.ca.gov/climate/fourth/>) and technical reference materials related to the implementation of the Sustainable Groundwater Management Act (SGMA) will also be built on the work of the DWR CCTAG. The WSIP regulations outline procedures for evaluating specific project proposals and therefore require a level of analysis that is more detailed than other more general types of analysis (such as the research investigations done related to the CCA4). Therefore, while specific scenarios and analytical methods may differ across programs and purposes, the WSIP climate change scenarios are built on the best available scientific information available and drawn from the same basic information and assumptions as other state programs and planning activities.

¹ “Safeguarding California: Reducing Climate Risk” was published in July 2014 by the California Natural Resources Agency. It is an update to the 2009 California Climate Adaptation Strategy and provides policy guidance to state decision makers, and is part of continuing efforts to reduce impacts and prepare for climate risks. The plan highlights climate risks in nine sectors in California, discusses progress to date, and makes realistic sector-specific recommendations. http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf