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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies.	))))))	Rulemaking 06-04-009 (Filed April 13, 2006)

SACRAMENTO MUNICIPAL UTILITY DISTRICT'S COMMENTS ON MODELING RELATED ISSUES

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January 4, 2008

SACRAMENTO MUNICIPAL UTILITY DISTRICT'S COMMENTS ON MODELING RELATED ISSUES

In accordance with the Rules of Practice and Procedure of the California Public Utilities Commission (CPUC) the Sacramento Municipal Utility District (SMUD) provides the following comments on modeling related issues. The comments respond to selected questions in the *Administrative Law Judge's Ruling Requesting Comments on Modeling-Related Issues* ("ALJ Ruling"). The questions are shown in bold text, and the responses directly follow the questions. These comments are also being provided to the California Energy Commission (CEC).

SUMMARY OF CONCERNS

SMUD has serious concerns about the attachments to the ALJ Ruling. Attachment B, CPUC GHG Modeling Stage 1 Documentation, of the ALJ Ruling ("Stage 1 Documentation"). The document significantly overstates SMUD's carbon emissions, incorrectly attributes SMUD's renewable portfolio standard contracts to the entire state, substantially underreports SMUD's energy efficiency gains, and effectively disregards any true representation of SMUD's resources or loads in the inputs for a model purporting to depict SMUD as one of the seven entities explicitly modeled.

This modeling effort is truly a pioneering approach that has great promise as a public communications and publicly available, highly transparent, policy evaluation tool. However, poor characterization of any of the seven explicitly modeled entities will seriously erode confidence in the use of these publicly available models as a policy evaluation guide. SMUD appreciates the stated intent of the electric utility sector modeling effort, and will continue to offer our detailed input comments for the modeler's needs. We ask, however, that the modeling be done with regard to the accuracy and granularity appropriate to the modeled entities. The above noted errors and others paint a seriously misleading picture of SMUD's efforts to reduce carbon to date as well as our decades long efforts to develop renewable energy, develop emerging renewable energy technology, and effectively promote efficient use of electrical energy by our customer/owners. Though a cursory review of model inputs for other POU's shows that

SMUD is not being singled out, SMUD finds these erroneous results when combined with the misleading comments[1] in Attachment A of the ALJ Ruling to signal a lack of interest in accurately portraying publicly owned utilities (POU). SMUD is seriously troubled by this implication.

Attachment A, Greenhouse Gas Emissions Reduction Measures for the Electricity and Natural Gas Sectors under Consideration as Part of R.06-04-009 of the ALJ Ruling ("Staff Report") at page 13 states:

> However, it also bears mentioning that existing control measures focus mainly on IOUs, and have little binding control on other types of LSEs throughout the state, such as publicly-owned utilities. Although these LSEs have been required to develop renewable and EE goals, they remain largely self-regulating under state law and thus not bound to compliance. As such, existing targets set for such entities may be inherently less reliable, however well-intentioned. (Staff Report at 13.)

SMUD finds this statement not only inaccurate but also insulting. This statement is not the only incidence of preference for CPUC adopted goals while completely ignoring POU Board adopted goals. The Stage 1 Documentation readily accepts CPUC renewable portfolio standard (RPS) goals for the IOUs but completely ignores SMUD Board goals of 20% renewable generation by 2011 and instead attributes only 14% RPS to SMUD throughout the entire modeling year. SMUD strongly supports the comments of the California Municipal Utilities Association (CMUA) in response to the above quoted statement from the Staff Report.[2] As stated by CMUA and in previous filings by SMUD, local boards are required to comply with law, and the SMUD Board holds themselves and SMUD accountable for meeting their energy efficiency and renewable energy targets. Statements like that quoted above do not foster the positive working relationship needed between the CPUC, CEC and the POUs to achieve the significant greenhouse gas (GhG) goals set by the legislature.

Both the Stage 1 Documentation and the Staff Report provide short treatment of

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[1] Furthermore, Section 3.1 of the Staff Report fails to mention any programs and targets established by POUs while providing information about investor owned utilities.

[2] *Comments of the California Municipal Utilities Association on Modeling-Related Issues,* R.06-04-009 and Docket No. 07-OIIP-01, filed on January 4, 2008.

publicly owned utilities (POU) by consistently failing to correctly attribute generation resources, using a value of zero for photovoltaic installation while providing estimates for the investor owned utilities (IOU), and omitting discussion of POU programs and POU Board adopted goals.

