



## CALIFORNIA ASSOCIATION of SANITATION AGENCIES

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June 13, 2013

Adam Schultz, Energy Division Staff  
California Public Utilities Commission  
San Francisco, CA

**Re: Additional Comments on Draft Black and Veatch Report: Small-Scale Bioenergy: Resource Potential, Costs, and Feed-In Tariff Implementation Assessment**

Dear Mr. Schultz:

The California Association of Sanitation Agencies (CASA) appreciates the opportunity to provide additional comments on the Draft Black and Veatch Report entitled “Small-Scale Bioenergy: Resource Potential, Costs, and Feed-In Tariff Implementation Assessment” (Draft Report). CASA is a statewide association of municipalities, special districts, and joint powers agencies that provide wastewater collection, treatment, and water recycling services to more than 90% of the sewered population of California. Many of CASA’s members are actively involved in anaerobic digestion (AD) activities that produce biomethane, biogas, clean bioenergy, and low carbon fuels for use in California.

CASA recently became a party to the proceeding in which the Draft Report is being considered, R.11-05-005, though we have provided feedback on issues specific to wastewater treatment plants (WWTPs) through comments submitted by the Bioenergy Association of California (BAC) and our attendance at recent CPUC workshops. While we agree with many of the Draft Report’s findings and recommendations, we also have significant concerns regarding some of the definitions and assumptions contained in the report. As described in greater detail below, there are a number of areas in which further clarification or correction of terms would be helpful. We have attempted to address these concerns in the framework of the specific questions posed by CPUC staff regarding resource potential, cost estimates and the levelized cost of energy (LCOE), and the LCOE model itself.

**Question #1: Resource Potential for Biogas from Wastewater Treatment, Municipal Organic Waste Diversion, Food Processing, and Co-Digestion** *[Identify alternative assumptions or methodologies that might better inform the quantification of the state’s potential of SB 1122-eligible resources.]*

There are several alternative assumptions and methodologies that would better inform the consultant study’s quantification of the state’s potential of SB 1122-eligible resources. In the wastewater treatment context, the primary assumption in the Draft Report that has a dramatic impact on the estimated resource potential for Category 1 (and specifically for WWTPs) is the

report's definition of an "eligible resource", which limits the resource potential/assessment to only brand new AD construction or use of existing biogas where none occurred previously. The other assumption is an underestimation of the resource potential of co-digestion of FOG and food waste at WWTPs. Both of these issues would have a substantial and material impact on the outcomes produced by the Draft Report as it relates to resource potential in the WWTP / Category 1 sector.

**A. The Draft Report's Definition of an "Eligible Resource" for WWTPs in Category 1 Excludes the Majority of Opportunity for Increased Generation**

CASA's primary concern with the Draft Report is the proposed interpretation of what constitutes an "eligible resource" for Category 1 purposes. As currently defined, this seems to include only a newly constructed AD system or new use of biogas where none previously existed (i.e. a facility is flaring). Specifically, the Draft Report cites a definition of "commence operation" in which eligible projects are assumed to mean "new projects that are not currently producing power" (Draft Report at p. 5-7). Also, according to Appendix A, only two types of WWTPs were identified as possible candidates to develop projects under SB 1122: those facilities that have operating AD but are not beneficially using the biogas produced, and those facilities that do not have operating AD for biogas production. This approach was confirmed in the presentation provided at the May 2, 2013 workshop, in which it was indicated that the Draft Report only evaluated potential at WWTPs greater than 10 MGD in size without existing AD and WWTPs with AD not utilizing any biogas. (Workshop Presentation at p. 19.)

Unfortunately, this definition would mean that no existing WWTPs currently generating any power on-site from their biogas would be eligible under SB 1122, even if those facilities made major retrofits or greatly expanded their biogas and energy production. This is a significant problem because: (a) many if not most of the medium to large scale WWTPs capable of economically utilizing AD to produce biogas are already doing so in some fashion and (b) the greatest potential gains in energy production are not through new construction, but rather incremental (and often significant) gains in generation through re-powering and implementation of new FOG and food waste digestion programs. This existing infrastructure, much of which is not fully utilized to maximize biogas use, provides untapped potential that should not be overlooked in fulfilling state mandates. In support, CASA has assembled information on WWTPs in California and their employment of anaerobic digestion and biogas use. (Attached hereto as Exhibit A). This data indicates that 94% of the wastewater flow in the state already treats their solids stream via anaerobic digestion (See summary information at the bottom of the second tab in the spreadsheet).

