COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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California Energy Commission
Dockets Office, MS-4
Re: Docket No. **12-EPIC-01**
1516 Ninth Street
Sacramento, CA 95814-5512

Comments of the County Sanitation Districts of Los Angeles County on the First Triennial Investment Plan for the Electric Program Investment Charge Program, Docket Number 12-EPIC-01

Dear Commissioners:

During the first two weeks of August, the California Energy Commission (CEC) held a series of workshops designed to seek input from experts, stakeholders, and the general public on the development of a coordinated triennial investment plan covering 2012 through 2014 for administration of the Electric Program Investment Charge (EPIC) Program, as established by the California Public Utilities Commission (CPUC) in Rulemaking 11-10-003. At these workshops, CEC staff solicited input on funding priorities and initiatives to develop the *First Triennial Investment Plan for Funds Administered by the California Energy Commission for the Electric Program Investment Charge Program* (Investment Plan). In addition to oral comments at the workshop, CEC Staff indicated that written comments would be accepted. The County Sanitation Districts of Los Angeles County (Sanitation Districts) respectfully submit the following comments on the Investment Plan.

I. DESCRIPTION OF THE SANITATION DISTRICTS

The Sanitation Districts are an organization of 23 independent special districts that provide wastewater treatment and solid waste management for 5.4 million residents of Los Angeles County. The Sanitation Districts treat approximately 460 million gallons per day of wastewater at 11 wastewater treatment plants and accept 10,000 tons per day of solid waste at three active landfills. These facilities, along with three closed landfills, produce biogas as a natural byproduct of the wastewater treatment and solid waste management processes. This biogas is captured and used to produce electricity. Currently,

the Sanitation Districts produce 80 MW of renewable electricity from biogas at five power plants, of which 23 MW is used onsite at Sanitation Districts' facilities to offset purchases from the grid. The Sanitation Districts are pioneers in the development of biogas-powered renewable generation as well as energy efficient wastewater treatment. Today, as new opportunities emerge to expand self-generation, improve efficiency, and reduce greenhouse gas emissions, the Sanitation Districts seek to continue its tradition of excellence in research and demonstration of new technologies.

II. COMMENTS

A. Significant Energy Potential for Wastewater Treatment

The portion of the EPIC Program administered by the CEC will provide funding for applied research and development, technology demonstration and deployment, and market facilitation for clean energy technologies and approaches for the benefit of ratepayers of Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company. Significant opportunity exists within the wastewater and solid waste industries to support the development of new and emerging clean energy technologies. It is well-documented that 19 percent of all electricity in California is used for the conveyance, treatment, and end use of water. Wastewater collection and treatment is a significant portion of this consumption.

Wastewater also represents a significant energy resource. A 2009 Staff Paper from the California Energy Commission[1] recognizes the significant potential that exists at California wastewater treatment plants to develop onsite biogas power resources. The Staff Paper estimates that the existing biogas-fueled combined heat and power renewable electricity generation capacity at California wastewater treatment plants is 35 MW. This renewable generation capacity is almost entirely consumed onsite at the wastewater treatment plants to offset their power purchases from the electricity grid. The Staff Paper also estimates that an additional 90 MW of renewable capacity is available based on the anaerobic digestion of conventional wastewater solids and that an additional 450 MW of capacity is potentially available through co-digestion of other high strength organic wastes, such as food and dairy waste. CalRecycle is currently targeting further diversion of organic materials from landfills and existing or expanded wastewater treatment facilities offer an option for processing this material.

This electric generation potential has contributed to a paradigm shift within the wastewater treatment industry. Wastewater treatment plants are no longer being considered waste disposal facilities, but rather resource recovery facilities that produce clean water, recover nutrients (such as phosphorus and nitrogen), and have the potential to reduce the nation's dependence upon fossil fuel through the

[1] Kulkarni, Pramod. 2009. *Combined Heat and Power Potential at California's Wastewater Treatment Plants.* California Energy Commission. CEC-200-2009-014-SF.

production and use of renewable energy. This new paradigm has caused researchers to look beyond the current technical energy recovery capacity of wastewater treatment to determine that the energy content embedded in wastewater (e.g., chemical, thermal, kinetic) is typically two to four times the energy used to treat it. In some cases, the energy content can be as high as ten times the energy for treatment. Electricity recovered to the maximum extent from domestic wastewater can potentially meet ten percent of the national electrical demand.[2]

