BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA
AND THE CALIFORNIA ENERGY COMMISSION

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)
AB 32 Implementation	CEC Docket 07-OIIP-01

COMMENTS OF THE ENERGY PRODUCERS AND USERS COALITION AND THE COGENERATION ASSOCIATION OF CALIFORNIA ON MODELING-RELATED ISSUES

Michael Alcantar
Donald Brookhyser
Alcantar & Kahl LLP
1300 SW Fifth Avenue
Suite 1750
Portland, OR 97201
503.402.9900 office
503.402.8882 fax
mpa@a-klaw.com
deb@a-klaw.com

Counsel to the
Cogeneration Association of California

Evelyn Kahl
Seema Srinivasan
Alcantar & Kahl LLP
120 Montgomery Street
Suite 2200
San Francisco, CA 94104
415.421.4143 office
415.989.1263 fax
ek@a-klaw.com
sls@a-klaw.com

Counsel to the
Energy Producers and Users Coalition

January 7,2008

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA
AND THE CALIFORNIA ENERGY COMMISSION

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)
AB 32 Implementation	CEC Docket 07-01IP-01

COMMENTS OF THE ENERGY PRODUCERS AND USERS COALITION AND THE COGENERATION ASSOCIATION OF CALIFORNIA ON MODELING-RELATED ISSUES

The Energy Producers and Users Coalition (EPUC)[1] and the Cogeneration Association of California (CAC)[2] submit the following comments on modeling-related issues pursuant to the November 9, 2007 Administrative Law Judge's Ruling (Ruling).

I. INTRODUCTION

The Energy and Environmental Economics, Inc.'s (E3) modeling effort will provide information about the cost of the state's emission reduction efforts using different resources and tools. Largely missing from the model and its calculator are combined heat and power (CHP) resources. Given the current contribution of these

[1] EPUC is an ad *hoc* group representing the electric end use and customer generation interests of the following companies: Aera Energy LLC, BP West Coast Products LLC, Chevron U.S.A. Inc., ConocoPhillips Company, ExxonMobil Power and Gas Services Inc., Shell Oil Products US, THUMS Long Beach Company, Occidental Elk Hills, Inc., and Valero Refining Company – California.

[2] CAC represents the power generation, power marketing and cogeneration operation interests of the following entities: Coalinga Cogeneration Company, Mid-Set Cogeneration Company, Kern River Cogeneration Company, Sycamore Cogeneration Company, Sargent Canyon Cogeneration Company, Salinas River Cogeneration Company, Midway Sunset Cogeneration Company and Watson Cogeneration Company.

resources to California's energy mix and the Commission's recognition and appreciation of these resources, the absence of CHP-specific information must be corrected.

The difficulty integrating emission and cost data for CHP into an electricity production simulation model is understandable. There are at least three characteristics of CHP which require some particular treatment in the model in order to adequately measure the contribution of CHP. First, CHP creates complexity because it sits astride two sectors, supply and demand, with both electric and thermal outputs. Consequently, the thermal production must be accounted for in some way in the model, or an allocation method between thermal and electrical outputs must be used. Second, unlike conventional resources, installation of new CHP facilities that serve on-site load can reduce transmission losses and, in some cases, avoid transmission investment. Third, the E3 model looks at the impacts of GHG reduction tools on ratepayer costs; the costs of CHP which serves on-site load, however, do not flow to ratepayers.

The assumptions applicable to conventional generators do not apply to CHP facilities. For these reasons, inclusion of CHP must be done with the following considerations in mind:

- To allow an apples-to-apples comparison of the emissions generated by electricity generation, the model must allocate emissions of a CHP facility between its thermal and electrical outputs;

- Treatment of the cost of a CHP facility serving on-site load requires modification; and

- Transmission cost reductions or cost avoidance associated with CHP serving on-site load must be reflected.

In addition to these issues, the model must reflect two other general considerations.

- Prioritizing resources including CHP must be done consistent with the Energy Action Plan's (EAP II) preferred loading order; and

- The aggressive policy results base case should reflect expansion of CHP resources as described in the California Energy Commission's (CEC) high deployment scenario.

All of these issues are discussed below.

