

**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
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AB 32 Implementation

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07-OIIP-01

**REPLY COMMENTS OF
THE ENERGY PRODUCERS AND USERS COALITION AND
THE COGENERATION ASSOCIATION OF CALIFORNIA
ON COMBINED HEAT AND POWER, ALLOWANCE ALLOCATION,
AND MODELING**

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

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The Energy Producers and Users Coalition¹ and the Cogeneration Association of California² (jointly, EPUC/CAC) submit the following comments pursuant to five Administrative Law Judge Rulings dated April 16, May 1, May 6, May 13 and May 20, 2008. These Reply Comments respond primarily to recommendations concerning CHP, allowance allocation proposals, and CHP modeling issues. In addition to these reply comments, the errata to the opening comments are attached as Appendix B.

Recommendations Concerning CHP. While the recommendations for CHP resources vary, parties agree that efficient CHP should be promoted. The comments highlight that efficient CHP is capable of substantial emission reductions. They also demonstrate that CHP should be treated differently from other electricity generating resources. Considered together, the comments demonstrate that CHP should be recognized an emission reduction measure and be included into the CARB scoping plan. They also highlight the need for an affirmative CHP policy that will accommodate the unique characteristics of these resources. EPUC/CAC's recommendation that CHP be treated in its own sector would fulfill these needs. In fact, all comments addressing treatment of CHP are based on the overarching principle that treatment of CHP, in its own sector, is essential to recognize CHP's unique contribution to GHG reduction.

Allowance Allocation Proposals for Remaining Electricity Sector Resources. The opening comments present a wide range of allowance allocation proposals for remaining electricity sector resources that attempt to balance the goals of equity and efficiency. PG&E's allocation proposal, however,

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 combined heat and power 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.

does not fairly or effectively balance these objectives. First, it amounts to a full auction for generators, which presents unforeseeable risk to consumers, supply reliability and the economy. Second, it threatens to put generators and retail providers at a competitive disadvantage. For these reasons, the PG&E proposal must be rejected. In contrast to the PG&E proposal, a hybrid allocation method that starts with a grandfathering allocation and transitions to an output-based allocation, would reasonably balance the dual objectives of efficiency and equity. Such a hybrid allocation method would provide a three year transition period for higher emitters to make efficiency investments. It would also reward those facilities that have already undertaken efficiency enhancements. After the three year initial period, the Commission could transition to an allocation based on a single output-based benchmark.

CHP Modeling Issues. PG&E and SCE's opening comments propose modifications to the E3 CHP input data. These proposed modifications are without support and must be rejected. First, E3's estimate of CHP growth is supported by the CEC's CHP market potential report, which is the only available study that evaluates CHP growth in California. Second, SCE's recommendation to alter CHP data consistent with its belief that CHP only marginally meet relevant efficiency standards is unsupported and inconsistent with the CHP data in its own region.

I. COMBINED HEAT & POWER

No two sets of comments contain the same recommendations for CHP resources, with comments ranging from strongly supportive to oppositional.

Some parties dispute whether CHP faces disincentive and barriers to continued operation and development that could be heightened by GHG regulation. Most parties agree, however, on two basic issues. Parties agree that efficient CHP will promote AB 32 and that the nature of CHP requires different treatment. These comments review these points, concluding that a holistic view of the California regulated market reveals that an affirmative CHP policy is needed to promote these resources.

A. All Signs Point To The Need To Recognize CHP As A GHG Reduction Measure

The opening comments overwhelmingly recognize the efficiency and contribution of CHP resources to the state's GHG emission reduction efforts. Parties acknowledge that CHP resources require different treatment and that efficient CHP should be promoted. These factors taken together demonstrate that CHP emission reduction potential warrants a place in CARB's Scoping Plan. Each of these points is discussed below.

1. Wide Range of CHP Proposals Demonstrate Need for Different Treatment

The recommendations for treatment of CHP vary considerably but parties agree that CHP resources need to be handled in a different manner from other electricity generating resources:

- PG&E recommends splitting CHP outputs among sectors, with different treatment of CHP based on the size of the facility. The different treatment would impact availability of allowances and inclusion in the cap-and-trade market.³
- SCE advocates placing CHP in the natural gas sector, with a provision of allowances to CHP for primary energy savings using a double benchmark.⁴
- CCC advocates a separate CHP sector. It proposes the allocation of allowances to existing CHP on a grandfathering basis regardless of the allocation system recommended for other electricity resources. It recommends use of a double benchmark allocation for new CHP.⁵

³ PG&E Opening Comments, at 66, 70-71.

