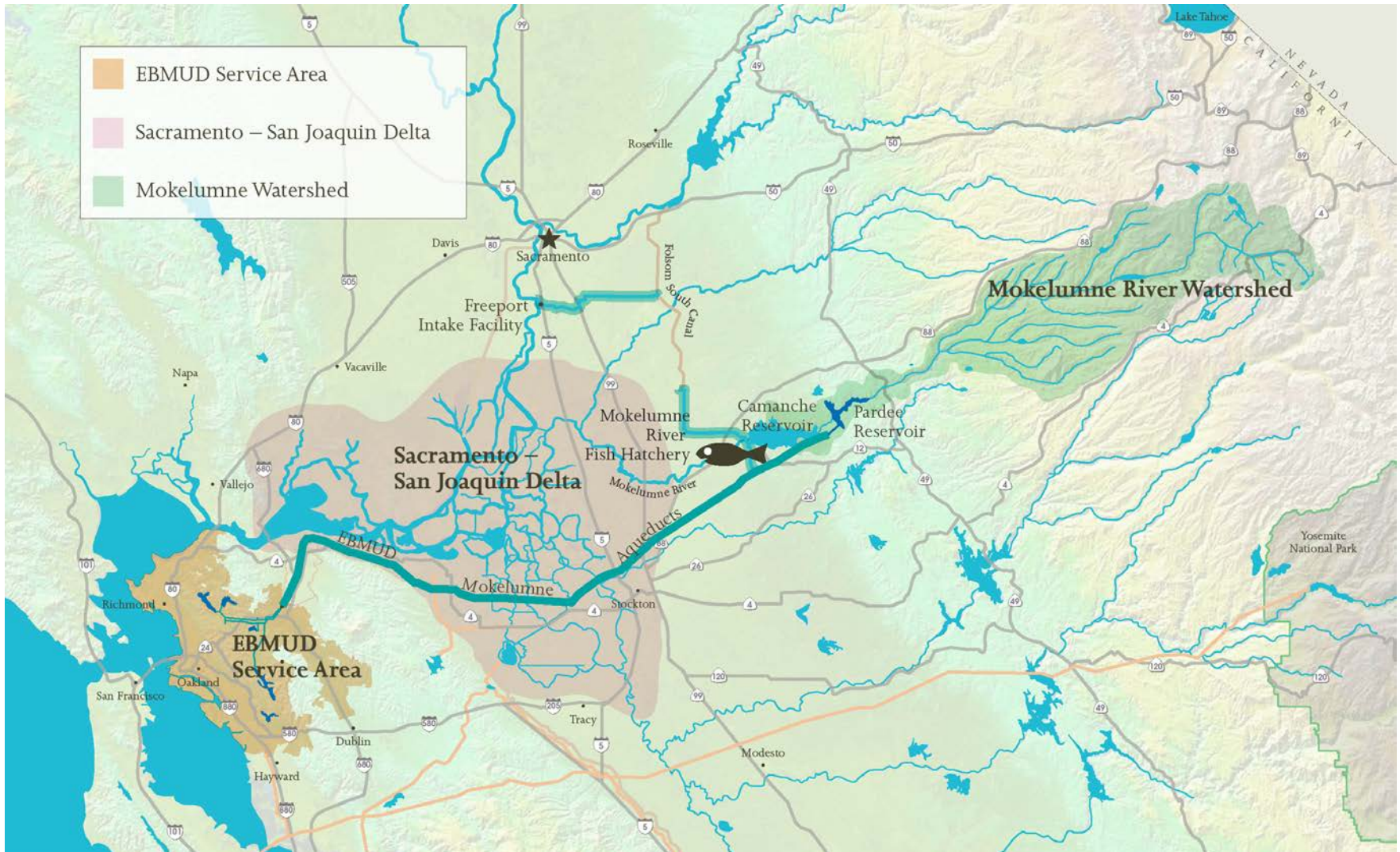


The Water/Energy Nexus

Alexander R. Coate, General Manager

QER Public Meeting June 19, 2014

EBMUD Overview



EBMUD Energy Strategy



- Minimize energy use
- Minimize energy costs
- Produce renewable energy, diversify supplies, and reduce greenhouse gases



Minimize Energy Use



- Promote water conservation to reduce potable water related costs
- Promote energy conservation and optimization in operations
- Improve energy awareness
- Water-energy research with the local electric utility provider and other entities

Less Water = Less Energy



- Demand Management
 - Home surveys and rebates
 - Education and information
 - New service regulations
 - Research on technology, use and education



Minimize Energy Costs



- Minimize the operation of more energy intensive water treatment plants
- Shift pumping operations to off-peak periods and participate in demand response programs
- Operate the most efficient pumps as a priority
- Invest in energy efficiency improvements