The Draft Report's limited definition of an eligible resource would exclude the resource potential that exists with repowering projects at WWTPs, such as converting from an internal combustion engine to a fuel cell or microturbine, or installing advanced emission control systems to meet new air quality requirements on existing units. These projects can produce significant gains in power production that should be eligible as a Category 1 resource under SB 1122. For example, many WWTPs have older generators that can be replaced with new more efficient generators to produce more power, and many generators are too small to utilize all the biogas that is available at the WWTP, and can be replaced with larger generators. Also, many WWTPs in the South Coast Air Quality Management District (SCAQMD) will be forced to shut down biogas-powered internal combustion engines that cannot economically comply with the recently adopted emissions limits in SCAQMD Rule 1110.2. These projects could potentially be repowered with new emissions compliant technologies rather than to flare their biogas,

essentially wasting an otherwise valuable bioenergy resource. The avoidance of flaring by producing useful energy should qualify as an eligible resource under SB 1122. In all of these repowering examples, a new generator would “commence operation” and would enhance the utilization of an existing biogas resource. Based on the language of SB 1122, it would then appear that these types of projects should qualify.

The Draft Report’s definition would also exclude WWTPs that are already producing some power through existing AD systems, but could vastly expand that production through the implementation of new FOG and/or food waste digestion programs. The California Energy Commission (CEC) has determined that “by using co-digestion, biogas production at a wastewater treatment plant can increase by 10 to 40 percent.” (2009 CEC Report at p. 11.)<sup>1</sup> This represents a potentially significant increase in generation at a number of WWTPs across the state that would be excluded from SB 1122 eligibility simply because the facility is already utilizing its existing biogas in some manner. This severely limits the program applicability, and is inconsistent with the intent of the legislation to encourage increased procurement of precisely these types of renewable bioenergy projects. Most WWTPs currently utilizing their biogas for energy production satisfy between 40 and 70% of their onsite energy needs, but could increase that to 100% and generate energy in excess of onsite needs, resulting in “excess” sales potential, as has recently been achieved at the East Bay Municipal Utility District in Oakland.

It is not entirely clear from where this limited definition of an “eligible resource” in this context is derived. In the May 2, 2013 workshop, presentation materials and verbal comments indicated that the authors were relying on a CEC definition of “commercial operation date (COD)” or “commence commercial operation.” It appears that this stems from the current edition of the CEC’s “RPS Eligibility Guidebook”<sup>2</sup> (Guidebook) where it states:

“...the criteria for RPS eligibility may depend on the date a facility begins commercial operations...Applicants seeking to certify a facility as a repowered facility must submit documentation confirming the replacement of the facility’s prime generating equipment and the capital investment made to repower the facility...The applicant must document that the facility’s prime generating equipment is new and that the repowered facility re-entered commercial operations on or after January 1, 2005.” (Guidebook at pp. 57-58.)

The Guidebook goes on to define the “prime generating equipment” for each renewable resource, and defines it for digester gas as “the entire digester unit **and** internal combustion engine or combustion turbine as applicable.” (*Id.*) While many WWTPs would consider replacing an existing generator with newer or more efficient generating equipment, very few would consider the digester unit itself as “prime generating equipment” and would not replace the entire digester when a decision is made to repower. Thus, by apparently relying on this RPS Guidebook definition in the WWTP context, the Draft Report artificially excludes a significant source of Category 1 bioenergy and does not take into account how increased generation can and will actually be accomplished at WWTPs across the state.

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<sup>1</sup> Kukarni, Pramod. *Combined Heat and Power Potential at California’s Wastewater Treatment Plants*. California Energy Commission. CEC-200-2009-014-SF, available at <http://www.energy.ca.gov/2009publications/CEC-200-2009-014/CEC-200-2009-014-SD.PDF>.

<sup>2</sup> Available at <http://www.energy.ca.gov/2013publications/CEC-300-2013-005/CEC-300-2013-005-ED7-CMF.pdf>

As it relates to the Draft Report's exclusion of all facilities beneficially utilizing any biogas, the same RPS Guidebook may be the source for that exclusion as well. The Guidebook defines the COD as "the date, as determined by the system operator, on which an electrical renewable energy generation facility...first generates electricity solely for the purpose of consumption by the facility or any customer or for sale to any procuring retail seller or POU..." (Guidebook at p. 117, emphasis added.) Again, using this definition excludes a significant majority of the potential power generation gains meant to be achieved by SB 1122, and excludes one of the largest source of potential biogas generation at WWTPs: increased production of biogas through implementation of FOG and food waste acceptance programs at facilities with existing AD and power generation capability.