⁴ SCE Opening Comments, at 31.

⁵ CCC Opening Comments, at 4-5.

- IEP suggests use of the CARB reporting regulation to split CHP emissions between the electricity and industrial sectors may help simplify regulation of CHP.⁶
- SMUD recommends that the electricity emissions of CHP be regulated in the electricity sector while thermal emissions be regulated in the industrial sector.⁷
- Indicated Cement Companies (ICC) suggests that CHP be regulated in a separate CHP sector.⁸
- California Clean DG Coalition (CCDC) recommends that qualifying customer CHP not be subject to GHG regulation, except to realize the benefits of the of GHG emission reductions associated with their facilities.⁹
- Calpine recommends that the Commissions consider converting thermal energy into units of megawatt hours to allow both thermal and electric emissions to be regulated in the electricity sector.¹⁰

Regardless of the various views, the range of recommendations alone makes clear that CHP varies from other electricity generating resources and requires different treatment. As discussed in the EPUC/CAC opening comments, in order to accommodate the unique characteristics of CHP, the Commission should recommend the creation of a separate CHP sector. Allowances should be allocated to CHP using a double-benchmark allocation as discussed in Section I.C.

2. Parties Agree that Efficient CHP Should Be Promoted

Despite the wide range of CHP recommendations, parties agree that efficient CHP should be promoted:

⁶ IEP Opening Comments, at 39.
⁷ SMUD Opening Comments, at 6.
⁸ ICC Opening Comments, at 2.
⁹ CCDC Opening Comments, at 2.
¹⁰ Calpine Opening comments, at 19.

- *PG&E*: AB 32 policy should encourage market incentives for new, efficient CHP without creating subsidies for inefficient CHP.¹¹
- *SCE*: To the extent CHP can increase the utilization efficiency of natural gas, there should be a mechanism created to award CHP owners with GHG allocations that represent such savings.¹²
- *SEU*: SEU does recognize CHP as a very useful efficiency measure that deserves encouragement.¹³
- *FPL*: CHP facilities should be given credit for their contribution to carbon reductions.¹⁴
- *CLECA*: The efficiency gains from both bottoming and topping cycle CHP due to the use of fuel for combined industrial processes and electricity production should be acknowledged and fully reflected in GHG regulations.¹⁵
- *NCPA*: Regulation of GHG emissions from CHP facilities should not disadvantage CHP technologies or applications. Also, regulations should recognize the unique efficiencies that CHP facilities provide.

In fact, the comments reveal that the reservations regarding CHP policy would be largely addressed if regulators ensure only efficient CHP is encouraged. PG&E, SCE, SEU, NRDC/UCS, and Calpine's concerns regarding promotion of CHP largely rest on their concern that inefficient CHP will be promoted.

- *PG&E*: Because not all CHP units are more efficient than other energy sources, PG&E would not support direct administrative allocation to CHP units. Such an approach could also reward inefficient CHP units.¹⁶
- *SCE*: SCE does not agree that CHP is inherently more efficient than the separate generation of electricity and heat. Whether it is or is not depends upon how the CHP unit is operated and to what it is

¹¹ PG&E Opening Comments, at 66.
¹² SCE Opening Comments, at 30-31.
¹³ SEU Opening Comments, at 14.
¹⁴ FPL Opening Comments, at 11.
¹⁵ CLECA Opening Comments, at 6.
¹⁶ PG&E Opening Comments, at 78.

compared. SCE has thousands of unit-years of data to support this conclusion. All CHP is operated differently.¹⁷

- *SEU*: CHP applications vary greatly as to size, technology, fuel, efficiency and location. Given the unique characteristics of CHP applications, an across-the-board determination cannot be made concerning emission reductions.¹⁸
- *NRDC/UCS*: Parties at the May 2 workshop at CARB also raised the issue that not all CHP facilities are net GHG reducers, so a blanket policy supporting CHP facilities would not be wise.¹⁹
- *Calpine*: Not all CHP is created equally. The relative efficiency of CHP facilities depends on a variety of factors, including their management and operation, age and fuel source.²⁰

These concerns can be assuaged with the use of an appropriate efficiency benchmark. As discussed below in Section C, a double benchmark is an appropriate way to ensure that only efficient CHP is encouraged.