These opportunities have created a new sense of urgency within the wastewater industry to invest in the research and development of emerging technologies, and to demonstrate and deploy technologies that are ready to make a new impact. Reflecting this urgency, the Water Environment Research Foundation, the unofficial research body of the wastewater industry, recently made the following statement:

> Even with the embedded energy content of wastewater, the majority of wastewater treatment plants are currently operated as significant energy users. As a result of this net energy demand, power generation capacity and electric delivery systems are needed to power these facilities resulting in significant emissions of greenhouse gases. Even the facilities using Best Practices currently produce only a fraction of the energy they require for their operations. If a self-sufficient operating paradigm is to be achieved, new practices, technologies and information must [be] developed and deployed; to do so will require substantial and immediate investment into research. Without a concerted effort to become net energy producers, wastewater treatment plants will continue to require substantial purchased energy from offsite sources, at considerable cost and waste.[3]

Any extent to which this massive embedded energy content is tapped into will benefit California electricity ratepayers through the expansion of renewable energy resources, the reduction in load on the grid from wastewater treatment plants that are typically located in urban load centers, and the reduction of greenhouse gas emissions.

B. Potential Areas of Research and Technology Demonstration

There are several potential areas for research and technology demonstration that exist in the wastewater and solid waste industries. These fall into the categories of renewable energy generation, energy efficiency, and greenhouse gas reduction and include the following examples of pre-commercial technologies and strategies:

1. Energy recovery from wastewater treatment

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[2] Water Environment Research Foundation. Energy Management Exploratory Team Report, Version 6. March 23, 2011. Available at: www.werf.org/EnergyETReport.

[3] Water Environment Research Foundation. Energy Management Exploratory Team Report, Version 6. March 23, 2011. p. 2.

- Food waste digestion – technology is maturing, and demonstration projects are needed to appraise the operational and performance characteristics as well as financial risks
- Pipeline biomethane production – demonstration and deployment is needed for this nascent technology
- Anaerobic digestion process improvements for enhanced gas production – several technologies have been researched and vendors have made claims, however there is a lack of information available from full-scale systems in the United States
- Improvement of biogas pretreatment methods for electrical generation – several emerging technologies are in need of research, others require demonstration to gather data at full-scale operation
- Air emission control technologies for biogas generators – new air emissions requirements necessitate the development of economic compliance options, several new technologies have been proposed but lack real-world data that demonstration projects would provide
- Microbial fuel cells – this emerging laboratory-scale research has the potential to transform the wastewater treatment industry and tap into the vast amounts of energy embedded in wastewater, more research is needed to improve performance and determine how to scale it up to the treatment plant
- Energy production from biosolids – significant amounts of energy are available in wastewater biosolids, several technologies are promising but some need more research and others need to be demonstrated before they can be adopted on a wide-scale

2. Reducing energy usage in wastewater treatment
    - Energy efficient removal of nitrogen in wastewater using anaerobic ammonia oxidation – this promising new technology has been utilized at a few treatment plants in Europe, local demonstration projects are needed to determine how to effectively implement it in Calfornia
    - Energy efficient aeration technology and enhanced dissolved oxygen control – aeration accounts for approximately half of all energy consumed in the wastewater treatment process so even incremental improvements can have a big impact; several technologies have been proposed but need to be demonstrated
3. Greenhouse gas reduction from wastewater treatment
    - Mitigation of nitrous oxide (N_2O) emissions from wastewater treatment processes – this gas is a minor byproduct of the wastewater treatment process, but has a global warming potential 310 times that of carbon dioxide; more research is needed to quantify emissions, to better define their cause, and to develop reduction methods

C. Response to Workshop Questions

During the workshop a series of questions were posed to consider for all research topics. The Sanitation Districts have the following responses to these questions regarding research topics related to wastewater treatment.