Produce Renewable Energy



- Hydropower
- Biogas Production
- Solar Power



Water-Energy Nexus Challenges



- Research on climate change, because it may increase energy use and decrease hydropower generation 10 – 30 percent
- Research on efficiently producing renewable energy from the waste stream
- Understanding that diverse water supply portfolios are essential to our future

W-E Nexus Opportunities



- Advance utility, market and consumer awareness of water-energy nexus
- Improve and expand on water-energy data collection and metrics
- Analyze and promote incentive funding for water-energy efficiency programs
- Expand public funding and public-private partnerships

Statement for the Record
Alexander R. Coate, General Manager, East Bay Municipal Utility District
QER Public Meeting on the Water-Energy Nexus--June 19, 2014 in San Francisco, California

Overview

Thank you for the opportunity to address the Quadrennial Energy Review Task Force to discuss the connections between water and energy. My name is Alex Coate and I am the General Manager of the East Bay Municipal Utility District, which supplies high quality drinking water to 1.3 million Californians and provides pollution prevention and wastewater treatment services that protect San Francisco Bay.

EBMUD delivers an average of 161 million gallons of water per day to East Bay residents and businesses. Next to labor, energy is our highest cost even though we typically use gravity to move water and our high quality source enables us to surpass all state and federal drinking water requirements with less energy-intensive treatment processes than many other agencies. Across California, the average amount of electricity used to deliver one million gallons of water is more than 7,000 kilowatt-hours. In normal water years, EBMUD uses about 1, 250 kilowatt-hours, 82 percent less than the average California utility. Drought years increase electricity use because supplemental supplies require more pumping and treatment. Our drought-period energy costs are projected to be at least three times higher than our non-drought costs.

EBMUD has been focused on the energy-water nexus for many years to manage costs and meet Board-adopted policies on sustainability and energy. As a public utility, we strive to minimize energy use and costs, to produce renewable energy and to maintain diverse energy and water supplies to assure reliability. By 2040, we hope to be carbon free for indirect emissions and to have cut our direct emissions in half when compared to the year 2000.

I'm grateful for this opportunity to share some of the strategies we are using to manage the energy-water nexus, and to suggest areas where federal policy and resources could be helpful.

Minimizing Energy Use

To minimize energy use, we promote water conservation and optimize our operations to conserve energy. We began helping customers conserve water 40 years ago, even before our worst-of-record drought in the late 70s. Drought remains a critical reason for conserving in the west but as you know, water saved is energy saved. A Board-adopted water conservation master plan is guiding our water conservation efforts to the year 2040. Our program addresses both supply-side (water supplier) and demand-side (customer) measures.

On the demand-side, water conservation measures improve customer water use efficiency and include rebates and other incentives, education and outreach, market support and regulatory programs.

Through long-standing partnerships with our water agency peers and investor-owned energy utilities, EBMUD is involved in water-energy efficiency research and program implementation at the utility and consumer levels. We are the lead agency for a California water-efficient products initiative and we partner on product testing and labeling in support of the Department of Energy and US EPA Energy Star and Water Sense programs. We also partner locally with PG&E on consumer audits and consumer rebates, food service equipment technology research, and on social norms-based consumer education.

We make new development water-smart from the start by requiring that new water service customers meet rigorous indoor and outdoor water-efficiency standards for plumbing fixtures, appliances, landscaping and commercial processes that use water. Our measures assess the combined and imbedded water-energy resource efficiency and conservation savings to benefit and support best practices.

The water sector is getting state-level interest for energy efficiency too. We participated in a study of the spatial and temporal distribution of energy use in the water sector to allow for better prediction, targeting, and monitoring of energy savings through water conservation in cooperation with the Center for Water-Energy Efficiency at UC Davis.

There's good alignment between our local conservation efforts and state and federal efforts to promote codes that foster water and energy efficiency in homes and businesses. Going forward, we encourage efforts that:

- Advance utility, market and consumer awareness of the water-energy nexus
- Improve and expand on water-energy data collection and metrics
- Promote incentive funding for cold and hot water efficiency programs that save energy
- Expand public funding and public-private partnerships

Minimizing Energy Costs

Next, I'd like to review briefly how we manage our operations with the goal of optimizing our water and energy strategies. I'll touch on four areas:

- Minimizing the operation of our more energy-intensive water treatment plants
- Shifting pump operation to off-peak periods and participating in demand response programs
- Operating the most efficient pumps as a priority
- Investing in energy efficiency improvements

EBMUD has five water treatment plants. The two conventional plants use, on average, more than six times as much energy as the inline plants. So, we minimize the treatment of water at the conventional plants to save energy.