3. Categorizing CHP as a Reduction Measure Acknowledges Contributions Towards AB 32 Mandate

In its opening comments, SEU states that “[i]t is not clear what being designated an ‘emission reduction measures’ would mean for efficient CHP.”²¹

At a minimum, the plain language suggests that if CHP is recognized as an emission reduction measures, it means that the resources can be used to achieve AB 32 mandates. AB 32 requires that the state achieve “*the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions . . . by 2020 . . .*”²² To the extent that CHP can promote these goals,

¹⁷ SCE Opening Comments, at 34.
¹⁸ SEU Opening Comments, at 14.
¹⁹ NRDC Opening Comments, at 30.
²⁰ Calpine Opening Comments, at 20
²¹ SEU Opening Comments, at 14.
²² Ca. Health & Safety Code § 38561.

it should be categorized as an emission reduction tool and be included in CARB's Scoping Plan.

Several parties, such as PG&E and SCE, while recognizing that efficient CHP will contribute to AB 32 mandates, have recommended that CHP not be categorized as an emissions reduction tool. These unsupported recommendations should be rejected in the absence of a concrete demonstration that CHP is not capable of lower GHG emissions when compared to what would have been built in its place: a CCGT and a boiler. The reservations expressed by PG&E and SCE are discussed below.

a) PG&E's Reservations Regarding CHP as an Emission Reduction Measure Should Be Rejected

PG&E claims that CHP cannot be considered an emission reduction measure on two grounds. First, it claims that a CCGT with carbon sequestration would save more GHG emissions than CHP.²³ Second, it asserts that treating CHP as an emission reduction measure will result in CHP being "over built."²⁴ As discussed below, neither of these points are sufficient to dismiss CHP as an emission reduction measure. In fact, PG&E has not provided any data or references that could justify the failure to include CHP as an emission reduction measure.

PG&E attempts to challenge the emission reduction potential of CHP when it says that a CCGT with carbon sequestration can generate more savings. First, and very telling, PG&E does not (and cannot) suggest that installing CCGT

²³ PG&E Opening Comments, at 83.

²⁴ PG&E Opening Comments, at 81.

alone can generate more savings than CHP, a proven technology capable of substantial emissions reductions. Additionally, however, its proposed alternative of carbon sequestration is unconvincing. Carbon sequestration is a method that can be used to lower the emissions of any fossil-fuel consumption. In fact, to the extent that CCGT with carbon sequestration is a feasible and cost-effective emission reduction technique, carbon sequestration can be used equally and perhaps more cost-effectively with CHP. It bears observing that many of the existing CHP facilities today are located in the oil producing fields, which could also prove to be an important carbon sink. PG&E's point therefore does not provide a sound basis to dismiss CHP as an emission reduction measure.

PG&E expresses reservations about CHP being categorized as an emission reduction measure on the basis that encouragement of CHP can lead to CHP being "over built:"

*Treating CHP as a "measure" with arbitrary benefits or subsidies would mean that the natural capture of the potential efficiencies of CHP would be distorted and CHP would be "over built" **from the perspective of most economically efficient methods for reducing GHG emissions.** As the Staff paper indicates it is possible for some CHP installations to result in no net change in overall emissions. CHP installed without existing thermal load may actually increase overall emissions.²⁵*

PG&E's statements reveal once again that its real concern lies in the development of *inefficient* CHP. The use of an appropriate double-benchmarking allocation mechanism can ensure that only efficient CHP will be built. To the extent economics is a concern of PG&E, the E3 model demonstrates that CHP,

²⁵ PG&E Opening Comments, at 81.

from a utility carbon cost perspective, is an extremely economic tool to achieve reductions. That model demonstrates that the development of 2,804 MW of large CHP and 1,574 MW of small CHP can generate up to 4.9MMtCO₂ at a carbon cost to utilities of negative \$161/MtCO₂.²⁶ In short, PG&E's concern that inefficient and uneconomic CHP will be built is misplaced.