II. TO REALIZE THE FULL EMISSIONS REDUCTION POTENTIAL OF CALIFORNIA RESOURCES, THE E3 MODEL MUST INCLUDE CHP

E3's model currently includes some CHP placeholders but does not otherwise adequately incorporate CHP resources into its analysis or GHG Calculator. This resource data must be included to allow the model to accurately consider the full range of tools available to meet the AB 32 target.

A. Integration and Expansion of CHP Will Be an Indispensable Tool in the State's Efforts to Achieve Emissions Targets

CHP is the most efficient technology for converting primary fuel into electricity and heat. Current California CHP capacity is roughly 9.2 GWe, which saves from 11 to 22 million $MTCO_2$ emissions annually compared with the separate production of thermal and electric energy.[3] As the CEC's 2005 CHP Report provides:

> *The use of CHP systems in commercial, industrial, and multifamily residential establishments could improve the overall efficiency of energy use by displacing fuel used for boilers while at the same time displacing marginal, predominantly gas-fired, sources of electricity generation.*[4]

This conclusion drove the CEC to undertake a research project to provide input to the Integrated Energy Policy Report regarding the potential for expansion of CHP resources

---

[3] The range depends upon the assumption used to determine the power generation emissions that were displaced with the CHP development.

[4] EPRI, *Assessment of California CHP Market and Policy Options for Increased Penetration: PIER Collaborative Report* (CEC CHP Report) (CEC-500-2005-173), at viii.

in California.[5] According to the CEC CHP Report, an additional 2,000 MWe to 7,340 MWe could be developed in California by 2020, for about 112 million tons of CO_2 emission reductions.[6] CHP is a tool that has the potential to play a large role in lowering emissions, as recognized by the EU-ETS.[7] CHP should therefore be maximized to increase primary energy savings and GHG reductions.

B. Aggressive Policy Results Must Consider All Tools With Emission Reduction Potential

The E3 modeling effort focuses on the development of two base cases: a business as usual approach and an aggressive policy result. As clarified in its documentation overview, the differences between the two base cases are energy efficiency and renewable targets:

> *In the first 'business as usual' case, resources are added based on an assumption that current levels of energy efficiency persist and a 20% RPS standard is reached through 2020. In the second 'aggressive policy' case, resources are added to satisfy goals that are increased from current goals such as a 33% RPS and high goals for energy efficiency saving in 2020.* [8]

The aggressive policy result should incorporate all technologies that are capable of lowering emissions. Noticeably missing from the aggressive policy set of assumptions is increased reliance on CHP resources.

---

5 *Id.*

6 *Id.*, at 2-24.

7 *See generally Directive 2004/8/EC of the European Parliament and of the Council on the Promotion of Cogeneration Based on a Useful Heat Demand in the Internal Energy Market and Amending Directive 92/42/EEC*, dated February 11, 2004 ("*Promotion of high-efficiency cogeneration based on a useful heat demand is a Community priority given the potential benefits of cogeneration with regard to saving primary energy, avoiding network losses and reducing emissions, in particular of greenhouse gases.*"); *The Second European Climate Change Programme Working Group ECCP Review – Topic Group Energy Supply Final Report*, at 1.

8 E3 Documentation Overview, at 2.

The CEC's CHP Report provides information regarding the integration and full potential of CHP resources. The report contains several base cases including low deployment, moderate market access, aggressive market access, and high deployment cases. To reflect aggressive policy results, this base case should reflect the high deployment case described in the CEC CHP Report. Under this scenario, total CHP market penetration reaches 7,340 MW with certain incentives in place.[9] The high deployment case results in energy savings of up to 1,900 trillion Btu, customer net reduction in energy costs of $6 billion, and CO_2 emissions reduction of 112 million tons.[10] Without CHP resources, the aggressive policy results base case does not accurately reflect the full gamut of available GHG emission reduction tools.

III. TO ACCURATELY MODEL COSTS ASSOCIATED WITH EMISSIONS REDUCTION POTENTIAL, CHP MUST PROPERLY BE INTEGRATED INTO THE MODEL

CHP differs from other types of generating resources because (i) it has both a thermal and electricity output and (ii) it can be used to self-serve load that exists behind-the-meter. Consequently, as explained below, certain CHP characteristics must be reflected in E3's model.

