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BEFORE THE PUBLIC UTILITIES COMMISSION AND THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT 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 Emission Standards into Procurement Policies.	Rulemaking 06-04-009 (Filed April 13, 2006)
Order Instituting Informational Proceeding – AB 32.	CEC Docket No. 07-OIIP-01

SOUTHERN CALIFORNIA PUBLIC POWER AUTHORITY COMMENT ON IDENTIFICATION OF EMISSION REDUCTION MEASURES AND MODELING APPROACH AND DATA RESOURCES

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Dated: January 4, 2007

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In accordance with the Administrative Law Judge's Ruling Requesting Comments on Modeling-Related Issues ("Modeling Ruling") issued on November 9, 2007, in the captioned proceeding and the Administrative Law Judges' Ruling Extending Comment Deadlines and Addressing Procedural Matters issued on November 30, 2007, the Southern California Public Power Authority ("SCPPA") respectfully submits this comment. In accordance with the Modeling Ruling, this comment is being submitted simultaneously to both the California Public Utilities Commission ("CPUC") and the California Energy Commission ("CEC") (jointly, "Commissions").

The Modeling Ruling provides for parties to file comments on a CPUC Staff paper entitled "Greenhouse Gas Emissions Reduction Measures for The Electricity and Natural Gas Sectors Under Consideration as Part of R.06-04-009" ("Staff Paper"). The Staff Paper was

appended as Attachment A to the Modeling Ruling. To assist parties in preparing their comments on the Staff Paper, the Modeling Ruling contains five questions about the Staff Paper.

Additionally, the Modeling Ruling seeks comments on a paper prepared by Energy and Environmental Economics, Inc. ("E3") entitled "CPUC GHG Modeling Stage I Documentation" ("E3 Documentation"). The E3 Documentation was appended as Attachment B to the Modeling Ruling and was subsequently recirculated in corrected form as an attachment to the November 30, 2007 Ruling Extending Comment Deadlines. The Modeling Ruling contains eight questions about the E3 Documentation.

SCPPA provides the following comments on the Staff Paper and the E3 Documentation and responds to the questions presented in the Modeling Ruling.

I. COMMENTS ON STAFF PAPER IDENTIFYING EMISSION REDUCTION MEASURES.

SCPPA provides the following general comments on the Staff Paper identifying emission reduction measures.

A. Incorporating Emissions Costs into the Operating Costs of a Facility to Alter Dispatching Should Not be Considered to Be an Appropriate GHG Emissions Reduction Measure.

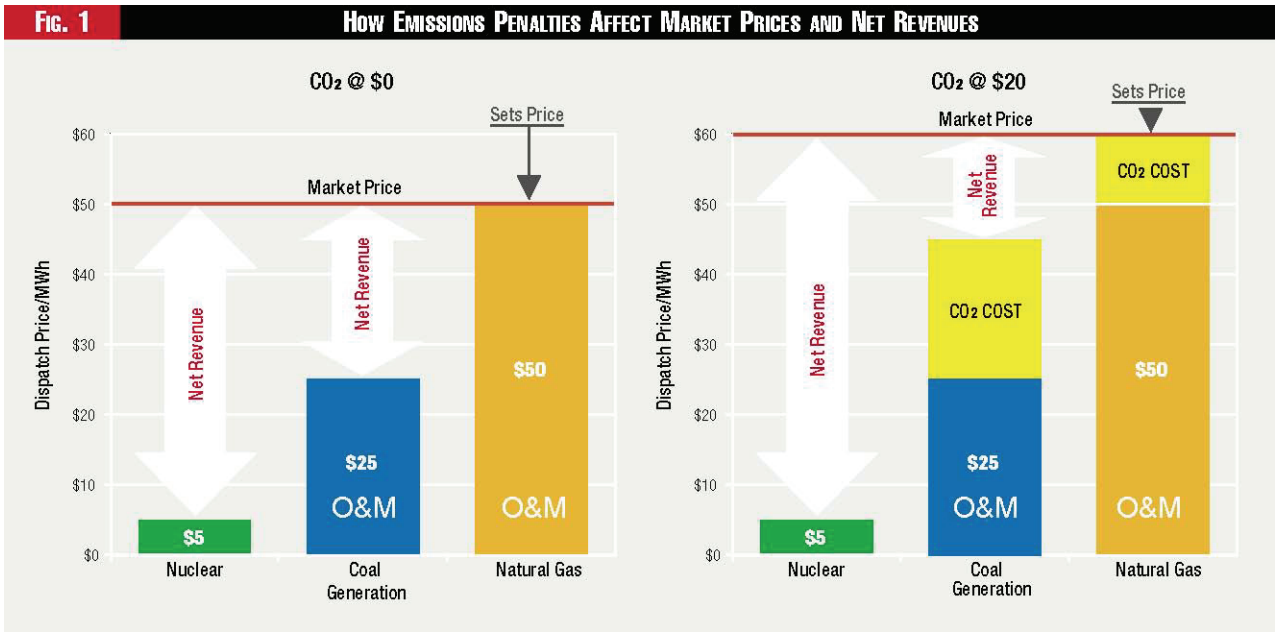
The objective of the Staff Paper is to provide a "summary of relevant policy efforts in place affecting emission reductions from California's electricity and natural gas sectors" and to identify "potential sources of emissions reduction above current policy." Staff Paper at 3. In the course of identifying "sources of emissions reductions above current policy," the Staff suggests that internalizing greenhouse gas ("GHG") emissions costs into the operating costs of generation facilities is an option that may be considered:

