CALIFORNIA WATER PLAN, UPDATE 2013

SEPTEMBER 12, 2012

WATER TECHNOLOGY CAUCUS SESSION

10:15AM – 12:00 AM

Session Goals and Purpose:

- Update on Water Technology Caucus deliverables and related CCST work
- Sharing water technology case studies and next steps for caucus

MEETING SUMMARY

Overview of Session:
Karl Longley (CSU Fresno, Technology Caucus Co-Chair) opened the meeting proceedings by noting that the agenda would have some slight revisions based on last minute speaker availability. Mr. Longley explained that Tom Harmon (UCM) was unable to attend the session today, and that a presentation would be given instead by Laurie Park (GEI).

Water Technology Caucus Charge:
Mr. Longley outlined the phased activities of the Water Technology Caucus, and described the relationship between the California Council on Science and Technology (CCST), and the California Water Plan.

CCST Water Technology Survey:
Karl Longley gave an overview of the ongoing CCST survey on Water Technology:

- Over 40% of respondents are from either state or federal agencies; the largest state contingent is coming from DWR and Regional Water Quality Control Boards.
- Most respondents stated, technologies exist to significantly improve California's water supply and management, and can be immediately implemented or can be commercialized/scaled up within three to five years.

The most common technologies suggested included:

- Better access to and use of data and modeling
- Onsite monitoring of water quality and environmental conditions
- Expanded use of remote sensing
- Membrane filtration and desalination
- Improved Water Use Efficiency
- Tying water prices to actual costs

Mr. Longley noted that time and energy to communicate and collaborate are challenges that face the water technology community. He stated that communications technology offers some solutions, like "go-to-meeting" and other webinar services. Teleconferencing presents a good option for higher quality communication. Funds to do these things are hard to come by, but they will save money in the long run. "*Spending money to save money*" is a new mentality that needs to go further. Audience members had a few comments and questions following the opening presentation:

Comment: I don't see "water conservation" on the list of survey results – that is surprising to me.

Comment: In terms of communications for state agencies, CalTRANS has developed this capacity, as have the Air Boards - it is the water world that is behind everyone else.

Question: What about the availability of private money? Can we access those funds?
Answer: Public Private partnerships are options going forward. Please fill out the survey and let us know your thoughts on that.

Case Studies – Technical Innovation in the Water Arena Brings Success:
Innovation for Groundwater Management: the GRACE Groundwater Survey

Amber Kuss (NASA Ames Research Center) presented on the GRACE Satellite Program. GRACE is a pair of twin satellites that obtain gravitational anomalies on a monthly basis, that allow for a calculation of total water storage. With additional datasets, overall Groundwater storage data can be calculated. These other datasets are CDC, CLSDAS, and SNODAS. Currently, the team uses the C2VSim Groundwater Storage Anomalies on a monthly basis. The tool is still in development, but will hopefully sometime produce real time results. Questions and anwers followed the presentation:

Q: Your data shows a 20% drop in Valley groundwater. Is that correct?
A: That was showing a trend for a specific time period. If we were to show a different timescale, that trend line may look different.

Q: Can you downscale to just the San Joaquin?
A: The GRACE dataset is very coarse, we cannot make that in an error-free way yet.

Q: Are seasonal changes accounted for?
A: The changes are small enough that it does not get accounted for.

Q: Is subsidence measured?
A: Yes

Q: How close are the standard and anomaly numbers in the mass balance? Is that difference measurable as a percentage? That will impact the error number.
A: The values are equivalent water height in millimeters, then converted in cubic kilometers. The largest we see are 5 – 10 km fluctuations.

Q: How will salinity affect measurement?
A: The anomalies are so large, that the salinity is accounted for in the standard estimate. We have been looking at this, and applying the technology to something like oil extraction.

Water Efficiency in an Urban Setting: Thinking Outside the Toilet Tank

Marsha Prillwitz (California Urban Water Council) began by asking attendees to “Thing outside the toilet”. The Bill and Melinda Gates Foundation issued grants to design the toilet of the future.

Last Month, Caltech won the project, and received $400,000 to develop and commercialize their proposal. It is a solar toilet that powers a reactor that breaks down human waste into recyclable materials. Currently 2.5 billion people worldwide don't have access to adequate sanitation. The hope is that this toilet can help people in the third world, as well as the developed world.

Ms. Prillwitz continued "Not only must we reinvent the toilet, but we must also be innovative in treating human waste". All innovations face some resistance. High-efficiency toilets and recycled water have faced opposition in a variety forms, but we are making progress towards greater water efficiency in our urban settings – especially in places like San Diego County.

Innovation and Implications for Water Use Efficiency in an Agricultural Setting

Dr. David Zoldoske (CSU Fresno) discussed the challenges faced by agricultural water users. Rural areas have different challenges, since distribution is less centralized, as are water rights. Mr. Zoldoske presented a staff report from the Center for Irrigation Technology (CIT) about Agricultural Water Use Efficiency in California.