The following list summarizes SMUD's concerns about the Stage 1 Documentation regarding SMUD's resources:

1. The treatment of SMUD's owned and contracted generation is inaccurate.

    a. The SMUD owned 688 megawatt (MW) Upper American River Project (hydroelectric) is not attributed to SMUD but instead is included in the Northern California mix. SMUD has used the output from these facilities to meet native load for 40 years, and in total, they make up approximately 15% of SMUD's total retail load. The model also did not attribute SMUD's 102 MW Solano Wind farm to SMUD's retail load. In addition, the model did not correctly attribute SMUD's 3 natural gas fired cogeneration units to SMUD's load, which SMUD financed and built through Joint Powers Authorities more than 10 years ago. When combined, the output from these units makes up approximately 20% of SMUD's load.

    b. Contracted generation is not attributed to SMUD but instead is included in the Northern California mix, or in the case of out of state resources, excluded from serving California load. In total, 8 long-term contracts were excluded, all of which were for hydroelectric or renewable energy sources. When combined, these make up approximately 15% of SMUD's retail load.

    c. In summary, the model accurately characterized only approximately 30% of SMUD's specified resources, with the other 70% being mischaracterized as system purchases. SMUD has provided corrected ownership and contract data to Energy and Environmental Economics, Inc. (E3) to address this issue and is hopeful that a more concerted effort will be made to accurately characterize the individual load serving entities (LSE) that are included in the model.

2. The RPS should accurately account for LSE RPS targets.

    a. The model assumes as a base-case that SMUD will only achieve 14% RPS by 2020 under a Business As Usual scenario, while other utilities in the State are for the most part achieving close to 20% or higher. SMUD made a Board commitment in 2001 to achieve a 20% RPS by 2011. This percentage is expected to increase or at a minimum stay the same through

the year 2020. We request that the E3 model accept POU Board commitments for RPS percentages just as it accepts commitments made by those who regulate IOU's for RPS percentages.

The input values for adjusting RPS content for each LSE should be done in such a way that it is possible to specify the end RPS % of an LSE without needing to change multiple cells on multiple sheets. The current values that must be adjusted to increase an LSE RPS % are associated with the % of new Renewable Energy that should be attributed to each LSE. Unfortunately this requires an analyst to change the % attributable to their own LSE, and reduce the % attributable to other LSE's in order to maintain 100%. In addition, adjusting this value on the Main tab (cells M45 to M52) result in adjustments to other renewable percentages in more aggressive scenarios that are unintended. This difficulty could be simplified for the analyst to specify the total RPS goal for an LSE rather than try to guess at allocating new renewables between the 7 represented LSE's as a means to achieve the same goal.

b. Emissions reductions associated with increased procurement of renewable energy do not appear to be accurately accounted for in the model. After increasing an LSE RPS percentage, there appears to be no change in the LSE emissions intensity or total emissions. Unless the LSE is backing out Nuclear or Large Hydro, this should not be the case. This problem can be addressed by tying RPS % in on the determination of the amount of pool power necessary to purchase on the "BaseCase" tab such that the pool power purchases required subtract out the specific LSE RPS target from the required pool power for purchase.

3. The model does not take into account green power pricing programs that are additional to LSE RPS commitments. SMUD's Greenergy program supplies 50 or 100% renewable energy to those SMUD customers that enroll, which is in addition to its RPS commitments. Currently SMUD's Greenergy program represents approximately 2% of SMUD's load, and is expected to grow to 3% by 2011. As a result, SMUD is procuring renewable energy to meet approximately 23% of its load in 2011 with renewable resources. The model should either increase the base-case estimate of SMUD's RPS commitments to include SMUD's Greenergy program, or provide a separate category for green pricing programs to the extent they are additional to RPS commitments.

4. The model may not reflect the reporting regulations adopted by the California Air Resources Board (ARB) The model should allow entities that have more generation than they need to serve native load to be able to export electricity into the wholesale markets with associated emissions. If possible, this should be done in a way that considers the Native Load designation rules that were adopted by the ARB.