A. The Dual Output of CHP Resources Requires the Model to Count Emissions in a Way That Allows an Apples-To-Apples Comparison of Resources

The emissions of a CHP facility include those associated with its thermal and electricity outputs, unlike other electricity resources that are responsible only for

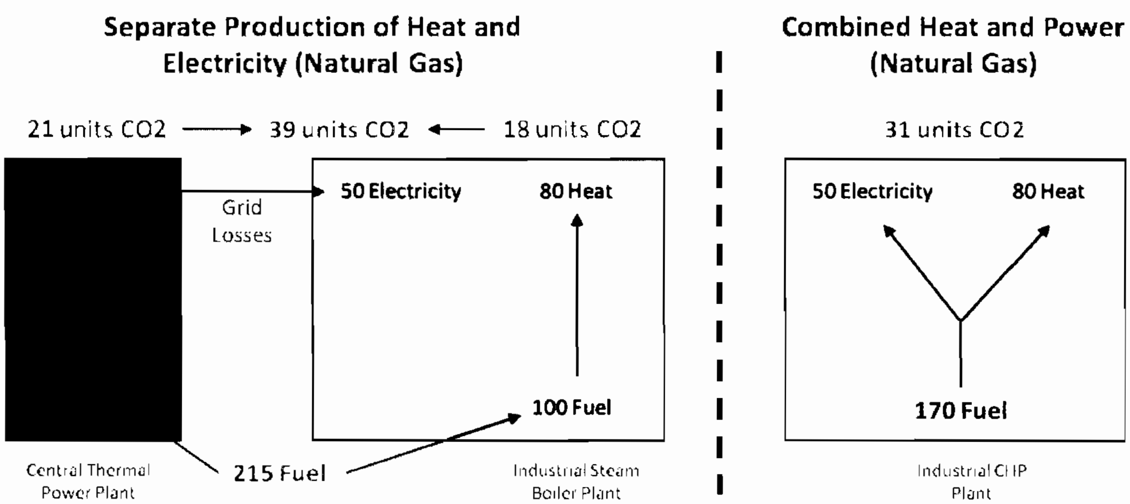
9 *See* CEC CHP Report, at 2-18. The high deployment scenario assumes the existence of the following incentives: incentives existing in 2005, facilitation of the power export market, addition of a transmission and distribution support payment, a CO_2 reduction payment, the rapid development and deployment of advanced technology, and an increased willingness of customers to improve customer attitudes toward CHP investment opportunities.

10 CEC CHP Report, at 2-24.

emissions associated with electricity generation. The total emissions from a CHP plant are not a fair measure of emissions attributable to electricity production. Consequently, the emissions associated with thermal production should be subtracted from total facility emissions to get a pure "electricity sector" snapshot.

For purposes of the E3 modeling, the simplest and most straight forward way of allocating emissions for the GHG model is to assume the emissions associated with producing the useful heat product that would have been made by a boiler if the investment in CHP had not been made. The remaining emissions associated with the CHP facility would be attributed to electricity production. It should be noted that this process may be different from the allocation of fuel or emissions for other reporting requirements.

The following example illustrates how emissions would be calculated. In the example below, the boiler efficiency for steam production is assumed to be 80% on an annual basis.



The calculation of electricity-generated emissions is based on the following formula:

$$CHP_{f(e)} = CHP_f - (CHP_h / B_\mu)$$

Where:

$CHP_{f(e)}$	is the fuel used to produce electricity from the CHP facility
CHP_f	is the total fuel used by the CHP facility
CHP_h	is the useful heat produced by the CHP facility
B_μ	is the boiler efficiency.

Applying the numbers in the example to the formula, the fuel used to produce electricity is 70 units.[11]

$$CHP_{f(e)} = 170 \text{ units of fuel} - (80 \text{ units of heat}/.80)$$

$$CHP_{f(e)} = 170 \text{ units of fuel} - 100 \text{ units of heat}$$

$$CHP_{f(e)} = 70 \text{ units of fuel}$$

Accordingly, the emissions attributed to electricity production should be derived from the use of 70 units of fuel, rather than the 170 units of fuel used to produce both thermal and electric outputs. This allocation method will allow the emissions associated with electricity generation to be compared with other generating resources that solely generate emissions from electricity generation.

