Remarks for Quadrennial Energy Review Public Meeting June 19, 2014

My name is Jim Herberg. I am the General Manager of the Orange County Sanitation District.

Orange County Sanitation District

We operate a regional wastewater collection system and two wastewater treatment plants, also known as Water Resource Recovery Facilities (WRRF) serving a population of 2.5 million residents in central and northern Orange County, California.

Our two WRRFs produce three products from the 200 million gallons of wastewater that we treat each day: renewable energy, clean water for recycling, and biosolids products for agriculture.

We generate 11 MW of electrical power-- enough to meet about 2/3 of the electrical demand required to run our WRRFs. Hydrogen vehicles are also being powered from fuel generated in our WRRF. With our partners from the Department of Energy, the California Air Resources Board, the National Fuel Cell Research Center, Fuel Cell Energy, and Air Products, we are hosting a 3 year pilot test of a tri-generation fuel cell producing electrical power, heat and hydrogen fuel which is being dispensed at our Fountain Valley site for hydrogen powered vehicles.

Also, in partnership with the Orange County Water District, we are currently recycling 70 million gallons per day of purified water to replenish our groundwater aquifer. This is enough new water to meet the needs of a population of over 600,000. This water recycling facility, the Groundwater Replenishment System, is currently being expanded to increase production to 100 million gallons per day. We are currently studying the feasibility of recycling the entire 200 mgd flowing through our WRRFs.

Our biosolids, the nutrient-rich byproducts of our treatment process, are also beneficially reused by conversion to compost and land application. Biosolids application on farm land reduces the use of water for crops and increases production by over 30%.

The production of recycled water, biosolids products and renewable power are widely practiced in the wastewater industry. The term “Water Resource Recovery Facility”, in fact, more accurately describes our industry rather than “sewage treatment plant “or “publicly owned treatment works”.

Wastewater Utilities Produce Renewable Energy and Help Meet Climate Change Goals

WRRFs provide essential public services to millions of Californians. The wastewater community, through its statewide association the California Association of Sanitation Agencies (CASA), is actively engaged as partners with the state to fulfill a number of mandates and initiatives to be accomplished by 2020 intended to deliver renewable energy and mitigate climate change impacts. These include: (1) providing 33% of the State’s energy needs from renewable sources; (2) reducing carbon dioxide equivalent emissions to 1990 levels; (3) reducing the carbon intensity of transportation fuel used in the state by 10%; and (4) recycling 75% of the solid waste generated in the State.

Anaerobic digestion (AD) is a typical part of the wastewater treatment process employed at many WRRFs across the state. Roughly 95% of wastewater flow in California is treated at WRRFs that utilize AD as the solids treatment process. The AD process produces biomethane, which is converted into power at the majority of these WRRFs, and provides between 40 and 70 percent of the WRRFs energy needs. Many WRRFs are now also hauling in additional organic waste such as fats, oils, and grease (FOG) and food waste for introduction into digesters; a process that helps produce more methane (and hence, additional power production) and divert the organic waste from landfills.

The methane produced in the AD process (or a portion of it) can be converted to low carbon intensity transportation fuel. This may especially be attractive in air districts certified as being in severe non-attainment for ground level ozone standards under the Clean Air Act.

In California, small WRRFs are required to meet the same strict emission control standards as large power plants. These controls are expensive, especially for small and medium-sized facilities. There is concern that smaller agencies will flare off the biomethane produced in their WRRFs, rather than utilizing it to generate electrical power, because of the high cost of meeting more stringent exhaust emission standards which will come into effect in 2016. Continued green energy production will require financial assistance to help WRRFs meet stringent air quality standards while reusing these resources.

Using very conservative assumptions from the United States Environmental Protection Agency (US EPA) Combined Heat and Power Partnership program, CASA estimates that WRRFs in California are currently producing more than 611,000 megawatt-hours per year (MWh/year) of electricity or more than 2,350,000 million British thermal units per year (MMBtu/year) of thermal energy. If converted to low carbon transportation fuel, 611,000 MWh/year would produce 18 million gasoline gallon equivalents (gge) or 16.2 million diesel gallon equivalents (dge). Similarly 2,350,000 MMBtu/year of thermal energy would produce 20.2 million gge or 18.3 million dge. If all WRRFs currently producing methane were to utilize all of that methane, then using those same conservative assumptions we could produce an additional 300,000 MWh/year of electricity or an additional 1,150,000 MMBtu/year of thermal energy. These estimates do not account for the additional methane produced from co-digesting solids with FOG or food waste, which means the potential is even greater.

Water Recycling Saves Energy and reduces GHG emissions

In California, the California Energy Commission reports that 20% of the State's electricity demand is used for the transport, treatment, heating, consumption, and disposal of water supplies. Water recycling can reduce this demand as illustrated by the Groundwater Replenishment System in Orange County. The advanced water purification facility which incorporates treatment steps including microfiltration, reverse osmosis, ultra-violet light treatment and advanced oxidation requires 1,500 kWh per acre-foot of produced water, this is only 50% of the energy required (3,000 kWh per acre-foot ) to move water from the State Water Project from the Sacramento Delta to Southern California.

Biosolids Usage Mitigates Climate Change

Biosolids used in agricultural or horticultural settings mitigate climate change by avoiding the use of fossil fuel intense inorganic fertilizer and by improving long-term sequestration of carbon in soil. Roughly 0.22 gallons of fossil fuel is required to produce every pound of inorganic nitrogen fertilizer, illustrating the tremendous offset gained by using biosolids for land application. Because biosolids are an organic matrix, rich in organic carbon and nitrogen as well as other valuable micro and macro nutrients, biosolids improve soil tilth, reduce the need for irrigation because of their excessive water holding capacity, and increase crop production. Furthermore, biosolids can be utilized to reclaim fire ravaged land, control erosion, and reduce the potential severity, and climate change impacts, of future fires by allowing native vegetation to out-compete invasive species which become dried out fuel by early summer.

Closing

Our Water Resource Recovery Facilities are delivering both clean water and renewable energy while helping to attain greenhouse gas reduction and climate change goals. One important lesson we've learned from our varied efforts to leverage the embedded energy and resources in the water and wastewater treatment processes is that partnerships matter. We would not have been able to implement

our renewable hydrogen vehicle fueling station without the technical and financial collaboration of the federal government and the private sector. Similarly, our partner agency, OCWD, was successful in moving forward with the country's most advanced water recycling program with significant support from the U.S. Bureau of Reclamation. Each of our shared experiences illustrates that the federal government must address the energy water nexus through meaningful collaboration among federal and local agencies. We stand ready to help.