SMUD discovered another disturbing assumption during the workshop on modeling issues. E3 attributed solar photovoltaic installations to the three IOUs and used a value of zero for all POUs. This disparate treatment is unacceptable. SMUD has been installing photovoltaics (PV) since the mid-1980's and provided national and international leadership in this area with the development of its customer sited rooftop PV program in the 1990's, To date the program has resulted in the installation of 10 MW of PV at more than 1,000 locations in Sacramento. Looking forward, SMUD intends to continue aggressive installation of PV with a commitment in response to Senate Bill 1 (2006) to install approximately 125 MW of solar PV over the next 10 years.

SMUD has contacted and provided additional information to E3 to improve the modeling analysis going forward but remains concerned about the initial lack of effort to obtain specific information from POUs in order to accurately portray their emissions and resources.

RESPONSES TO THE SPECIFIC QUESTIONS IN THE ALJ RULING

Questions Related to Attachment A, Identification of Emission Reduction Measures

1. Does Attachment A cover all of the viable emissions reduction measures available in the electricity and natural gas sectors? If not, what other measures should be considered for the purposes of forecasting emissions reduction potential within these sectors? Please include suggested data sources and references for information regarding any additional measure you propose.

SMUD reserves the right to provide reply comments to this question.

2. Are there emission reduction measures identified within Attachment A that you believe, based on currently available information, should not be implemented as a means to achieving emission reductions with the context of AB 32? Please justify your answer.

SMUD reserves the right to provide reply comments to this question.

3. What means beyond policies currently adopted by the two Commissions hold potential for the delivery of additional energy efficiency?

The CEC should look to expand its appliance efficiency standards into personal computers, cellular phones, televisions and other home appliances or battery charging operations. In order to truly reduce the impact of energy use by Californian's the CEC should look beyond their traditional appliance standards to other home and business energy using items. New technologies such as organic-LED televisions can operate with much lower energy demands than a plasma type television. The state needs to provide leadership regarding energy use in all home appliances and battery operated devices by requiring that they all be designed to use less energy.

4. What means beyond policies currently adopted by the two Commissions hold potential for the integration of additional renewable resources into the grid?

The reliability issues identified on page 12 of the Staff Report are important considerations in developing greenhouse gas reduction measures. The CPUC and CEC could recognize projects and technologies that are needed to support the expansion of intermittent renewable generation on the grid that do not have carbon emissions such as pumped storage. SMUD notes that without energy storage devices an increase in intermittent generation could increase the dispatch rates of reliability based peaking resources that are inherently less efficient than combined cycle resources.

5. How might an emissions reduction strategy within the electricity sector be targeted to displace the most carbon intensive aspects of California's electricity resource mix?

SMUD reserves the right to provide reply comments to this question.

Questions Related to Attachment B, Modeling Approach and Data Sources

6. Does E3's modeling documentation adequately document the methodology, inputs and other assumptions underlying its model? If not, what additional documentation should be added?

The modeling documentation falls short in its description of how renewable energy is treated for reducing LSE emissions. The description seems to be reasonable, however the model does not appear to mirror the description. Further complicating this, the tracking of calculations between spreadsheets for key values such as tonnes of CO2 by LSE is difficult and hampered by a lack of documentation of sheets other than the primary input and output sheets. As a result, when making adjustments to values in the input and output sheets, tracking through all of the changes that occurring on the other sheets, or understanding why expected changes are not occurring becomes quite difficult. Flow diagrams of calculations between sheets for key values would be helpful. Alternatively, a tracking tool could be developed relatively easily in the sheet in order to follow calculations backwards and forwards. SMUD would appreciate any streamlining of the model and additional documentation that could be provided with regard to the remaining sheets in the model.

7. Provide feedback, as desired or appropriate, on the structure and approach taken by E3 in its GHG Calculator spreadsheet tool.

The structure described in the documentation for how the renewable energy sources were treated at the LSE level appeared to be accurate, however the actual model structure does not appear to bear this out. The model structure appears to take owned or contracted for generation, subtract that from retail load, and fill the remainder with the appropriate pool power. The more accurate calculation would be to fill an LSE's RPS commitment with zero-emission renewable energy before filling the remaining retail demand with pool energy.