B. Use of CHP to Serve On-Site and LSE Load Requires Different Cost Treatment

E3's model, in part, quantifies emission reduction costs by looking at consumer (*i.e.*, ratepayer) impact. The formula used by the model assumes that the total cost of a facility including costs associated with transmission flow through to the electric consumers in a manner consistent with traditional cost of service treatment for ratepayers. As explained below, this simplistic cost assumption does not adequately model a CHP facility that serves behind-the-meter load.

[11] The formula assumes that both fuel and energy production are stated in the same units, such as BTUs.

A CHP facility serving on-site load uses the thermal energy and electricity it generates to serve the needs of its local industrial host. Electricity generated to serve on-site load is not sold to any retail service provider and is not transmitted on the transmission grid. Moreover, the determination of the "electric energy-related portion" of a CHP facility cost is a complex allocation issue requiring knowledge of the individual industrial processes. The E3 model simplistically assumes that the total CHP facility costs get passed through to the ratepayer.[12] This assumption will overestimate the costs of CHP.

Additionally, it is not accurate to assume that use of CHP to serve on-site load imposes a transmission cost on ratepayers. Where self-generated electricity is used to serve on-site load, it

- Reduces the strain on the grid because generation is close to load;
- Reduces grid losses by displacing bulk electricity transport and transformer losses; and
- In some cases, reduces investment needs for new grid infrastructure.[13]

CHP generation used for on-site load *reduces* system transmission costs. Currently, the E3 model does not appear to consider this characteristic of CHP in calculating costs of electricity resources.

It is noteworthy that from the standpoint of electric power sold over the transmission grid by a CHP facility, the cost of the electric power to ratepayers is the "avoided cost payments" made to the CHP facility consistent with Commission policy. For this reason, the actual total cost of the CHP facility is not an appropriate consideration in determining impacts on ratepayer costs.

---

12 The model calculates costs for ratepayers. It is unclear whether ratepayers are limited to utility ratepayers or include ESP customers.

13 Prepared Direct Testimony of J. Ross and D. Schoenbeck, submitted in R.06-02-013, at 40.

In short, CHP facilities impact the system differently from other conventional resources. EPUC/CAC look forward to working with E3 to incorporate these features into the GHG model.

IV. ASSUMPTIONS REGARDING PRIORITIZING OF RESOURCES SHOULD MIMIC THE EAP II'S PREFERRED LOADING ORDER

Under E3's model, once 2020 load is determined, resources are chosen in a particular order to satisfy load. This order should reflect the EAP II's preferred loading order.

The preferred loading order advocates the use of CHP resources, along with renewables, after energy efficiency and demand response:

> *EAP II continues the strong support for the loading order – endorsed by Governor Schwarzenegger – that describes the priority sequence for actions to address increasing energy needs. The loading order identifies energy efficiency and demand response as the State's preferred means of meeting growing energy needs.* ***After cost-effective efficiency and demand response, we rely on renewable sources of power and distributed generation, such as combined heat and power applications.*** *To the extent efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, we support clean and efficient fossil-fired generation.*

Resources in the E3 model should be used in a manner consistent with the preferred loading order. Accordingly, once 2020 load is established, resources should be used in the following order:

(1) Energy Efficiency and Demand Response
(2) Renewables and CHP
(3) Fossil-Fired Generation

Prioritizing of resources in this order will ensure that CPUC and CEC policy is accurately reflected in the model.

V. ANSWERS TO SPECIFIC QUESTIONS

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.

Attachment A recognizes the potential of CHP to provide additional emission reductions but does not list CHP as an "*existing control measure*." As noted in the attachment, "*CHP installations improve generation efficiency [and] [a]ttendant with the reduction of energy use come reductions in GHG emissions . . .*" The attachment also acknowledges that "*CHP units already provide 9.2GW of capacity within California*." Accordingly, CHP should be included as an existing emission reduction tool as it currently contributes to the state's efforts to lower emissions.

Q2. 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 within the context of AB 32? Please justify your answer.

EPUC/CAC have no view on this issue.

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

The encouragement of CHP through the creation of a separate CHP sector, the use of appropriate emission allocation protocols and a strong supportive policy framework can further the state's efforts to promote energy efficiency.[14]

Given CHP's unique characteristics and contribution to GHG reduction, a separate sector for CHP should be created. As discussed in Section II(A), the use of CHP is more efficient than the separate production of heat and power but its installation increases on-site emissions. CHP's unique position in the energy sector requires careful treatment both to avoid creating disincentives to the development of new CHP and to encourage continued operation of existing facilities. Regulation of CHP as a separate sector would best allow for the emissions associated with CHP to be counted in a manner that recognizes the CHP's contribution to global emissions reductions. Where that is not possible, for purposes of electricity sector modeling, the counting method advocated in Section III is a way to ensure an apples-to-apples comparison of resources.

