

7th Annual Statewide Energy Efficiency Forum

“Gaining Efficiencies at the Water-Energy Nexus” June 16th, 2016 | Riverside, CA

Moderator: Mo Lahsaie

Panelists: Mike Antos, Cody Coeckelenbergh, and Alex Porteshawver

- Introduction by Mo Lahsaie (ML)
- ML gave introduction of Cody Coeckelenberg (CC)
- CC has worked as a consultant to help client establish low management practices that line up with business objectives: minimizing supply requirements, enabling grid management control, integration renewable energy generation, etc.
- CC is currently the Director of Program Services at Lincus, Inc.
- ML’s question for CC to frame his presentation: “Do we spend less water to save more energy, or make water and wastewater more energy efficient, to save energy; or maybe we can do both?”
- **Cody Coeckelenberg**
 - Question I always get is: “Solar, can we use it in the water world?”
 - As I explain the water-energy nexus, I want to take it at a very high level, and explain the direct links between both energy and water
 - Lincus, Inc. is a fairly young company composed of energy engineering consultants that helps clients optimize energy use; mostly for utilities: technical support services, incentive programs, etc.
 - WISE = Water Infrastructure System Efficiency Program
 - Water-energy nexus: water we need for energy + energy we need water
 - UC Davis recently published sheds light on how much energy we save with the drought: a “positive” of the drought
 - The nexus is traditionally related to hydroelectric, but also cooling: we withdraw huge amounts of water to power energy plants, but also need energy to treat water/wastewater, move water around
 - Wastewater treatment plants should be power-producing facilities
 - Therefore, if you conserve energy, you conserve water, and vice versa
 - In 2005, the CEC came out with a study that showed that 19% of all electricity used in CA is used for water (an enormous energy value)
 - This is broken down into water/wastewater, and the end-user customer
 - In 2010, the CPUC determined that the energy use in California needed to support water sector operations was 7.7%
 - In water-energy nexus, we often talk about how much energy we save when we save water: but its important to think about how much water we are saving when we save energy → saving light bulbs = using less of the power plant energy = less water to cool it
 - They are very tied together

- 39% of freshwater withdrawals are for power plants, which is the same amount that we use for power plants
- Any transitions to renewable energies will have implications for water
- WISE is operated through SCE, SDG&E, PG&E
- For customers within those territories, Lincus, Inc. provides consultations and technical support for no fee
- Focuses on 2 areas: first is source water pumping and water distribution systems (those two systems are analyzed first, and assessed)
- Second is water and wastewater treatment plants
- Water system operators will maintain the systems, but the energy use is not necessarily clear as to how much its costing the water operator
- There are payback times for water savings too
- When you look at energy efficiency, there is a pyramid of priorities
- The first thing is to look at the components: what valves are broken
- Then look at system optimization: how are pumps working with or against each other
- Then, hydraulic modeling: leak detection and repairs, pressure optimization, distribution optimization
- Then, water conservation with targeted programs for high-intensity zones
- At the highest part of the pyramid: integrating water and energy management → how does the water grid interact with and help balance the energy grid, and vice versa?
- At the highest part: then look at distributed generation of solar, in-conduit hydro, etc.
- **Mike Antos, PhD (MA)**
 - MA introduced the Water-Energy Community Action Network (WECAN)
 - This is a program at SAWPA (same name as a program that LGC is running in Fresno)
 - SAWPA currently sits in the Santa Ana Watershed: about 20,000 square miles
 - SAWPA is a JPA with 5 member agencies; there are other stakeholders as well
 - Brine Line: watershed-wide tool to drain groundwater, has high salts; it allows de-salters to draw salty water and discharge salts further down the coastline
 - WECAN Program: funded through the California Climate Investments Grant via the Department of Water Resources (DWR)
 - SAWPA is the lead on the grant
 - Scope: removing and replacing thirsty landscapes and inefficient indoor plumbing (outdoors and indoors)
 - This is focused on communities identified by CalEnviroscreen
 - Major goal: strengthening engagement between the agencies that operate in the watershed and the general public
 - It uses Census boundaries and a single factor of income
 - WECAN: goals are to retrofit 260,000 sq ft of turf, retrofit indoor hot- and cold- water devices, at no cost to residents

- This differs from rebate programs: it is at no-cost, which helps for working with low-income communities
- Many cannot often afford the up-front costs of rebates
- By the end of it, the program will have created 23 million gallons saved per year, 3 million kWh saved per year, and 300 more homes with native landscapes
- More so, long-term outcomes: new relationships with the agencies, partners, and people; and the people involved will have a new strengthened ethos; these are critical pieces in moving toward a sustainable future
- Governor's Water Action Plan: making water conservation a way of life for Californians (strengthened ethos)
- Resilience is often talked about as applied to tangible infrastructure
- But the piece we often miss is the social side of resilience: more importantly, it is a social concept that describes people and communities
- Social networks yield social capital: an investment in resilience
- You need to build relationships with people so they will come to you and value your message
- Conservation in water and energy: all the research shows that water and energy use per capita is strongly correlated with income
- When we talk about these programs to benefit disadvantaged communities, chances are you are going to places that are already conserving well (not because they want to, but because they are forced to for economic reasons)
- Disadvantaged communities: how can you identify them? We in policy need to identify the needs vs. strengths of different communities: we need to assess our mindset of what "disadvantaged" means
- Boundaries: if you used CalEnviroScreens to designate where you are working, you may be dropping in and out of communities: need to figure out who the people are and what community they think they are a part of, not just what the program shows you on a map
- Two reports: came funded through DWR, on this topic
- Study conclusions:
 - We found that there are 3 kinds of models for engagement: community-led, institution-led, project outreach and institution-led community assessment
 - For the first: needed is institutions to enhance their attentiveness
 - Second: "traditional institution-led project outreach": usually done pretty poorly (e.g. an afternoon meeting at the library that gets 10 people in attendance; need to individualize community outreach strategies to mitigate that)
 - Third is "institution-led community needs assessment": institution-led assessment of needs and strengths of a community
 - Last conclusion: need to be sensitive and inclusive in our approaches
 - "DACs" are bad; they are reaffirm barriers and differences