Our service area has some pretty steep terrain and it takes more than 130 water distribution pumping plants to move water across our 4,200 miles of distribution pipes. To reduce our costs and electrical demand on the grid, we pump mainly during off-peak hours, and about a fifth of our pumping plants participate in PG&E's demand response program. Our latest energy-saving strategy is to prioritize pump unit operation based on measured efficiency.

We're also reducing electricity use. We've installed more energy efficient lighting at three treatment plants and plan to do the same at other facilities. We are only using high efficiency motors at new and rehabilitated pumping plants to reduce energy use. And, we are replacing a 25-year old ozone treatment system with one that will use up to 70% less electricity.

We welcome federal engagement in promoting water operations efficiency, such as developing pump and energy efficiency programs and investments in research to balance pump optimization and water quality.

Producing Renewable Energy

Now I'd like to touch briefly on our renewable energy production, which includes hydropower, biogas production, and solar power generation.

EBMUD has been producing hydropower for more than 80 years. Two hydroelectric power plants at dams on our Sierra reservoirs produce, on average, 185,000 megawatt-hours of electricity annually—enough to power nearly 20,000 homes for a year.

EBMUD's wastewater treatment plant transforms recyclables from the waste stream, food waste collected from local restaurants and other biodegradable waste into renewable energy. This innovative use of existing infrastructure is a national model and we are looking for opportunities to accept new waste streams and improve the energy efficiency of the system. Currently the plant is a net producer of renewable energy, generating more than 55,000 megawatt-hours annually.

We generate more than 2,000 megawatt hours annually of solar power and continue installing photovoltaic systems at facilities where feasible. Using third-party owned equipment and performance-based agreements avoids the capital and maintenance costs of photovoltaic equipment, so EBMUD only pays for the power produced.

The water-energy nexus challenges we see in renewable generation relate to climate change, which may increase energy use and decrease hydropower production. Hydropower provides up to 70 percent of the electricity generation in the northwest and 20 percent in California, Alaska and the Northeast (National Climate Assessment 2014). Climate change is expected to affect hydropower through changes in runoff, increased competition for water, and water availability constraints.

A warming climate will decrease hydropower generation mostly in the summer months when hydropower generation is needed most to meet peak demand (Our Changing Climate 2012).

EBMUD estimated that if precipitation decreases or runoff patterns change significantly, hydropower generation may decrease between 10 to 30 percent, resulting in a reduction of 18,000 to 54,000 MWh in energy production annually.

We urge continued federal investments in research on climate change, particularly as it relates to our nation's water supplies, and on ways to beneficially reuse the waste stream through more efficient anaerobic digestion.

Water Loading Order

Before I close, I'd like to briefly mention what we do on the supply side. We have a plan to the year 2040 that relies on a diverse water supply portfolio to meet customer needs. Our supplies start with water conservation, and include water recycling, reservoir storage, groundwater storage and water transfers. We're also investigating desalination opportunities as part of a Bay Area regional partnership. I cannot underscore enough how important it is for us to be able to pursue and acquire reliable supply sources while continuing our commitment to water conservation. It took nearly a half-century of continuous effort for EBMUD to be able, this year, to deliver supplemental supplies during drought. The work we did to bring this supplemental supply project to fruition has been lauded as a national model.

There are inherent differences between the water and energy sectors that require different approaches to achieving resource efficiencies. The water sector requires site-specific, geographically-based solutions to address water quality, reliability, infrastructure, and operations. A loading order for water based on the lowest energy cost would not take into consideration factors other than cost we must consider when selecting supplies. And as our supplemental supply project timeline shows, water rights are complex and water plumbing takes years to build. We must continue our commitment to conservation but our economy and our quality of life depend on water utilities being able to make long-term choices to invest in future water supplies. A diverse portfolio of water supply sources provides resiliency and flexibility to address future uncertainties such as climate change.

Closing Comments

As a nation, when we make good policy choices about the connections between water, energy and the environment, we deliver profound benefits to future generations. Going forward, it is imperative that energy and water utilities, trade associations, consumer groups, businesses, regulatory agencies, universities, non-profits, national laboratories, and policymakers work together to address shared resource management challenges. We need to make a concerted

effort to work together on studying and improving how water and energy are used, measured and managed.

We need to:

- Advance utility, market and consumer awareness of the water-energy nexus
- Improve and expand on water-energy data collection and metrics
- Promote incentive funding for water-energy efficiency programs, and
- Expand public funding and public-private partnerships that support
 - Operational improvements such as pump and energy efficiency programs
 - Research into balancing pump operation optimization and water quality
 - Development of new anaerobic digestion feedstocks for wastewater treatment plants, and other renewable energy programs, and
 - Understanding the impact of climate change and droughts on hydropower generation and water supplies.

Thank you again for allowing me to share our experiences and to offer input on the water-energy nexus challenges and opportunities.