---

[14] See Attachment A to November 9, 2007 ALJ Ruling, at 8.

E3, to the extent it considers CHP, has included CHP in the electricity sector. This approach to modeling CHP should be allowed only if it accurately calculates the real benefit of CHP and only if this practice does not pre-determine or conflict with the use of a separate sector for CHP.

A strong supportive policy framework is also required to allow the state to realize material emissions reductions from CHP resources. As Attachment A and the CEC has recognized, CHP market potential can be as high as nearly 7,340MW of new CHP by 2020.[15] Attachment A also observes that "*[r]emoving market barriers and disincentives to the installation of CHP units will be essential to achieving the outer bounds of CHP market potential.*"[16] To maximize GHG reductions from CHP, therefore, the GHG policy framework should include the following features:

- Portfolio set-aside for CHP power purchases by the utilities, similar to the RPS;
- Reasonable pricing provisions for power purchases from CHP facilities;
- Removal of deployment barriers, including eliminating departing load charges; and
- Regulatory incentives for utilities to procure from CHP resources.

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

EPUC/CAC have no view on this issue.

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?

A cap-and-trade program provides continuing incentives to market participants to identify and invest in emission-lowering tools.[17] A cap-and-trade program, including the electricity sector, will ensure that emission reductions can take place and take place in a cost-effective manner.

---

15 See Attachment A to November 9, 2007 ALJ Ruling, at 8; EPRI, *Assessment of California CHP Market and Policy Options for Increased Penetration: PIER Collaborative Report* (CEC-500-2005-173).

16 *Id.*

17 MAC Report, at 7.

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?

E3's modeling documentation fails to include CHP data and assumptions. EPUC/CAC look forward to working with E3 to integrate this information into the model.

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

The GHG Calculator spreadsheet tool is a device that is meant to allow stakeholders to evaluate rate impacts if they alter the 2020 target resource mix. Currently in the absence of CHP data, there is no way to evaluate the benefits of expanding reliance on CHP resources. Once CHP data is added into the model, the GHG Calculator spreadsheet tool must allow parties to adjust the use of these resources.

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.

E3 is securing information about generating resources from the TEPPC WECC database. This database does not list all of the generating resources that should be included into its GHG modeling effort and therefore requires supplementation.

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?

As discussed in Section III, the model requires some changes to its calculation of the cost of electricity resources. Further analysis of the data and cost estimates can be provided once CHP data is integrated into the model.

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

No. CHP is a preferred resource that has not been modeled correctly. As discussed in Section III, the input data, assumptions and formulas used to calculate cost and quantify emissions require adjustment. EPUC/CAC look forward to working with E3 on these and other issues that arise.

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?

As discussed more fully above, the modeling should include the effects of a more robust deployment of CHP.

Q12. 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?

All flexible emission reduction mechanisms should be evaluated in Stage 2. Among these, the impacts of a cap-and-trade program and an early action credit program should be evaluated.

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?

Cost per $MTCO_2$ is a standard performance metric to evaluate the least cost strategy to meet an emissions target. In addition, it would be useful to compare and evaluate the following information: total electrical demand, share of renewable resources and share of CHP resources.

Respectfully submitted,

Evelyn Kahl

Evelyn Kahl
Michael Alcantar
Seema Srinivasan

Counsel to the
Energy Producers and Users Coalition and the
Cogeneration Association of California

January 7, 2008

CERTIFICATE OF SERVICE

I, Karen Terranova hereby certify that I have on this date caused the attached **Comments of the Energy Producers & Users Coalition and the Cogeneration Association of California on Modeling Related Issues** in R.06-04-009 to be served to all known parties by either United States mail or electronic mail, to each party named in the official attached service list obtained from the Commission's website, attached hereto, and pursuant to the Commission's Rules of Practice and Procedure.

Dated January 7, 2008 at San Francisco, California.

Karen Terranova

Karen Terranova