1. What are the major barriers to developing and commercializing clean energy technologies?
    - Air permits – Emissions standards continue to become more restrictive, especially in the South Coast. These require new emissions controls that are expensive and in many cases unproven, for which the costs can make projects uneconomical.
    - Limited biogas resources – Many small treatment plants do not have enough biogas to develop projects of sufficient scale to make them economically viable. Enhanced gas production is needed to spur the development of new generation projects.
    - Lack of funding – The large majority of wastewater treatment plants are owned by cities and other public entities that are not able to take financial risks with the public funds that are collected for their services. Research and demonstration projects are inherently risky ventures that do not fit with the financial constraints of public entities. Public entities also cannot attract venture capital to develop new technologies. In addition, limited capital is often directed toward competing higher priorities, even when an energy-related project holds a good deal of promise.
2. Where should funding be placed to maximize the deployment of clean energy technologies? (i.e. where is technology innovation needed versus where is support for commercial scale-up the critical need?)
    - Technology innovation is needed in the areas of biogas pretreatment, microbial fuel cells, energy production from biosolids and mitigation of nitrous oxide emissions.
    - Commercial scale-up is needed in the areas of food waste digestion, pipeline biomethane production, enhanced gas production, biogas pretreatment methods, air emissions controls, energy production from biosolids, energy efficient removal of nitrogen and energy efficient aeration technology.

3. What specific initiatives are recommended to advance innovative energy technologies that benefit ratepayers?
    - A specific initiative setting aside funding for research, development, and demonstration of energy production, energy efficiency, and greenhouse gas reduction technologies in the wastewater treatment industry. Such an initiative would provide focus and opportunity to move forward.
4. Define the ratepayer need for which EPIC investment should be targeted.
    - The CPUC decision establishing the purposes and governance for EPIC defined ratepayer and societal benefits in terms of "the extent to which the funded activities promote greater reliability, lower costs, increased safety, and/or enhanced environmental sustainability in the specific context of the provision of energy services".[4] EPIC investment in research, demonstration, and deployment of technology related to wastewater treatment has significant capacity to provide widespread benefits in these areas, especially since the costs and impacts of wastewater treatment intersect all sectors of society. Specific benefits are expanded upon in the response to the next question.
5. Prioritize initiatives and identify the benefits that should be anticipated and measured, such as: Energy and cost savings, grid reliability, job creation, economic benefits, environmental benefits, likelihood of return on investment, other.
    - Grid reliability and energy cost savings – Wastewater treatment plants consume a significant amount of energy and are typically located in urban load centers. Both reducing wastewater treatment energy usage and expanding onsite distributed generation will provide grid support and minimize the costs of transmission and distribution.
    - Environmental benefits – Reducing the consumption of power and the production nitrous oxides at wastewater treatment plants contributes to significant reductions in greenhouse gas emissions. Advancements in air emissions control technologies improves local air quality.
    - Economic benefits and job creation – Distributed generation projects at wastewater treatment plants create long-term well-paid jobs that cannot be outsourced. Reducing energy usage saves money that can be passed on to the agency's ratepayers.

[4] CPUC Decision 12-05-037. May 24, 2012. *Phase 2 Decision Establishing Purposes and Governance for Electric Program Investment Charge and Establishing Funding Collections for 2013-2020.* p. 12.

- Reliable, base loaded power – Digester gas to energy facilities are one of the few base loaded renewable power resources, producing renewable power at all times.

6. What areas are already well covered by DOE and private funding?
    - DOE funding has not typically been available for the wastewater industry. Technologies with commercial promise are in some cases developed by private companies, however, deployment is often a challenge as wastewater agencies are typically unable to undertake the financial and technical risks associated to implementing an unproven technology at full scale.

III. CONCLUSION

Investment of EPIC funds in research and technology demonstration in the wastewater industry will contribute extensively to the guiding principles of the EPIC program – providing society and ratepayer benefits, mitigation of GHG emissions, support for energy efficiency and renewable generation and economic development. The investments that need to be made in the development of technologies for wastewater treatment in general will not otherwise be funded by other sources such as the DOE, private companies, or internal capital. The EPIC program funding categories recognize the importance of investing in bioenergy by requiring that at least 20 percent of the funds dedicated to technology demonstration and deployment be set aside for pre-commercial bioenergy technologies and strategies. While the program does not specifically recognize wastewater treatment plants as a potential resource for investment of EPIC funds in bioenergy technologies and strategies, these facilities clearly merit significant investment to further develop the potential that exists for reducing energy use and expanding energy recovery. The Sanitation Districts urge the CEC consider the extensive opportunities that exist within the wastewater industry in its funding priorities and initiatives including in its EPIC Investment Plan.

Very truly yours,
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