In the end, PG&E has not provided a valid reason to disregard CHP's emission reduction potential. To the contrary, PG&E acknowledges that the efficient CHP deserves encouragement.²⁷ For these reasons, PG&E's reservations should not be accorded any weight.

b) SCE's Reservations Regarding CHP as an Emission Reduction Would Be Addressed With Adoption of Double Benchmark Efficiency Standard

SCE contends that CHP should not be considered an emission reduction tool because the efficiency of CHP largely depends on how each facility is operated to what it is compared.²⁸ SCE's reservations about recognizing CHP as an emission reduction measure, like PG&E, appear to be grounded in its concern that inefficient CHP could inadvertently be promoted. This concern would be adequately addressed with the adoption of a double benchmark standard which would limit encouragement of CHP to those that are efficient. SCE's concern therefore is not sufficient reason to dismiss CHP as an emission tool.

²⁶ See E3 May 13, 2008 Presentation, at Slide 16 (available at www.ethree.com).

²⁷ PG&E Opening Comments, at 66 ("AB 32 policy should encourage market incentives for new, efficient CHP without creating subsidies for inefficient CHP.")

²⁸ SCE Opening Comments, at 34.

B. CHP Efficiency And The “Market” Do Not Ensure Incentives

A faulty assumption coloring the comments of PG&E, SCE, and SEU is that the increased efficiency of CHP will allow it to recoup carbon costs and even profit in the market. This ignores the fundamental topping cycle CHP disincentive that EPUC/CAC has tried to highlight: *while CHP increases fuel efficiency and has fewer emissions than that of a CCGT and a boiler, the investor will bear more carbon cost responsibility.* The ability of a CHP facility to secure compensation for carbon cost responsibility is also largely contingent on market clearing price reflecting a facility’s full carbon costs. As discussed below, California’s imperfect market structure does not assure investors that conclusions reached in economic papers will apply to the California electricity market.

The utilities made various arguments to support their claim that there is no disincentive to investment in topping cycle CHP:

- PG&E claims that CHP has an “*inherent market incentive*” because “[t]he owner would first meet onsite electricity use (thus reducing their utility bills) and could sell electricity to the California grid at a lower marginal cost than higher-emitting sources setting the marginal electricity price.”²⁹ PG&E provides three reasons to support its claim of an inherent market incentive:

*First, assuming that electricity produced on-site is less emissions-intensive than grid electricity delivered from other sources, the facility would have access to an energy source with a lower marginal cost than electricity it would otherwise buy. Second, the facility could sell electricity at a lower marginal cost than competitive, higher emitting sources that set the marginal electricity price. Third, the facility would benefit from increased thermal efficiency.*³⁰

- SCE also believes that CHP does not require any incentives because “[e]fficiently operated CHP has tremendous economic advantage over separate production of electricity and heat.”³¹
- Sempra Energy Utilities (SEU) notes that “[s]ince carbon price will be contained in purchased energy price, and installation of efficient CHP should provide a net reduction in carbon costs, there will be an additional income stream for the owner of the CHP facility to encourage development of CHP.”³²

²⁹ PG&E Opening Comments, at 74.

³⁰ PG&E Opening Comments, at 78.

³¹ SCE Opening Comments, at 36.

³² SEU Opening Comments, at 20.

These explanations fail to recognize several conditions in the California market.

First, these explanations erroneously assume that the electricity produced on-site will be less emissions-intensive than the average emissions rate of a utility portfolio. In the absence of CHP, a facility would purchase power from its interconnected utility. A utility's emissions rate is a composite and average of all of the power in its portfolio, which includes nuclear, hydro and renewable facilities. Depending upon assumptions and the thermal/electric split employed, a CHP plant's electric output emissions can be more carbon intensive than the IOU blended emissions rate even though it is less intensive than the generation it displaces.

Second, the statements assume the existence of a perfect market in which all market prices fully reflect the full carbon costs of selling generators. As DRA has aptly noted, *"[t]he fact that markets are imperfect is often overlooked in economic theories; this has been the Achilles heel to the California electricity market restructuring experience."* IEP comments discuss the hybrid nature of the California electricity market:

For the 75 percent of the state's load subject to the jurisdiction of the Commission, a "hybrid market structure" is the adopted model in which utility-owned generation ("UOG") is supposed to compete against independent power producers ("IPPs") to supply the electricity needed to serve load. To serve the remaining 25 percent of the market, the municipal utilities either build their own generation or enter into contracts with IPPs or other utilities.