- Reframing from “DACs” to “members of disadvantaged communities”
 - Integrating engagement: ego → eco
 - We are building from a legacy of the ego system where man is at the apex, and we need to move to an eco system: of the world, where everyone is communication with one another on the same level
 - “Outreach is communication; engagement is dialogue”
- **Alex Porteshawver (AP)**
 - AP to describe energy efficiency and water programs in Benicia that she is involved in with Michael Baker International
 - It is about 30 minutes north of San Francisco and Oakland; small city of 28,000 people
 - Of the potable water use breakdown, 26% is unallocated (very outdated pipes and meters are improperly sized; there are leakage issues)
 - 55% is in the residential sector
 - Response to the drought: City has made a priority, with an incredible response from the community
 - Between April of 2015-2015: 22.6% reduction, by May 2016 compared to 2013: 52% reduction
 - At city facilities, water usage reductions are taking place
 - Water usage in the City is highest in the late summer annually
 - In 2012, the City installed solar at 10 different municipal sites: as water usage decreased, the need for pumping has decreased as well, and in turn, the associated energy with that pumping
 - City of Benicia is a part of the Marin Clean Energy CCA, started in November 2014
 - There is a number of community water and energy reductions taken place: turf replacement, rebates, outdoor water assessments
 - Additionally, existing programs have been promoted: “Water Smart”, Benicia Home Efficiency Program (BHEP), and the Business Resource Incentive Program (BRIP)
 - “Water Smart”: Benicia was approached to do a 1-yaer pilot with it, to see if the program would work in the county: reached 67 different homes, that had access to a residential home water report card (ranking against other competitors) and a web portal that showed all participants’ water use
 - Residential water use decreased by 3-7% among all participants for the 1 year of implementation
 - There was some pushback in terms of the report card: some people did not like the disapproving “frowning face” for inefficient users of water
 - The Benicia Home Efficiency Program offers all residential homeowners for no cost, a home energy and water assessment
 - 12 high school student interns did 182 consultations (door-to-door) to advise on water and energy usages during a specific, tracked period of time
 - Since 2010, 700 consultations have taken place

- The Benicia Water Reuse Project: goal is a 1.9 MGD or 2,200 AF per year reduction decrease
- This must be connected to the City’s Climate Action Plan (CAP) moving forward
- www.beniciasaveswater.org and www.beniciahomeefficiency.org
- **Questions**
 - Question: “How do you participate in the WECAN Program?” for MA
 - Answer, MA: “There will be a landing page on our website; depending on where you live and what you are interested in, that will have links to follow. The turf replacement program only covers 1/3 of the watershed’s area, but there are other programs too.”
 - Question: “In WECAN and the one in Benicia, was that in major collaboration with any IOUs, and if not, would such a collaboration help?” for MA and AP
 - Answer, AP: “On the residential side, the implementers are aware of the IOU utilities; they promote those incentives when discussing the results of an assessment. For the Home Efficiency Project, a resident can link the “green button data” to the WattzOn program, which can track energy usage overtime.
 - Answer, MA: “WECAN project: fairly sure that we did not approach IOUs; it’s a grant provided by DWR. But there is room for more collaboration with the energy sector.”
 - Answer, CC: “With the way the collaborations are currently being administered by the CPUC, its hard for water agencies to get involved”
 - Answer, AP: “Because residents and businesses in Benicia have done so well at conserving, water rates are increasing; therefore, the City is trying to figure out how to leverage IOU utility programs”
 - Question: “Can you share what you’re seeing in the behavioral or operational water savings approach, and if there are any best practices to share?” for all panelists
 - Answer, AP: “Students are working with residents to show them how to use appliances already located in their houses more efficiently.”
 - Answer, MA: “We are supporting local water retail companies and agencies moving toward a budget-based rate. SAWPA is providing the watershed-wide spatial data to move toward that rate system. Prop 218 makes that difficult, though.”
 - Question: “What lessons do you think the water world can learn from the electricity world?” for all panelists
 - Answer, CC: “In CA, energy efficiency is a very complex system, but there are so many opportunities that keep presenting themselves. One thing that hasn’t been addressed enough is the potential of energy in water efficiency systems. There is a huge amount of energy and cost reduction potential just through energy efficiency. There has to be more overlap between water and electric utilities: the electric utilities are dealing with very variable, unpredictable peaks: need to re-assess their practices based off of that, and partnerships with water agencies. Those partnerships are

essential, and require a collaborative environment. Its possible to synchronize the water pumping with the activity of the electric power utilities' generation. Wastewater plants also really should be used to generate power."

- Answer, AP: "Transparency is really important: how do you set rates, where does water come from? More transparency is there in the electric world, but there needs to be more of it in water. Also, in water, there needs to be more streamlining. Now, the complicated wastewater/greywater systems are quite complicated, and should be made simpler."
- Question: "Is there a better way to manage water so that it is more consistent statewide? for all panelists
- Answer, MA: "Its very complicated, that question needs to be asked to the legislature."
- **Closing remarks**
 - AP: "There are economic development benefits to all of this, it's not just for the environment."
 - CC: "There is tremendous potential in the wastewater treatment world: we can generate electricity from there. Energy and water has impacts on the other: turning lights off saves water."