The report detailed that there had been a 150% increase in the use of Drip irrigation in California. This is significant, because the cost is high – over $1,000 to $1,500 per acre. The trend is positive, and represents a paradigm shift in California agriculture. Drip Irrigated plants do in fact use more water, but provide more yield. That is a key message to share with potential adopters. Over – irrigation, and inefficient flood irrigation have contributed to depleting groundwater levels. Drip irrigation improves water management, improves yields, fertilizer uses, reduces groundwater depletion, and has better potential for better TOU/PD energy pricing.

Mr. Zoldoske shared two studies, on one Pixley Irrigation District in Tulare County, and one on the "Drip paradox" in the Consolidated Irrigation District. These districts face unique challenges because of increased drip irrigation adoption. The future of drip irrigation is more adoption, greater efficiency, and sustainability in agriculture. Remote sensing and increased modeling will help researchers improve the systems and study the impacts.

Q: Did your report keep data on root density and plant weight?
A: Yes, and it is improved

Q: What about evaporation?
A: I think there are studies that show it is variable. Microsprayers exposed to winds can have very high evaporation coefficients. It's hard to differentiate between evaporation and spray loss.

Q: With regard to the water – energy nexus. What has your research looked at?
A: Agricultural labor is in demand and in short supply, drip system demands are going to impact on-farm economic decisions. There is no silver bullet; it will be an individual decision.

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Membrane Technology Innovations

Yoram Cohen (UCLA) described the current picture of saline water in California, including sea water and agricultural water. Ongoing research at UCLA is trying to reduce scaling/fouling with surface nano structures membranes. There has been a lot of work on monitoring, regarding bio-fouling and other types of fouling. There are a lot of opportunities to use technology to achieve goals like treated wastewater to drinking water quality, recovery of brackish water, and reducing the size of water treatment/production plants. Small, smart plants that are automated could improve the water/energy nexus by reducing pumping distances for treating water. UCLA students did a test of a mini-mobile modular plant, and were able to deploy in the San Joaquin Valley and produce 65% recovery of ditch water to drinking quality in 12 hours (including transit and set up) because it is only 65%, then it is not efficient, but it is improving. The economics of high recovery membrane desalination do require a certain water value in order to break even. The example study showed that an average brine disposal cost would be $1.15 per m^3. Applications are agricultural water, industrial water, wastewater, and sea water.

Comment: The Hopis have a desalinization plant with reverse osmosis membranes, and started production in June 2012. Are there more opportunities for Tribal involvement?
Response: If there is an interest, please speak with the folks at DWR.

Innovation for Efficiency Considering the Water-Energy Nexus: Carbon Free Water by 2015

Grant Davis (Sonoma County Water Agency) distributed a brochure on the Sonoma County Water Agency (SCWA) “Carbon Free Water by 2015 and Projects of Regional Benefit”. Six hundred-thousand customers depend on water from SCWA, as well as wholesale to 9 contractors. SCWA also does water treatment and flood control, so energy innovation and new technology is very important to accomplishing its mission. The water agency always wants to find where the new efforts are coming from, and has found in the past that these ideas need areas to incubate.

SCWA is applying new technologies in its service area, and can test new technologies in a way that the State of California cannot. The agency has worked with NOAA on atmospheric rivers, and used satellite technology, precipitation measurement, and worked in collaborative coalitions (Applied Solutions Committee). Tremendous promise exists if we can put our minds together. Our agency is 95% of the way to carbon free water by 2015, and provides examples of how we can do this.

Q: The state of Oregon has taken the lead in wave energy, but green wave is out in California. What is the future of this?
A: We had three applications into FERC, but the technology has yet to keep up with the promise. There are environmental constraints, and a lot of costs that we could not continue operation. It is certainly not over, but new technology has to come online.

Innovation for Efficiency Considering the Water-Energy Nexus: Pathways to implementation

Laurie Park (GEI) presented an advance copy of California’s Water-Energy Nexus – pathways to implementation. She described some of the brainstorming that happened in stakeholder sessions that

occurred in development of the document. Unlike water that can be stored, energy can be immediately lost – as can opportunities.

Ms. Park described two case studies used in the report; one for the California Public Utilities Commission, and one on 22 water and wastewater agencies. The studies did not provide a magic number, every agency has a unique set of needs and opportunities. The report presents a methodology for designing energy programs in conjunction with utilities and CPUC. Regulations need to catch up. In seven years, the paper also worked with WET-CAT and the DWR to move forward on the policy dialogue.

Every year, the water sector invests billions of dollars a year – these are opportunities to improve energy consumption in the state. There are a lot of urgent questions around as to what we can do next, and how the water sector can help. The paper presents a range of opportunities that are available right now to planners.