There are two reasons why the use of these definitions and assumptions is inappropriate in the context of the Draft Report and should be modified in any subsequent drafts. First, these CEC Guidebook definitions are not necessarily binding on the SB 1122 proceeding. As noted in the Draft Report itself, "[t]he statutory language authorized by SB 1122 requires significant interpretation by the CPUC..." and one of the issues subject to interpretation is this definition of "commence operation." (Draft Report at 1-8.) An interpretation consistent with what CASA has suggested above, which would identify repowering and new FOG/food waste programs at WWTPs as new projects and thus "eligible resources" for purposes of SB 1122, is entirely in line with the purposes and intent of SB 1122, and should be incorporated in the Draft Report. In addition, the statutory language of SB 1122 simply states that "the commission shall direct the electrical corporations to collectively procure at least 250 megawatts of cumulative rated generating capacity from developers of bioenergy projects that commence operation on or after June 1, 2013." SB 1122 does not define "projects", and thus the language is open to the interpretation that a repowering project, implementation of a FOG/food waste program, and other such projects that are initiated and begin producing additional generation on or after June 1, 2013 would qualify under the language of the statute. Such an interpretation is consistent with the intent of SB 1122.

Second, the practical circumstances in the WWTP context necessitate a different interpretation designed to encourage increased bioenergy production at WWTPs, consistent with the underlying goals of SB 1122. As the Draft Report acknowledges, although there is some opportunity for increased generation through "new construction" of AD (See Draft Report at Table B-3, p. B-5.), most all WWTPs that can economically generate power are already doing so. The vast majority of expanded generation in the WWTP sector will come from plants with existing generation capability, and will be the result of those plants implementing FOG and food waste digestion programs that enhance biogas production and increasing power production through repowering. The definitions and assumptions in the Draft Report need to be modified to reflect this reality, which would result in a significant and material increase in resource potential estimates for WWTPs in Category 1.

In addition, many of the projects that will constitute the bulk of opportunities for increased generation at WWTPs would qualify as "incremental generation" according to the RPS Guidebook. Specifically, Section E of the Guidebook states:

...the Energy Commission may certify incremental generation from the expansion or repowering of a facility... Only the incremental portion of the facility output will be considered RPS eligible. The incremental portion of the facility output will be determined either by direct measurement of the facility

expansion or by comparison of the facility output to the historical baseline of the facility. (Guidebook at pp. 61-62.)

The types of increased generation at existing facilities described above, including repowering and/or co-digestion of additional feedstock such as FOG and food waste, would certainly produce incremental gains in generation that would be RPS eligible. Allowing facilities that engage in these activities to qualify as an “eligible resource” pursuant to SB 1122 would be consistent with the Guidebook in this respect.

## **B. The Draft Report Substantially Underestimates the Resource Potential for WWTPs**

In addition to the “eligible resource” definition issue described above, and perhaps in part due to the limitations of that definition as currently written, the Draft Report underestimates the overall resource potential for Category 1 projects. Specifically, the Draft Report estimates that the resource potential for WWTPs is just 4 MW (Draft Report at p. 1-6 and B-5). This estimate is substantially lower than the true resource potential for WWTPs, particularly when new co-generation and repowering projects are considered.

Other studies and analysis support much greater resource potential in the WWTP sector. For example, a 2009 CEC Report entitled “Combined Heat and Power Potential at California’s Wastewater Treatment Plants”<sup>3</sup> (Attached hereto as Exhibit B) recognizes the significant resource potential that exists at California WWTPs to expand biogas power generation. The report estimates that 90 MW of new generation capacity exists based on the anaerobic digestion of conventional wastewater solids. The report also identified an additional resource potential of 139 MW from co-digestion of FOG and food waste. (2009 CEC Report at p. 10.) These WWTP resource potential estimates are far higher than those contained in the Draft Report, and we would encourage the authors of the Draft Report to review this document and consider its findings. As another example, information from the United States Environmental Protection Agency (Attached hereto as Exhibit C)<sup>4</sup> has indicated that adding FOG to a WWTP through co-digestion would significantly increase the estimated generation potential. According to those estimates, if all of California’s WWTPs with AD were co-digesting with FOG (and assuming FOG constituted 1% of the facility’s flow), this could generate □ 10,288,399 MWh/year, which is more than twice the CEC’s estimates.