> While in the short-term the generating resources available to meet demand are relatively fixed, if emissions costs were to be incorporated into operating costs of a facility, dispatch may change to reflect a new merit order. Low emitting resources may operate

> more frequently, and high-emitting resources less frequently, minimizing the emissions output of [a] given set of generating resources.

Staff Report at 8-9.

The most likely way to incorporate emissions costs into the operating costs of a facility would be to require the generator to purchase GHG emission allowances. The purchase price would become an additional cost of operating the facility. If CO_2–emitting generators were required to buy allowances, they would charge higher prices for electricity. That would result in an increase in wholesale real time and forward electricity prices. As the Electric Power Research Institute ("EPRI") explains: "Climate policy that puts a price on CO_2 significantly increases the dispatch cost of fossil generation. [These] cost increases largely are passed on to the wholesale market in the short run." "The Change in Profit Climate," Victor Niemeyer (EPRI), Public Utilities Fortnightly at 26 (May, 2007):



Ibid at 20; *see* SCPPA Opening Comment at 28-30 (Dec. 3, 2007).

Similar to EPRI, The Utility Reform Network ("TURN") explains that requiring generators to buy allowances so as to "internalize" the cost of GHG emissions into operating costs "would increase wholesale energy prices because the allowance cost for the marginal generator would set the Market Clearing Price for all power." TURN Reply Comment at 2 (Dec. 17, 2007). To the extent to which retail providers would need to buy electricity on the wholesale market in order to serve their retail customers, they would incur an increased cost that would be passed on to customers.

The adverse impact of internalizing the cost of GHG emissions in wholesale electricity prices could be substantial and could have a profoundly adverse economic impact on consumers. TURN cites an analysis presented in this proceeding by Bruce Biewald of Synapse Energy, Inc. The Synapse analysis shows that "a $30/ton carbon allowance price, which represents an additional annual cost of approximately $300 million per year to reduce carbon emissions by 10%, would increase annual wholesale power costs by two to four *billion dollars* due to its impact on the market clearing price in the wholesale market." *Ibid* at 3 (emphasis in original).

Little benefit would be realized from imposing this massive cost on California electricity consumers. As the CPUC Staff recognizes in the Staff Paper, "it is clear that existing control policies, provided targets are met, will deliver the lion's share of emissions reductions available from the electric and natural gas sectors." Staff Paper at 13. This view is shared by numerous stakeholders. For example, the Natural Resources Defense Counsel ("NRDC") and Union of Concerned Scientists ("UCS") "expect the majority of reductions to be achieved through traditional regulatory policies and performance standards (such as the energy efficiency programs of standards, RPS, etc.)…." NRDC/UCS Opening Comments at 4-5 (Dec. 3, 2007).