The model structure should also allow the user to adjust values that are meaningful to the user with respect to the RPS percentages. The current structure requires a user to adjust the percentage of new renewables attributed to each LSE in order to attain a desired RPS percentage for their own load. Further, plots that result from this adjustment on the results page appear to significantly overestimate aggressive policy scenario RPS results when changes have been made to the renewable resource attribution percentages. We suggest allowing users to specify a desired renewable energy percentage for each LSE with a single change, and adjusting the other values according to this control.

The use of multiple of the spreadsheet model, with multiple sheets that did not have documentation explaining them makes it difficult to understand which items in the model are being used and how the sheets flow together. We would suggest streamlining the model where possible, and providing additional documentation for those sheets that do not have any.

8. Provide feedback, as desired or appropriate, on the data sources used by E3 for its assumptions in its issue papers. If you prefer different assumptions or sources, provide appropriate citations and explain the reason for your preference.

In Issue paper #4, "Assigning generation to LSE's", E3 failed to accurately attribute nearly 70% of SMUD's specified resources to SMUD. Approximately half of these resources were owned by SMUD, and half were contracted resources. Some of this attribution could have been done by consulting federal filings with the EIA, namely EIA form 906, which is publicly available on the EIA website and which lists nearly all power plants over 1 MW in the U.S., along with their owners. Attribution of power purchases could have been done with a simple data request to the LSE's at the beginning of the process, all of whom are required to post this information publicly prior to entering into any power purchase agreement of significance.

In Issue paper #7 "2020 Reference Case Input Assumptions, for Demand Response, POUs are assumed to have 0 MW of Demand Response while IOU's are estimated to have 5% of their peak load available as Demand Response. SMUD has had an active demand response program for more than 20 years.

In Issue paper #10 "Renewable Portfolio Standards", SMUD would like to request that the authors consider green pricing programs in addition to RPS programs at the LSE's that are modeled. SMUD expects its green pricing program Greenergy to supply an additional 3% on top of the 20% of its load that will be met with renewables in 2011, for a total of 23%. Given program growth, it is likely that this percentage will continue to increase going forward. Public documentation of this is available here: http://www.smud.org/about/reports-pdfs/2007StatusRenewableEnergy.pdf.

In Issue Paper # 13 "California Solar Initiative (CSI)", the modeling team assumed no contribution to the 3,000 MW state goal, however recent legislation (Senate Bill 1) has put in statute that all LSE's in the state will participate in achieving this goal, and further, SMUD has shown leadership in PV for more than 20 years and has publicly stated its goal of achieving 125 MW of PV installations in Sacramento over the next 10 years. SMUD requests that the 3,000 MW goal be distributed evenly across the modeled entities based on their proportion of state energy consumption.

In Issue Paper # 16 "New Wind Generation Resource, Cost, and Performance Assumptions", the wind speeds associated with the NREL classes appear to be higher than more commonly used windspeed classes as found in the Battelle windspeed atlas, which can be found on the American Wind Energy Association site http://www.awea.org/faq/basicwr.html. We would suggest making sure that the windspeeds cited are accurately stated on the NREL website that the information was taken from. Also, the wind costs were thought to be low by SMUD's wind expert however, alternative citations are not available at this time.

In Issue Paper # 19 "Concentrating Solar Power (CSP) Resources, Cost, and Performance", SMUD's experience with recent solar thermal proposals suggests a capital cost nearly 25% higher than those that are estimated in the model. Also, the land area exclusions seem to be too restrictive. For the DNI restriction, the filter is applied based on annual solar resource, however Sacramento's summertime solar resource rivals that of the Mojave region, and there are likely other areas in California whose solar resource during Spring, Summer, and Fall months is exceptional. Alternative filter approaches should be considered to account for the fact that energy prices and the solar resource are both more important during summer months. Further, exclusions for locations of 1% or greater slope seems restrictive as most solar siting studies we have seen put that value at 2% or greater as the balancing point for costs.

In Issue Papers # 28 "Cost of Integrating Wind Resources" and 29 "Firming Cost", it is not clear whether it was assumed that the cost of integrating wind would include the firming cost or whether that was solely used for the cost ranking process. It is recommended that the firming penalty only be used for the resource selection process if that is not the case already. It should also be noted that the assumptions behind the 'integration cost' are not consistent for the studies reviewed, in particular the Idaho Power methodology has been singled out as being inconsistent with other studies. The expectation that the integration costs ought to be linear with penetration also does not seem consistent with industry expectations.

