



**Roundtable on Climate Change and other Flood-Related Impacts to Bay Area
Energy Assets and Interdependent Infrastructures**

A Discussion among Local, State, Federal, and Private Sector Partners

Sponsored by the Bay Area Center for Regional Disaster Resilience

Hosted by East Bay Municipal Utility District (EBMUD)

November 6, 2013

Final Roundtable Summary

Local, State, Federal, and private sector representatives met on November 6 at the EBMUD EOC in Oakland to discuss potential climate change-related flood impacts on energy and other interdependent infrastructures with Alice Lippert, the U.S. Department of Energy's Senior Technical Advisor for Energy Infrastructure Modeling and Analysis, Office of Energy Delivery and Energy Reliability. The Roundtable was sponsored by the Bay Area Center for Regional Disaster Resilience (Bay Area CRDR) and hosted by EBMUD in its Emergency Operations Center in Oakland.

The focus of the Roundtable discussion was sharing information on DOE current and anticipated activities working with Localities and States in cooperation with Federal partners on infrastructure-related climate change and resilience challenges, and key projects ongoing in the Bay Area, by FEMA Region IX, the U.S. Army Corps of Engineers, the California State Coastal Conservancy, Alameda County, and other organizations addressing climate change/sea level rise and other major flood threats to the Bay Area. Participants shared ideas on useful collaborative actions and activities to undertake building on regional capabilities. They also addressed how to better coordinate efforts to assess potential flood threats and impacts on infrastructure assets and systems, restoration challenges, and potential mitigation measures.

Welcome and Introductions

Roundtable host Steve Frew welcomed participants on behalf of EBMUD, which provides water and wastewater services to a large part of the San Francisco East Bay. After participant introductions, Paula Scalingi, Bay Area CRDR, stated the reasons for the Roundtable, including: the emergence of climate change resilience as a national and state priority and focus of local concern, President Obama's Climate Action Plan of June 2013 and November 1 Executive Order creating a Task Force on Climate Preparedness and Resilience of State, Local and Tribal officials, the *California's Flood Future* report, and work underway on a State climate change adaptation strategy. She also cited the need to share information on various activities in the Bay Area focusing on major flood threats and broader climate change challenges, as well as to discuss a coordinated, collaborative path forward among Local, State, and Federal partners.

Highlights of Presentations on Federal, State, and Local Activities

Alice Lippert, U.S. DOE Office of Electricity Delivery and Energy Reliability (OE)

OE's focus in the past few years, with Federal stimulus funds, has been on modernization of the energy grid with a small but substantial amount allocated to State and Local energy assurance planning. An Energy Assurance Modeling and Simulation Group was established to address all-hazards threats and impacts from disasters and other events, including climate change. The focus is on risk and criticality studies of regional energy infrastructure, cascading impacts and interdependency analysis, analytic tool development, tools for planners and emergency responders, and supporting activities that increase energy systems reliability and resilience. Lippert noted that DOE's focus on climate change was a result of different factors, including Presidential policy and the Executive Order, Energy Secretary Ernie Moniz's interest, and threats and disasters over the last few years. She pointed out that 2012 was the second costliest year for disasters since 1980, with 11 major weather events, each exceeding \$1 billion. She noted the more extreme storms that were impacting the U.S. with significant consequences resulting from infrastructure interdependencies. Examples are the recent floods in Colorado, , that damaged natural gas and petroleum wells, impacted water/wastewater systems, and Superstorm Sandy, which impacted 24 States, causing a great deal of damage to energy infrastructure, including inundating petroleum product terminals in New Jersey and New York Harbor. Regarding sea-level rise threats and storm surge, DOE is using the publically best available data looking at four metropolitan regions—New York City, Miami, Houston, and Los Angeles, with the goal of developing energy assurance methodologies that can be used by all coastal regions. She pointed participants to the DOE OE website—<http://www.oe.netl.doe.gov/outreach.aspx>—for analytical reports related to major energy disasters and public and private sector response actions. She also noted two other reports, DOE's Report on U.S. Energy Sector Vulnerabilities to Climate Change: <http://energy.gov/downloads/us-energy-sector-vulnerabilities-climate-change-and-extreme-weather> and the White House/DOE paper on Economic Benefits of Increasing Electric Grid Resilience to Weather Outages:

http://energy.gov/sites/prod/files/2013/08/f2/Grid%20Resiliency%20Report_FINAL.pdf