In addition, the Draft Report’s WWTP resource potential estimate purports to have identified every treatment plant with anaerobic digestion that is not currently utilizing their biogas as well as every treatment plant that does not currently have anaerobic digestion (See Draft Report at p. A-1). The Draft Report only identified 12 treatment plants that contributed to the estimated WWTP resource potential (Draft Report at Table B-3). However, CASA recently conducted an assessment of anaerobic digestion at California WWTPs, and identified 42 plants with anaerobic digestion that are not beneficially utilizing the biogas, and another 97 WWTPs without anaerobic digestion. (Assessment Matrix Attached as Exhibit A.) These WWTPs are not included in the report’s estimate of resource potential at WWTPs.

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<sup>3</sup>Kulkarni, Pramod. 2009. *Combined Heat and Power Potential at California’s Wastewater Treatment Plants*. California Energy Commission. CEC-200-2009-014-SF. Available at <http://www.energy.ca.gov/2009publications/CEC-200-2009-014/CEC-200-2009-014-SD.PDF>

<sup>4</sup> Also available at <http://epamap21.epa.gov/biogas/updates.html>

**Question #2: Cost Estimates for Biogas from Wastewater Treatment, Municipal Organic Waste Diversion, Food Processing, and Co-Digestion** [*Identify alternative public estimates of the levelized cost of electricity (LCOE) of SB 1122-eligible projects and sources of data that impact some component of the LCOE estimates (e.g., feedstock cost, transportation cost, etc.).*]

While we appreciate that the estimated LCOE for WWTPs with existing AD were relatively low as compared to other categories, there are several considerations that may have been left out that would reduce that figure even further. CASA identified several of these items at the May 2, 2013 workshop, but they are worth reiterating here so that they can be properly incorporated into the LCOE estimates when the Draft Report is revised and ultimately finalized. Most of these are in response to the assumptions built into the section of the Draft Report addressing biogas from wastewater treatment facilities (Draft Report section 4.1.1 at pp. 4-1, 4-2.).

First, the Draft Report improperly assumes that selective catalytic reduction (SCR) for NOx control and a catalytic oxidizer for CO reduction are necessary for all WWTP projects (Draft Report at p. A-1.), which contributes to the statement that costs for biogas cleaning and emissions controls leads to a higher LCOE for WWTPs (Draft Report at p. 4-2). However, in a majority of California air districts, internal combustion engines can meet NOx and CO emissions requirements without such controls. Accounting for this should significantly reduce the LCOE estimates for WWTPs.

Second, the Draft Report assumes that all wastewater treatment plant projects will be 300 kW in size because that is identified as the minimum size necessary for a project to be economically feasible. (Draft Report at p. 4-1, A-1.) However, larger projects (ranging from 300 kW to the maximum of 3MW) would take advantage of economies of scale and lead to a lower LCOE. As one example, the estimated costs for the relatively recent East Bay Municipal Utility District (EBMUD) turbine project include a capital cost of \$5,200 per kW, with a fixed operating unit cost of \$289 per kW, and an LCOE (per the estimator that was included with the Draft Report, and after consideration of financing arrangements including bond rates and term) of \$82/MWh. This demonstrates the benefits and potential LCOE reductions available as a result of taking advantage of economies of scale (relative to the numbers provided in Table 4-2), and while this was a 4.5 MW project, and thus of a slightly larger scale than that covered by SB 1122 and the estimates in the Draft Report and is greater than the eligible capacity under the FIT, it is far closer to the actual LCOE than the estimates based on 300Mw projects in the Draft Report. It is not clear that the Draft Report takes this into account in arriving at the LCOE estimates.

A large amount of generation potential exists at wastewater facilities where the available biogas is not all currently being used for generation or where older inefficient generators can be repowered with new efficient generators to produce greater amounts of electricity. In addition, co-digestion with FOG and food waste will enhance biogas production and create an opportunity to expand generation at WWTPs. Many of these projects will be greater than 300 kW in size, and many will partially utilize existing infrastructure, which will reduce the cost of generation and thus the LCOE estimate for WWTPs.