TURN opposes "increasing the cost of all power" by internalizing GHG allowance costs in the operating costs of generation facilities. *Ibid* at 5. SCPPA supports TURN. The Commissions should reject the Staff Paper suggestion that internalizing GHG emissions costs into the operating costs of generation facilities is a viable or appropriate source of emissions reductions.

B. The Need to Maintain Highly Reliable Electricity Service to Consumers Should be Explicitly Recognized.

The Staff Paper recognizes that the Commissions' Energy Action Plan ("EAP") "suggests state policy to increase renewables to 33 percent by 2020" and observes that "it is widely accepted that increased procurement of renewable energy on the scale anticipated by the EAP, will be a central component of achieving the level of GHG reductions required under a GHG cap covering the electric sector." Staff Paper at 7.

However, it should be recognized that any increased procurement of renewable energy should be accomplished in a manner that is consistent with maintaining highly reliable electricity service to consumers. The Los Angeles Department of Water and Power ("LADWP") correctly observes that "reliability of the electricity grid is of utmost importance." LADWP Reply Comment at 3 (Dec. 17, 2007).

The Staff Paper implicitly recognizes the importance of maintaining reliability of electricity grid while simultaneously achieving GHG reductions. For example, the Staff Paper observes: "As wind penetrations become larger, balancing generation supply with customer load may require simultaneous build-out of highly dispatchable generation." Staff Paper at 8. However, the Staff's implicit recognition of the need to maintain highly reliable electricity service while achieving GHG reduction goals should be *explicitly* recognized. All emissions reduction measures that may be adopted by the Commissions and ultimately recommended to the

California Air Resources Board ("CARB") to achieve Assembly Bill ("AB") 32 GHG reduction goals should be implemented in a manner that is consistent with maintaining highly reliable electricity service to California consumers.

C. Achieving GHG Reductions Through the Existing Measures Identified in the Staff Paper by Publicly Owned Utilities Would Be an Effective Means for Achieving GHG Reduction Goals.

The Staff seems to doubt that publicly owned utilities ("POUs") can be counted upon to achieve GHG reductions in the course of meeting renewable portfolio standards or energy efficiency ("EE") goals: "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." *Ibid* at 13.

The Staff's doubts are misplaced. While POUs have some discretion in deciding how to implement various programs, the POUs do not have discretion to decide whether to establish the program in the first instance. All POUs are required by law (1) to establish a renewable portfolio standards that recognize the Legislative intent encouraging renewable resources, Cal. Pub. Util. Code § 387, (2) to implement a solar initiative program, Cal. Pub. Util. Code § 387.5, (3) to identify all potentially achievable cost-effective electricity efficiency savings and to establish annual targets for energy efficiency savings and demand reduction for the next ten-year period, Cal. Pub. Util. Code § 9615, (4) and to comply with the Emission Performance Standard for baseload generation set by the California Energy Commission, Cal. Pub. Util. Code § 8341.

The implementation of these programs by SCPPA members is both well-intentioned and reliable. For example, the SCPPA members committed themselves in 2003 to achieve a 20 percent renewable portfolio standard by 2017. Since then, individual members have committed themselves to more aggressive standards or timetables. For example, LADWP has committed

itself to achieving a 35 percent RPS by 2020. Burbank has committed itself to achieving a 33 percent RPS by 2020. Both Riverside and Anaheim have committed themselves to achieving a 20 percent RPS by 2015. The SCPPA members are fully dedicated to meeting their RPS goals.

II. COMMENTS ON E3 DOCUMENTATION REGARDING MODELING APPROACH AND DATA SOURCES.

SCPPA offers the following general comments on the E3 Documentation.

A. The Staff Paper and the E3 Documentation Should be Melded to Assure that all Appropriate Emissions Reductions Measures are Taken into Account in Developing the E3 Aggressive Policy Reference Case.

All appropriate GHG emission reduction measures that are identified in the Staff Paper should be included in the aggressive policy reference case proposed by E3. E3's Table 1 shows all assumptions that are common to the business-as-usual reference case and the aggressive policy reference case. E3 Documentation at E22-E24. E3's Table 2 shows the differences between the business-as-usual reference case and the aggressive policy reference case. *Ibid* at E24. The two key differences are in the goals for energy efficiency and renewables portfolio standards ("RPS"). The business-as-usual reference case assumes 100 percent of current market potential for energy efficiency as embedded in the CEC's load forecast.[1] The aggressive policy reference case assumes 100 percent of the net economic potential for energy efficiency. As for the RPS, the business-as-usual reference case assumes 20 percent of retail sales for all LSEs by 2020, whereas the aggressive policy reference case assumes 33 percent of retail sales for all LSEs by 2020. *Ibid*.