Kathleen Schaefer, FEMA Region IX

FEMA's Mitigation Division has been centering its efforts on developing flood insurance rate maps. More recently FEMA is emphasizing actions to mitigate flood threats through its Risk Mapping, Analysis and Planning program and other activities. The vision of Risk MAP is to reduce loss of life and property through delivering quality data that increases public awareness and leads to action. The objective is to provide updated flood hazard data for a hundred percent of the populated U.S. coast. FEMA Regional Administrators are encouraged to focus on flood risk assessment and mitigation in their regions. In the Bay Area, there is a California Coastal Analysis and Mapping Project that is comprised of two significant efforts— the San Francisco Bay Area Coastal Study and Open Pacific Coast Study. The studies reassess the flood risk along the open coast and inland bays of all California coastal counties and re-map the elevation and inland extent of wave-induced coastal flooding. In the Bay Area, coastal communities in nine counties are part of the studies, which leverage the latest NOAA and USGS LiDAR data for regional storm surge and wave modeling and assesses onshore coastal hazards. The studies involve extensive stakeholder outreach, coordination, and collaboration. Schaefer noted that there is a companion study that the California Department of Water Resources is doing on the

Delta. Results of project activities show the base flood elevation going up a foot, and that the vast majority of developed areas in the flood zone, such as Redwood City and Foster City, are protected by levees that barely meet 100 year flood levels. She observed that areas around the Bay Area that were marshlands in 1940 would be “reclaimed” with water level rise. All of downtown San Rafael under certain scenarios would be flooded. San Francisco Airport is entirely within the flood zone, and new construction will need to comply with FEMA flood elevation requirements. She added that flood maps are being produced for Bay Area counties, and that they are available for San Francisco, Marin, and Contra Costa. The web site is www.r9map.org and www.r9coastal.org.

Jason Regan, PG&E

PG&E has extensive capabilities to address weather and climate change threats that would impact assets, operations, and service to customers. The company’s service area extends from Los Angeles to Oregon. Customers in the nine Bay Area counties provide a third of PG&E’s income with San Francisco County as the largest power user. There are 35 substations in the Bay Area that would be at risk under certain conditions. PG&E has undertaken mitigation measures to address the flood threat, including having elevated substations. Looking more broadly at climate change, the bigger concern is drought, which can cause contamination on insulators from dust, which when affected by fog or other moisture in the air, can lead to fires. PG&E has made agreements with vendors and is interested in discussing with the Bay Area Operational Areas rebuilding its assets after a disaster or significant event. Regarding major earthquakes, since June, PG&E has been studying the M7.9 San Andreas Fault scenario. Modeling has shown that in a M7.9 earthquake, PG&E would need 516 three-person crews to restore the damage to its electric power infrastructure in the first seven days. PG&E has not yet addressed crew restoration needs for post-earthquake natural gas restoration requirements.

Craig Conner, U.S. Army Corps of Engineers, San Francisco District

The mission of the SF District is to partner with State and Local agencies to focus on navigation, flood management, and eco-system restoration. The USACE is partnering with the California State Coastal Conservancy and the Santa Clara Water District to develop alternative courses of action for an adaptive approach to sea-level rise. There are two projects: a South San Francisco Bay Shoreline Study, which is nearly complete with release for public review beginning in mid-December, and a San Francisquito Creek project, which is delayed due to lack of funds. The USACE anticipates further phases of the Shoreline Study to address flood threats in Santa Clara, San Mateo, and Alameda Counties, and other activities, including addressing Bay Area airports (San Francisco and Oakland). The challenge is the limited amount of resources available. The USACE can do work for other Federal agencies. FEMA provided them a small amount of funding to provide support to counties and cities. Conner observed that there should be shared responsibility among Federal, State, & Local agencies and better collaboration and leveraging of programs, data, and funds.

