

**David Behar: Collaborative climate science: A user's perspective on need, communication and application**

Over the next 20 years, drinking water and wastewater/stormwater managers in the United States alone will need to spend approximately \$633 billion on long-lasting assets to keep their systems in a state of good repair (USEPA). This investment will be made in the context of climate change, but these costs do not include an additional investment of \$448-944 billion potentially needed through the year 2050 exclusively to make these systems resilient to the effects of climate change (AMWA/NACWA). The stakes are enormous for the ratepayers who will be asked to fund these expenditures.

For civil society, evaluation of the potential effect of climate change is experienced first as an interaction between climate science, engineering, planning, policymaking, and politics. Decisionmakers managing drinking water systems, wastewater and stormwater treatment works, public health, coastal zone management, and regulatory mandates are turning increasingly to the climate science community in general, and climate modeling centers in particular, to help them determine how to maintain levels of service under climate change. The IPCC 4<sup>th</sup> Assessment Report galvanized global society as never before on the subject of adaptation to climate change. Decisionmakers today ask the question: now what?

A number of challenges face the adaptation community. A first-order challenge for us is that the infrastructure of collaboration between climate science providers and users is nascent at best, and indisputably undersized in relation to need. There are a number of reasons for this, but one is that each group's interest does not by its nature coincide neatly with the others. The imperatives of curiosity science differ from the needs of decisionmakers, particularly decisionmakers entrusted with substantial tax- or rate-based revenues. Decisionmakers seek what the Water Utility Climate Alliance, a coalition of ten large drinking water providers focused on assessment and adaptation, calls "actionable science." (WUCA water utilities include those in San Francisco, Arizona, Denver, Las Vegas, New York, Portland [Oregon], San Diego, Southern California, Seattle, and Tampa Bay)

Our objective in defining this term is to be neither provocative nor naïve (and certainly not to indicate discomfort with uncertainty – the water community deals with uncertainty each day, month, and year, and we also understand that the stationarity paradigm is being replaced something much more mobile.) Our objective is to emphasize the imperative to action – including the spending of potentially vast sums of public funds on adaptation – that will increasingly animate our missions as the 21<sup>st</sup> century unfolds. Our additional objective is to motivate collaboration between providers and users, initiate sustained conversations and processes leading to co-production of knowledge, and to gain a seat at the tables where prioritization of scientific inquiry and investment on climate questions is determined.

Small shoots of collaboration are emerging from the ground here in the United States. A non-exhaustive list might start with the recent creation of a Societal Dimensions Workgroup within the Community Earth System Model structure, a major step forward by one of our leading modeling centers. The National Academies Committee on a National Strategy for Advancing Climate Modeling will release a report setting strategic goals for the modeling enterprise over the next 10-20 years – this process has actively solicited user perspectives. A new National Climate Assessment process underway holds hope for improving connections between science and society. This emerging ecosystem must

be nurtured, and additional seeds of collaboration planted, here in the United States and around the world.

**David Behar, Director, Climate Program, San Francisco Public Utilities Commission (SF PUC), United States**

David Behar's career spans nearly twenty-five years in water management, environmental advocacy and policy analysis. David joined the San Francisco Public Utilities Commission in 2005 and currently serves as its Climate Program Director. SFPUC manages water and power facilities serving 2.5 million customers in the San Francisco Bay Area.

Dr Behar led development of the SFPUC-sponsored Water Utility Climate Change Summit in early 2007 and has served as staff chair of the Water Utility Climate Alliance



(WUCA) since its founding in 2007. WUCA is a coalition of ten water utilities dedicated to providing leadership and collaboration on climate change issues that affect drinking water utilities by improving research and developing adaptation strategies. WUCA includes the Central Arizona Project, Denver Water, Metropolitan Water District of Southern California, New York City Department of Environmental Protection, Portland Water Bureau, San Diego County Water Authority, Seattle Public Utilities, Southern Nevada Water Authority and Tampa Bay Water. Collectively, WUCA members deliver drinking water to over 43 million Americans.

Dr Behar serves also as project manager of the Piloting Utility Modeling Applications for Climate Change (PUMA) project – a collaboration among WUCA utilities, Regional Integrated Sciences and Assessments (RISA) leaders, and selected representatives of the climate science and applications communities – to identify state-of-the-art climate modelling tools and techniques for use in assessing water supply vulnerability. He has provided testimony to Congress outlining stakeholder needs from a National Climate Service, and served on the Steering Committee for the National Climate Adaptation Summit that was convened by the White House in 2010.