The Staff Paper identifies existing "control measures" that can be used to achieve GHG reductions beyond energy efficiency and RPS. Staff Paper at 4-5. The Staff Paper also identifies

[1] The E3 Documentation contains conflicting information regarding the level of energy efficiency under the business-as-usual reference case. *See* for example, page E4 which indicates that the energy efficiency assumed in the business-as-usual reference case is 75 percent of the economic efficiency level.

some potential sources of additional reductions. *Ibid* at 6. It is unclear from the E3 Documentation why the additional existing control measures or appropriate potential control measures as identified in the Staff Paper are not considered by E3 for its aggressive policy reference case.

B. Parties Need Further Information About E3's Energy Efficiency Supply Curves.

It would be helpful for E3 to provide further information about energy efficiency supply curves that are described in the E3 Documentation (at E49 – E51). E3's GHG calculator shows that energy efficiency offers the greatest opportunity to reduce GHG emissions at a low cost. Thus, it is especially important that the assumptions and data that underlie the energy efficiency supply curves be readily apparent to stakeholders.

Subject to receiving explanatory information from E3, it appears that E3 has utilized reports prepared by the investor owned utilities ("IOUs") that include the energy efficiency savings from building standards and appliance codes in their estimates of energy efficiency potential. POUs generally do not include energy efficiency savings available from applying building codes and appliance standards. Instead, the POUs embed these savings in their load forecasts.

The result of this difference in the treatment of savings from building standards and appliance codes is that E3's estimated energy efficiency savings for IOUs are 20-25 percent of load but the estimated savings for POUs are much lower. The treatment of savings that might be available from applying building standards and appliance codes should be consistent between IOUs and POUs.

C. The Estimate of Renewable Generation Interconnection Costs Should be Refined.

E3 relies heavily upon the addition of renewable resources to reach the aggressive policy reference case results. *See* E3 Documentation at E36-E37. E3 makes some gross assumptions about interconnecting renewable resources, particularly wind resources. E3 estimates the total capacity of all existing transmission lines in the WECC based on line length and voltage. *Ibid* at E139. E3 then "assumes that 10% of the total capacity of each line is available for transmission of new wind resources." *Ibid*.

E3's approach appears to be overly simplistic, particularly given the importance that the addition of wind resources has for achieving GHG reduction goals. Information about transmission constraints as well as firming resources that would be available for wind resources exists in the PLEXOS model. Rather than making a gross assumption about the availability of transmission capacity, it would be more appropriate to test the feasibility of specific wind expansion scenarios by using the PLEXOS model. This would provide a better test of the feasibility of assumed additions of wind resources and would more appropriately calculate the cost of adding wind resources.

D. The Assumption that There Will Continue to Be Uniform WECC-Wide Least-Cost Dispatching is Suspect.

E3 assumes that WECC generation resources will continue to be dispatched uniformly on a least-cost basis. This assumption is suspect. If retail providers invest in renewable resources as envisioned in the E3 Documentation, it is reasonable to expect that there may be some deviation from least-cost dispatching practices.

III. RESPONSE TO QUESTIONS RELATED TO ATTACHMENT A, STAFF'S IDENTIFICATION OF EMISSION REDUCTION MEASURES.

The following are SCPPA's responses to questions set forth in the Modeling Ruling regarding the Staff Paper on the identification of emission reduction measures.

> ***Q1*: *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 purpose.***

It appears that the Staff Paper covers all appropriate emissions reductions measures that are available for the electricity sector as well as at least one that is not appropriate.

> ***Q2*: *Are there emissions reduction measures identified within Attachment A that you believe, based on currently available information, should not be implemented as a means to achieving emissions reductions within the context of AB 32? Please justify your answer.***

As explained above, the Commissions and CARB should categorically reject proposals to achieve what would be, at best, marginal GHG emission reductions by "internalizing" the cost of GHG emission allowances in wholesale electricity prices.