Indeed, these comments reveal that it would be inappropriate to assume California has a perfect market to which outcomes in economic papers can be directly applied. Once MRTU is implemented, many assume that the market clearing price will facilitate a full pass through of carbon compliance costs. MRTU, however, was not designed with a state GHG program in mind. As discussed in the opening comments, the market power mitigation provisions, therefore, will limit the ability of independent power producers to seek recovery of these compliance costs.³³ In addition, those in existing bilateral contracts have no recourse to seek compensation for these costs regardless of the market clearing price.

Third, the assumption that a CHP plant will be "economic" or "advantageous" simply because it is more efficient in its use of natural gas misses a critical point. As discussed in EPUC/CAC's opening comments, existing regulatory barriers challenge the economics of even the most efficient CHP plant.³⁴ To begin with, for plants that maximize the total efficiency of the plant export excess power to the grid but without QF contracts in place there

³³ EPUC/CAC Opening Comments, at 13-16.

³⁴ EPUC/CAC Opening Comments, at 42-44.

remains no assurance that the plant can actually export the power to the grid. While the CPUC has attempted to solve this problem in the QF policy proceeding, the long-term value of the program remains in question. Without an economically viable place to put the excess power, project economics suffer. Second, when load leaves the utility system to be served by CHP, it incurs substantial departing load charges. Today a “bare bones” estimate on the PG&E system is roughly \$13 MWh, while the SCE rate is roughly \$10 MWh. Depending upon the outcome of pending proceedings, additional departing load charges (the CAM and procurement non-bypassable charges) could be added to the current list. Even if no new categories of charges are added, the existing categories are on the rise. Finally, adding a new burden under GHG regulation – even if the burden may not be sufficient alone to kill a CHP plant – further weighs project economics. These factors, taken together, impact the CHP investment hurdle rate. *The Commissions thus cannot look at each policy issue for CHP in isolation; decisions must be made in the context of the total impact of their policies on CHP.*

C. The Double Benchmark Allocation Method Best Ensures Efficiency, Mitigates The Potential For Disincentives And Encourages Continued Operation Of Existing And Development Of New CHP

As noted earlier, opening comments reflected concern of parties that incentives would be made available to inefficient CHP. A double benchmark allocation, however, would ensure the encouragement of efficient CHP. Such an approach would only make available allowances to cover the emissions of a CHP alternate: CCGT + boiler. The use of a double benchmark standard is supported by SCE, CCC, ICC, and FCE.³⁵

1. Use of Double Benchmark Is Appropriate Because It Focuses on Efficiency

Consistent with AB 32 objectives, regulators should focus on promoting efficient CHP. As suggested by Staff’s CHP Paper, the efficiency of a plant may be an appropriate manner to determine whether a CHP facility should qualify for support.³⁶ As discussed below, PG&E’s support for size-based distinctions is not appropriate, especially where it would compromise the state’s efforts to promote emissions reductions.

PG&E asserts that regulators should make a distinction between large and small CHP on the basis that “[l]arge CHP facilities tend to have owners with the economic knowledge necessary to effectively compete with other generators and

³⁵ See SCE Opening Comments, at 30-31; CCC Opening Comments, at 13; ICC Opening Comments, at 14; FCE Opening Comments, at 4.

³⁶ Staff CHP Paper at 10.

*sell excess electricity in the market.*³⁷ The focus of any AB 32 policy should be promotion of GHG emission reductions. PG&E's preference for a size distinction loses sight of this goal. Indeed, it openly reveals PG&E's real concern: competition. Rather than integrate high capacity CHP resources into its baseload, PG&E has demonstrated that it would prefer to build or acquire its own gas-fired resources on which shareholders will earn a rate of return. The focus of this inquiry should not be whether owners have economic knowledge, it should be on whether the individual CHP facility can promote the goals of AB 32.

2. Opening Comments Reflect Support for Use of Double Benchmark

Various parties support the use of a double benchmark for various purposes:

- SCE supports an allocation of allowances on the basis of economic harm. It does not advocate a direct allocation of allowances to CHP but it does support an allocation that reflects the emission savings generated using a double-benchmark standard.
- CCC supports an allocation of allowances to new CHP using a double benchmark standard.
- FCE *"conceptually supports the Energy Producers Coalition and Cogeneration Association of California's ("EPUC/CAC") proposed double-benchmarking concept as a reasonable methodology for accounting for GHG emissions of CHP electrical and thermal output compared to the equivalent generation of the same electrical and thermal output using two separate processes."*³⁸

The difference between these proposals is the recommended electric and thermal references.