9. Are uncertainties inherent in the resource potential and cost estimates adequately identified? Does E3's model provide enough flexibility to test alternative assumptions with respect to these uncertainties?

E3 used a production cost model for dispatch of resources. A production cost model cannot reflect out of market or bilateral purchases. Purchases from cogeneration projects when placed into the standard economic dispatch may not be dispatched at all on price due to their higher cost when in reality, they would be dispatched to meet contract energy delivery requirements. Thus, the model selected to evaluate the impact on individual entities or the state as a whole has inaccuracies that may be difficult to correct. We feel this is more of an issue for the 2008 modeling than for the 2020, and are hopeful that the next dispatch model that is run will include more detail on unit commitments to ensure that economic dispatch does not distort the reality of bilateral contracting.

The modeling effort should consider the possibility of a federal greenhouse gas cap assessed at the generator level; a carbon cost that may or may not be additive for California generators. One modeling approach for such scenarios would be to assess a carbon adder into the Plexos Dispatch model. This would change the price of some generators, and could likely change some dispatch order along with the apparent added costs associated with various policy scenarios. Considering the large amount of activity at the federal level, it would be reasonable to consider this possibility in the 2020 timeframe as a scenario.

10. Has the E3 model adequately accounted for the implications of increased reliance on preferred resources (renewables, efficiency) on system costs?

SMUD reserves the right to provide reply comments to this question.

11. Should E3's model, in Stage 2, attempt to model potential market transformation scenarios, in the form of cost decreases, new technologies, or behavioral changes? What might be an appropriate way to characterize such potential for market transformation?

Given the continual technology advancements and cost decreases, as well as the significant increases in public and private funding for new technology development, it would make sense to look hard at market transformation possibilities when examining a 13 year time horizon. Considering recent adoption of zero energy building targets at the CPUC, and the international demand for clean technologies it is hard to imagine a future without significant market transformation. The modeling team should look to those technologies which have the largest potential for impact, examine the key drivers to making those technologies successful, and examine past market transforming technologies in order to develop appropriate scenarios to capture these possibilities.

12. What specific flexible GHG emission reduction mechanisms to mitigate the economic impacts of achieving the desired GHG emission reductions should be modeled in Stage 2?

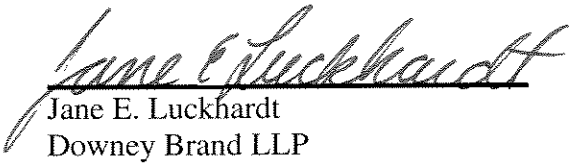
The modeling team should consider California, national, and international projected emissions reductions costs to examine whether the costs seen in the current model are within the bounds of these other reduction costs. If the California electricity sector costs for reductions are significantly more than the costs of reductions using flexible compliance mechanisms, it would make sense for California policy makers to consider the role that these kinds of mechanisms should play.

13. What output metric or metrics should be utilized to evaluate the least cost way to meet a 2020 emission reduction target for the sector?

It is difficult to examine the costs of RPS and energy efficiency from strictly a greenhouse gas benefit perspective, considering that California has been pushing these technologies for their other benefits for 30 years. However, in order to compare costs of achieving greenhouse gas targets by requiring additional emissions reductions out of the electricity sector vs. requiring additional reductions out of other sectors, it is necessary to understand the costs using a common metric, and using the standard metric of dollars per tonne achieves this goal. It would certainly be worthwhile for the state to examine ancillary benefits of particular regulations enacted to meet greenhouse gas targets, however this quantification is likely outside of the scope of this analysis.

Dated: January 4, 2008

Respectfully submitted,



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CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the attached:

SACRAMENTO MUNICIPAL UTILITY DISTRICT'S COMMENTS ON MODELING-RELATED ISSUES

on all known parties to R. 06-04-009 and CEC Docket No. 07-OIIP-01 by transmitting an e-mail message with the document attached to each party named in the official service list. I served a copy of the document on those without e-mail addresses by mailing the document by first-class mail addressed as follows:

See attached service list

Executed this 4th day of January, 2008, at Sacramento, California.

Lois Navarrot

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Service List R. 06-04-009, as of January 2, 2008

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