Additionally, the Commissions and CARB should be aware of the need to maintain highly reliable electricity service to retail consumers while adding intermittent renewable resources such as wind.

> ***Q3:* *What means beyond policies currently adopted by the two Commissions hold potential for the delivery of additional energy efficiency?***

SCPPA supports a heightened focus on market barriers to the adoption of energy efficiency measures by consumers. E3 correctly differentiates between the *economic potential* of energy efficiency measures and the *market potential*. As E3 explains: "Market potential is a subset of economic potential: it only includes the measures which are likely to be adopted by people given market barriers and the current level of utility rebates." E3 Documentation at E49.

However, E3 understates the significance of market barriers. E3 observes that "there are a number of market barriers to the adoption of energy efficiency which often prevent consumers from making least-cost purchasing choices." E3 Documentation at E52-E53. Not only do market barriers prevent consumers from "making least-cost purchasing choices." Market barriers can prevent consumers from adopting *any* energy efficiency measures, let alone least-cost options. Consumers may be confronted by difficulties in obtaining information, complex and time-consuming rebate procedures, unreliable or dishonest third-party energy efficiency providers, and a host of similar problems that could forestall or preclude adopting meritorious energy efficiency measures. Energy efficiency programs should be designed to minimize and, wherever possible, eliminate market barriers. In the long run, reducing or eliminating market barriers could be as important as robust funding in achieving energy efficiency goals.

Q4: What means beyond policies currently adopted by the two Commissions hold potential for the integration of additional renewable resources into the grid?

The Commissions and other relevant regulatory agencies should be steadily focused on the need for transmission facilities that would facilitate the addition of renewable resources to the electricity resource mix and the need for firming resources that would permit the reliable integration of intermittent renewable resources. This is particularly true of wind resources. SCPPA agrees with E3's observation that the wind resource "is poised to become a major component of new low-carbon energy supply in California…." E3 Documentation at E72. SCPPA also agrees with E3's observation that "the key issues facing greater wind deployment are transmission interconnection and the reliable integration of high percentages of intermittent generation into the grid." *Ibid*.

Q5: 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?

An emissions reduction strategy to displace the most carbon intensive aspects of California's electric resource mix can be accomplished through energy efficiency, the addition of low or zero electricity generation technologies, the addition of gas-fired generation and the displacement of electricity end uses with the end-use of renewable energy such as solar heating. These strategies can be pursued through energy efficiency programs, strengthened building codes and appliance efficiency standards, strengthened renewable portfolio standards, the California Solar Initiative, self-generation incentive programs, and the implementation of emissions performance standards.

IV. RESPONSE TO QUESTIONS RELATED TO ATTACHMENT B, E3 DOCUMENTATION REGARDING MODELING APPROACH AND DATA SOURCES.

The following are SCPPA's responses to the questions set forth in the Modeling Ruling regarding Attachment B, the E3 Documentation.

Q6: 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 E3 Documentation is cryptic in various places. The E3 Documentation would benefit from additional and expanded descriptions. For example, the description (at E49) of the energy efficiency supply curves does not provide information about the energy efficiency measures that supports the curves. This is particularly important, given that energy efficiency offers a significant opportunity to reduce CO_2 emissions at low cost. Similarly, in Table CA-3, it is unclear whether the wind costs include the cost of firming resources and transmission. E3 Documentation at E155.

Additionally, there should be an indication about when E3 will have PLEXOS verify that various resource plans are feasible. E3 states:

> The GHG Calculator is designed so that the project team and stakeholders can run many cases easily and PLEXOS is used to verify that the resource plan is still feasible. In order the GHG Calculator to be able to evaluate many target cases, it is designed to 'extrapolate' from a feasible PLEXOS solution over a range of input assumptions. To check the feasibility of the extrapolation, the project team will test variations of as many of the key drivers listed above, and their impact on emissions, as is possible in the available time.

E3 Documentation at E4. It would be helpful to know when the PLEXOS feasibility assessments will be performed and how the results of the assessments will be provided to stakeholders.