- SCE suggests the use of *"a modern high-efficiency boiler with a minimum efficiency of 85% to an efficiency as high as 95% as the benchmark for heat. It recommends a modern high efficiency Combined Cycle Gas Turbine ("CCGT") with a maximum heat rate of 7,200 BTU per net kWh to a minimum heat rate of 6,826 as the benchmark for electric power."*³⁹

³⁷ PG&E Opening Comments, at 70-71.

³⁸ FCE Opening Comments, at 4.

³⁹ SCE Opening Comments, at 31.

- CCC recommends the “*electric production from a combined-cycle gas turbine with a heat rate of 7,000 Btu/kWh and thermal production in a high-efficiency boiler with an efficiency of 85%.*”⁴⁰

The appropriate double benchmark standard should consider the emissions of an electric and thermal reference. The electric reference can vary depending upon the vintage of the electric reference generation, the fuel used, the treatment of grid losses and other factors. As discussed in the EPUC/CAC opening comments, an average fossil emissions rate or an emissions rate of a new CCGT can be used for the electric reference. While design specifications may be more optimistic, CCGTs in fact operate today at a heat rate approximately the heat rate used in the E3 model: 7364 Btu/kWh.⁴¹ Use of a new CCGT emissions rate should also account for avoidance of grid losses and vintaging. The thermal reference varies less, but can be influenced slightly by design elections. In general the thermal reference will be a stand-alone boiler. While SCE has suggested that a boiler can have an efficiency ranging from 85-95%, it acknowledges that a value more consistent with operational data is 80%.⁴²

D. Failure To Address CHP Benefits In The State’s GHG Program Could Have A Material Effect On CHP Development

The state has the ability to realize significant emission reductions through promotion of CHP. In order to secure these reductions, however, the state must consider all factors that impact the development of CHP. As highlighted below, several existing CHP barriers exist that prevent the full deployment of these resources. If burdened with carbon compliance costs, the viability of these resources will be further threatened.

1. Opening Comments Acknowledge CHP Barriers

As demonstrated in the opening comments of ICC, CLECA, IEP, the CCDC, and FCE, existing barriers to CHP development exist. The barriers highlighted by each of these parties are summarized below:

- ICC recommends that the Commissions eliminate departing load charges, require standby rates to reflect diversity adjustments, and require utilities to provide emission reduction credits (ERCs) to promote CHP under certain conditions. It notes that “[s]uch policies to encourage installation of CHP for GHG reduction and efficiency

⁴⁰ CCC Opening Comments, at 13.

⁴¹ The Energy Information Administration (EIA) 2006 EIA-906/920 and EIA-860 data show that the La Paloma, Sunrise, and High Desert power plants exhibited actual operating heat rates (in Btu/kWh) of 7,437, 7,357 and 7,342, respectively, for calendar year 2006.

⁴² SCE Opening Comments, at 36.

purposes are entirely consistent with both the second Energy Action Plan (EAPII) and the CEC's Final 2007 IEPR Report."⁴³

- CLECA recommends that the Commission reduce or eliminate regulations which limit the "over the fence" sales of electricity and wheeling, non-bypassable charges and exit fees, cumbersome grid interconnection rules, excessive standby rates which fail to reflect diversity of distributed generation and CHP and excessive local permitting rules especially where they are not consistent with broader state reduction goals and objectives.⁴⁴
- IEP states that "[t]o the extent that the Commission wants to encourage cogeneration as an emission reduction strategy, it can do so most efficiently by directing the utilities under its jurisdiction to make available commercially executable standard form power purchase agreements, as it directed in D.07-09-040."⁴⁵
- CCDC notes that "[t]he CPUC and CEC, and the Legislature, should continue their efforts to remove legal and regulatory barriers to CHP implementation in California. To achieve this goal, transmission and distribution congestion relief and capacity payments should be made, incentives for natural gas-fired DG should be reinstated, DG tariffs permanently eliminating standby charges should be adopted, nonbypassable charges should be eliminated, CHP DG should be allowed to serve microgrids, and the CHP recommendations set forth in the 2007."⁴⁶
- FCE observes the existence of the following barriers: (i) regulatory constraints that limit electricity exports; (ii) interconnection issues; and (iii) natural gas procurement issues.⁴⁷