Key Points and Issues Raised in Participant Discussion

Additional Flood Threat-Related Activities

Several other projects were noted by participants that were underway in the Bay Area, either at the Roundtable or in follow-up communications:

- FEMA and EPA are embarking on a project to look at sea-level rise and coastal surge, with FEMA providing funds to EPA and Scripps for this purpose. Ed Curtis is the lead and can be reached at ed.curtis@dhs.fema.gov.
- The California Energy Commission (CEC) is undertaking modeling and simulation capabilities to assess climate change impacts. It also has been assisting local governments throughout the State through the DOE-funded California Local Energy Assurance Planning program (CaLEAP) in preparing plans to ensure that key assets are resilient to disaster events that impact energy.
- The California Governor's Office of Emergency Services (Cal OES) recently received approval from FEMA for the update to the Enhanced State Multi-Hazard Mitigation Plan (SHMP). The State is required to review and revise its SHMP every three years and submit for FEMA approval to ensure the continued eligibility of Stafford Act funding. This includes eligibility for FEMA's hazard mitigation assistance programs: Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance, as well as the Fire Management Assistance Grant Program and Public Assistance grants (Categories C-G). The "enhanced" designation for the 2013 SHMP makes California eligible for millions of dollars in additional federal Hazard Mitigation Grant Program funds following each Major Disaster declaration. In addition, the state remains eligible for the reduced cost share for grants awarded under the Flood Mitigation Assistance grant programs. Development of the 2013 SHMP is the culmination of a multi-agency, multi-disciplinary team of subject matter experts representing more than 80 agencies/departments/stakeholders tasked with implementing and updating the SHMP to comply with the most-current FEMA requirements. The SHMP can be found at the following link: http://hazardmitigation.calema.ca.gov/plan/state_multi-hazard_mitigation_plan_shmp.
- University of California, Berkeley has a project with CEC examining Potential effects of sea-level rise on energy infrastructure (gas pipelines) in the Sacramento-San Joaquin Delta.
- The San Francisco Bay Conservation and Development Commission (BCDC) is leading an Adapting to Rising Tides Subregional Project to help San Francisco Bay Area communities adapt to sea level rise and storm event flooding. The National Oceanic and Atmospheric Administration Coastal Services Center is also engaged in the project along with local, regional, state and federal agencies and organizations, non-profit and private associations.
- The Silicon Leadership Council has a San Francisco Bay Restoration and Flood Protection Initiative that includes a taskforce of business leaders to support activities and

policies to restore habitat and improve flood protection in the South Bay. A key focus of the Initiative is public outreach and education.

- California Department of Water Resources, with USACE, led the *California's Flood Future Report*, the draft of which was released for public review last April and characterizes the flood risk state-wide. The goal behind the report is to influence legislators and the public about the threat. The report notes that in the Bay Area alone, over 600,000 people are exposed to flood risk.

General Issues

Per a panel session at the recent CESA conference:

- Climate change threats include extreme heat, drought, wildfire, and storm intensity
- 480,000 people will be affected by rising sea level and public health issues (spread of, or increased occurrences of respiratory and insect borne diseases)
- Economic impacts include rise in demand for energy and water, impacts to agriculture, decrease in tourism
- Will necessitate readdressing response and recovery planning
- Need to sort out rebuilding process and political issues
- Emergency managers and other practitioners should get smart on the threats
- Need for informed policy decisions and public messaging
- There should be a focus on prioritizing mitigation measures.