Q7: Provide feedback, as desired or appropriate, on the structure and approach taken by E3 in its GHG Calculator spreadsheet tool.

Additional work is needed if the E3 modeling is going to be used by the Commissions as a basis for recommendations about various carbon reduction strategies for the electricity sector. The model uses a "snap-shot" electric system dispatch for the WECC from PLEXOS and the permits users of the model to modify the resource mix. Although the model seems to contain some controls to determine the actual feasibility of a proposed resource mix, there is no assurance that a given resource mix would be electrically feasible.

For example, as discussed above, E3 assumes that 10 percent of the total of each transmission line of the WECC would be available for transmission of new wind resources. E3 Documentation at E139. Following an NREL protocol, E3 would assign wind resources to successive transmission lines until no transmission capacity remains available. *Ibid*. This assumption does not match reality and masks likely congestion costs. It is likely that the addition of renewable resources will result in higher system costs than would be reflected by the model. If policy recommendations are going to be made based upon the E3 and PLEXOS

modeling effort, gross assumptions should be replaced by assumptions that more clearly reflect reality so that the results reached through the modeling effort do not suggest that carbon reductions can be accomplished at unrealistically low costs.

Additionally, although the model may provide a guide to the total societal costs of various carbon reduction strategies, the model is not useful for individual retail providers to assess the cost of their individual reduction strategies. POUs other than the Sacramento Municipal Utility District ("SMUD") and LADWP are not individually represented. As a result, an individual southern California POU other than LADWP cannot test its own emissions reduction strategy. It would be helpful to be able to use a model to test various POU-specific emission reduction strategies.

Furthermore, the model has an internal logic that allocates renewable additions on the basis of E3's pre-determined ranking of the desirability of various renewable technologies. While this might be convenient for an aggregate determination of the total cost of various emission reduction strategies, the internal ranking of various renewable technologies precludes individual retail providers from testing the impact of a resource mix that would be unique to the retail provider. This limits the usefulness of the model as a tool for supporting decision-making by retail providers or generators in assessing various resource mixes.

Q8: 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

Table 1, Electricity Sector Emissions Benchmark for 1990 and 2004, contains data from the August 22, 2007 version of the CARB GHG emissions inventory. E3 Documentation at E186. The CARB GHG emissions inventory was updated on November 19, 2007. Accordingly,

the table showing Electricity Sector Emissions Benchmark for 1990 and 2004 should be updated. An updated table is attached as **Attachment 1**.

Plant ownership and contract information should be updated as stakeholders offer more accurate information.

As discussed above, further information about the assumptions underlying the energy efficiency supply curves should be provided to permit stakeholders to assess whether the assumptions are appropriate. Insofar as the results of the model are particularly sensitive to the supply curves for energy efficiency, stakeholders should be provided an opportunity to comment on the appropriateness of the underlying assumptions once further information has been provided to stakeholders.

Additionally, as discussed above, the assumptions about accommodating substantial additions of wind resources are too simplistic. Information about specific transmission constraints as well as the firming resources that would be required for adding wind resources at particular locations exists within the PLEXOS model. The feasibility of various assumed wind resource expansion scenarios should be tested by using PLEXOS in a configuration in which all network constraints are represented. This would test the feasibility of various wind resource deployment scenarios and would more properly calculate system costs.

Q9: 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?

The GHG Calculator does not have selectable inputs on the "main" or the "input" sheets that would permit users to modify assumptions about resource potential or resource costs. This is especially true for renewable resources for which E3 has developed composite supply curves

based upon relative costs and assumptions about resource potential. The GHG Calculator does not easily support adjustment of the attributes that have been developed by E3.

Q10: Has the E3 model adequately accounted for the implications of increased reliance on preferred resources (renewables, efficiency) on system costs?

No. *See* the responses to questions 6, 7, and 8 above.

Q11: 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?

If possible, it would be very helpful to have E3 model potential market transformation scenarios, including cost decreases, new technologies, and "behavior changes." However, it appears that it would be difficult to model the effect of cost decreases, new technologies, or behavioral changes that are unknown at this time. Any such modeling would appear to be based upon pure speculation.

Q12: What specific flexible GHG emission reduction mechanisms to mitigate the economic impacts of achieving the desired GHG emission reductions should be modeled in State 2?