Finally, there are two other considerations and assumptions that may impact the LCOE estimates. First, the LCOE model for WWTFs including new digesters assumes the digesters will be constructed of glass-lined steel tanks (Draft Report, Appendix D, p. D-3). However, typical municipal wastewater treatment plant digester construction consists of concrete coated with elastomeric polyurethane, which should be considerably less expensive and thus decrease the

LCOE. Second, there is an assumption for WWTFs that feedstock would be provided at no cost, which in terms of inflow is an accurate assumption. However, some digester feedstocks (most notably those used in co-digestion such as FOG and food waste) are provided at a negative cost (i.e. “tip fee”), which when considered could decrease the LCOE. This is a particularly important consideration given that, as described above, a large amount of additional power generation is expected to come from acceptance of these types of feedstocks at WWTFs.

**Question #3: LCOE Model** [*Identify specific refinements that would improve the LCOE Model and how it should be modified.*]

While we were unable to make specific edits to the LCOE estimator that was included as part of the Draft Report, the above narrative information (and particularly the example provided by EBMUD) should be considered as part of any edits to the LCOE model that are made, and we would expect these to reduce the LCOE estimates considerably. We would also be happy to work with the CPUC or authors of the Draft Report if there is specific information about specific projects that are of interest or could assist in reaching a more accurate LCOE for WWTFs.

### **Additional Issues**

Although not specifically raised by the questions distributed by the CPUC, there are several other issues that could impact considerations regarding the LCOE and the economic viability of WWTP projects, and thus may be appropriate to raise as part of these comments. These include, but are not necessarily limited to, the following:

- **High Interconnection Costs:** Although this is allegedly being addressed in other proceedings, it is important to note that this is a significant driver of cost for WWTPs and could have a direct impact on the LCOE estimates. Interconnection costs for WWTPs can be upwards of \$1M, and can be the difference in preventing a project that might otherwise be economically viable from being undertaken.
- **Public Benefits:** We understand that this issue will be addressed in a subsequent workshop, however it is important to note the myriad of public benefits associated with increasing bioenergy production at WWTPs, including a wide variety of environmental benefits as well as sewer ratepayer benefits/savings. On-site generation also provides reliability of wastewater treatment service, especially during natural disasters.<sup>5</sup>
- **Incentives and Credits:** There are a number of state and federal financial incentives available to WWTPs that could factor into reducing the LCOE, including GHG offset credits. We understand because of the long-term and somewhat uncertain nature (and value) of these credits, they have not been included in the Draft Report’s analysis, though we would suggest that some thought be given to assigning some reduction in the estimated LCOE based on their availability.
- **PPA Flexibility and Related Issues:** The Draft Report focuses almost entirely on export-only projects as opposed to “excess sales” projects. Many WWTP’s utilize self-generation to serve onsite loads and increasingly have potential to export excess electricity that is generated above and beyond their onsite demands. However in order for SB 1122 to capitalize on this excess sales potential, certain flexibility needs to be provided in sales contracts to account for the export variability that inherently exists in excess sales situations at WWTPs due to factors such as: (1) changes in onsite demand that affect the amount of excess power available and (2) variability in feedstocks,

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<sup>5</sup> For example, during the Loma Prieta earthquake, the EBMUD facility ran entirely on on-site generation for several days, avoiding interruption in service during a critical period.

particularly as it relates to co-digestion (food waste and FOG). Such variability necessitates flexible terms in order to mitigate the financial risks that would otherwise be incurred by an excess sales project. The necessary flexible terms include: (1) the flexibility to adjust contract quantity on a regular basis to account for co-digestion feedstock changes, or as onsite demands change due to changes in wastewater flow or modifications to the treatment process, and (2) flexibility with guaranteed energy production such that potential penalties do not create an undue burden on excess sales producers. Flexible terms for excess sales arrangements are absolutely critical for the participation of WWTPs in the program, as WWTPs will simply not be inclined to take on the financial risks inherent in a long term contract that contains fixed contract quantities and guaranteed energy production requirements. The potential for excess sales projects and the necessary contract flexibility of such projects needs to be examined as part of the SB 1122 implementation process.

Finally, to the extent that issues not raised in these comments are addressed by the separate comments of the Bioenergy Association of California, CASA would like to join in those comments and incorporate them by reference here.

We appreciate the opportunity to comment on the Draft Report and all of the work that Black and Veatch and the CPUC have put into this process. If you have any questions regarding these comments on the Draft Report or the proposals and concepts identified herein, please feel free to contact Greg Kester, CASA's Director of Renewable Resource Programs, or Adam Link, CASA Legal and Regulatory Affairs, at (916) 446-0388.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam D. Link". The signature is fluid and cursive, with the first name "Adam" being more prominent than the last name "Link".

Adam D. Link  
Legal & Regulatory Affairs