Planning and Coordination

- Need to incorporate climate change into all-hazards mitigation planning and coordinate regionally across jurisdictions and the State plan. Producing climate change resilience plans should be avoided.
- There are dozens of Local, State, and Federal agencies, diverse infrastructures, and other organizations and associations that have missions, responsibilities, and vested interests in coastal surge, sea-level rise, and broader climate change resilience and mitigation.

Sea-Level Rise Modeling

- There is discrepancy concerning numbers in threat assessments, with divergent high and low estimates and in some cases extreme estimates. Consequently, there is a lot of stakeholder confusion. Coordination is needed at the Federal level to address this.
- We are suffering from “model overload”—we need to address which to use for what purpose.

Lifeline Recovery Issues

- Policies are needed on rebuilding infrastructure assets after a disaster or significant event to address key questions, among them, how can we rebuild more smartly to lessen future impacts?

Coordination Issues

- There are several major projects and many activities across the Bay Area focusing on climate change resilience related to flooding, many with similar goals and some with duplication of effort. There is little coordination or sharing of outcomes.

Ideas for Collaborative Action (*BACRDR is pleased to note that those action items highlighted in green font below have been addressed since the Roundtable occurred in late 2013 with FEMA Region IX taking a facilitating leadership role with regional stakeholders.*)

The following were raised by participants:

- Augment the Roundtable participant group with the San Francisco Bay Conservation and Development Commission, USGS, and Floodplain Management Association and other relevant groups to create a Regional Climate Change Resilience Coordination Group.
- Look at lessons learned and identify what worked and what didn't work, and what can be applied re. climate change resilience.
- Examine waivers for fuel regulations under different disaster scenarios.
- Develop a Public Awareness and Education Campaign on flood risk.
- Hold a major state-wide conference on Climate Change Resilience Threat and Mitigation Challenges similar to a conference held in LA a few years ago.
- Create a digital clearinghouse of information on climate change resilience (threats, infrastructure and societal/economic impacts, and mitigation needs).
- Develop standards for flood modeling systems (investigate leveraging FEMA/UC Davis Blue Ribbon Panel).
- Develop a common vocabulary to enable talking to decision-makers on climate change flood risk.
- Enable sharing of Local, State, and Federal agency missions, goals, and activities.
- Develop a regional emergency fuel distribution process and system for Local agencies, infrastructures and other essential services.
- Create an educational seminar/tabletop exercise for State and Local elected officials on climate change and flood risk.
- Need to expand activities assessing impacts on lifelines, infrastructure, and essential services under different coastal surge/sea-level rise scenarios with focus on interdependencies, and develop the analysis capabilities to accomplish this.
- Need a process and mechanisms to assure information-sharing and provision of necessary data to decision-makers for infrastructure restoration post-event.
- Develop real-time situational awareness capabilities and a decision support system for prioritizing post-disaster recovery/restoration.

- Get the right people to the table from the Operational Areas to address climate change resilience challenges.

Roundtable Participants

1. Alice Lippert, U.S. Department of Energy Office of Electricity Delivery and Energy Reliability
2. Chris Reilly, Marin County Emergency Services
3. John Bourgeois, California State Coastal Conservancy
4. Jason Regan, PG&E
5. Craig Conner, US Army Corps of Engineers
6. Phil Oglesby, Cal OES Infrastructure Protection Division
7. David Behar, San Francisco Public Utilities Commission
8. David Michel, California Energy Commission
9. Gordon Schremp, California Energy Commission
10. Julie Norris, Cal OES, Hazard Mitigation Planning Branch
11. Merwin Brown, CA Institute of Energy and Environment, UC
12. Genevieve Pastor-Cohen, City of Oakland
13. Terri Wegener, CA Department Of Water Resources
14. Simone Brant, California Energy Commission
15. Ray Riordan, City of San Ramon
16. Patrick Ji, Alameda County Public Works Agency
17. Steve Frew, EBMUD
18. Kathy Schaefer, FEMA Region IX
19. Paula Scalingi, Bay Area CRDR
20. Gerald Kiernan, Bay Area CRDR