As discussed above, it would be helpful to have further PLEXOS modeling for the full California nodal network to determine the feasibility of specific assumed deployments of renewable resources to assess the cost of the assumed deployments. Such further modeling would be likely to result in a more accurate assessment of the cost of various renewable resource deployment scenarios and avoid the understatement of costs that would be likely if modeling is performed solely on the basis of the gross assumptions that are described in the E3 Documentation.

Furthermore, there should be some provision for disaggregated modeling for POUs beyond LADWP and SMUD, as discussed above.

Q13: What output metric or metrics should be utilized to evaluate the least cost way to meet a 2020 emission reduction target for the sector?

The cost per ton of CO_2 emission reductions is certainly a key metric. However, other metrics would be useful, including the total cost to serve load across all California participants and the cost of assumed emission reduction strategies for individual retail providers.

V. CONCLUSION.

For the reasons set forth above, SCPPA recommends that the Commissions and CARB reject any suggestions to attempt to achieve GHG emission reductions by driving up wholesale prices of electricity. SCPPA further recommends that the E3 modeling effort be modified consistent with the comments set forth above.

Respectfully submitted,

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Dated: January 4, 2008

ATTACHMENT 1

E3 Documentation, page 186

Table 1. Electricity Sector Emissions in 1990 and 2004, from CARB Inventory

36. Electricity Sector Emissions Benchmark for 1990 and 2004

Table 1 below shows all GHG emissions for which the electricity sector was responsible in 1990 and 2004, taken from the November 19 ~~August 22~~, 2007 version of the CARB GHG emissions inventory. There are four categories of emissions: electricity generation, CHP, fugitive SF6 from electricity T&D, and fugitive CO2 from geothermal generation. All types of emissions are included: CO2, CH4, and N2O. Both in-state and import emissions are included. The total is 119.7 ~~123.9~~ MMT in 2004 and 110.6 ~~100.1~~ in 1990. The calculation of emissions in the GHG Calculator reflects all of these categories and types of emissions.

Table1. Electricity Sector Emissions in 1990 and 2004, from CARB Inventory

Million metric tons CO2 equivalent			
Activity	**Source**	**1990 Emissions**	**2004 Emissions**
Total Electricity Sector Responsibility		110.626 ~~100.07~~	119.750 ~~123.92~~
Electricity Generation	Total	90.502 ~~82.12~~	93.112 ~~100.10~~
	Import Specified	29.605 ~~25.95~~	33.179 ~~33.48~~
	Import Unspecified	30.956 ~~26.25~~	27.729 ~~35.36~~
	In State Merchant	1.361 ~~1.32~~	26.580 ~~25.80~~
	In State Utility	28.579 ~~28.61~~	5.623 ~~5.45~~
CHP	Total	15.241 ~~15.14~~	23.547 ~~22.46~~
	~~Electric~~	~~8.01~~	~~12.15~~
	Commercial	0.701 ~~0.73~~	0.836 ~~0.83~~
	Industrial	14.541 ~~6.40~~	22.711 ~~9.49~~
SF6 from electrical T&D	Total	2.577 ~~2.429~~	1.018 ~~1.029~~
	In State Generation Not Specified	1.561 ~~1.509~~	0.677 ~~0.669~~
	Imported Electricity Not Specified	1.016 ~~0.920~~	0.341 ~~0.360~~
Geothermal Fugitive Emissions	Total	2.307 ~~0.373~~	2.074 ~~0.333~~
	Merchant	0.968 ~~0.157~~	1.907 ~~0.307~~
	Utility	1.339 ~~0.217~~	0.167 ~~0.027~~

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the **SOUTHERN CALIFORNIA PUBLIC POWER AUTHORITY COMMENT ON IDENTIFICATION OF EMISSION REDUCTION MEASURES AND MODELING APPROACH AND DATA RESOURCES** on the service list for CPUC Docket No. R.06-04-009 and CEC Docket No. 07-OIIP-01 by serving a copy to each party by electronic mail and/or by mailing a properly addressed copy by first-class mail with postage prepaid.

Executed on January 4, 2008, at Los Angeles, California.

/s/ Sylvia Cantos

Sylvia Cantos

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