The comments, taken together, further highlight the need of regulators to evaluate current barriers to ensure AB 32 mandates can be achieved. As highlighted by these comments and the comments of EPUC/CAC, to promote CHP, (i) reasonable pricing provisions must be available, (ii) grid interconnection rules must be less complex, and (iii) the imposition of departing load charges on customer departing load should be reconsidered. As noted in Section I.A.2., the opening comments recognize the energy efficiency value of CHP. To the extent that departing load charges are not imposed on energy efficiency, there is good reason not to impose those charges on CHP.

⁴³ ICC Opening Comments, at 12.

⁴⁴ CLECA Opening Comments, at 5-6.

⁴⁵ IEP Opening Comments, at 40.

⁴⁶ CCDC Opening Comments, at 3.

⁴⁷ FCE Opening Comments, at 10.

2. Utilities Discussion of Barriers Is an Attempt to Distract Regulators From Real, Documented CHP Barriers

The utilities' discussion of CHP barriers fail to acknowledge the true barriers to CHP. The comments of SCE, PG&E and SEU are discussed below:

- SCE comments discuss three CHP barriers. First it observes that *“general lack of any requirements for users of thermal energy to make a showing that their technology choice for supply of that energy is more efficient than CHP or that a process efficiency improvement may reduce the need for any thermal energy.”* Second, it acknowledges that multiple and overlapping permitting processes within the state of California can deter CHP. Finally, it claims that the lack of power purchase agreements is driven more by CHP economics and the need for thermal energy, than by a lack of electricity buyers.⁴⁸
- PG&E believes barriers exist due to *“complexity found in Cal ISO tariffs; high payback criteria for capital investment in the commercial and industrial sectors; perceived volatility of the natural gas market; and unwillingness to acquire the necessary skills to own and operate a CHP installation.”* PG&E also claims that the expected high payback for CHP is also a barrier: *“The high payback criteria for nonresidential customers, typically one and a half to two years, means that CHP would effectively require a return on investment (ROI) of at least 50%.”*
- SEU note that regulators should consider barriers cited in CEC CHP Potential Study (CEC-500-2005-173, p. 3-14 and 3-15) which included the length of payback and the lack of management interest. SEU suggests that *“LSE-owned or financed major energy systems would overcome the payback barrier and the perceived risk of reliability and performance of energy equipment.”*

In short, SCE suggests that CHP owners lack understanding, CHP run into permitting problems, and CHP economics cause contracting problems. PG&E believes CHP owners are unwilling to acquire the skill-set needed to operate a facility and have ridiculously high payback expectations. Finally SEU believes barriers can be eliminated if only the utilities themselves build or finance CHP facilities.

These theories are misplaced and fail to acknowledge real documented barriers that exist in the California market. For large systems, knowledge is not a material barrier. This suggestion, in fact, runs contrary to PG&E's statement that

⁴⁸ SCE Opening Comments, at 39.

“[l]arge CHP facilities tend to have owners with the economic knowledge necessary to effectively compete with other generators and sell excess electricity in the market.”⁴⁹ Likewise, the permitting process is not considered to be a critical path barrier to CHP development, and it is unclear why SCE believes it is a barrier. And while economics are certainly a driving force in CHP operation and development, those economics are materially affected by the regulatory choices (principally, departing load and QF contracting) the Commissions make in this and other settings.

SEU suggests that, in light of barriers, utilities should develop new CHP is the wrong answer. The solution is not to promote utility-owned CHP, but to lift barriers to non-utility investment. As demonstrated by the E3 results, a significant portion of CHP investment costs are currently borne by the private investor. As a result, from a utility carbon cost perspective, CHP is an extremely economical reduction tool. If utilities must absorb the investor’s costs that amount to \$389/MtCO₂, the cost to ratepayers is likely to increase. It also harms the state’s efforts to promote competition in the market.

E. Bottoming Cycle Facilities

The record on bottoming cycle CHP presents a range of proposals. SCE proposes that bottoming cycle CHP units be regulated in the natural gas sector, using the same method as they propose for topping cycle: double benchmarking.⁵⁰ SEU proposes that the Commission segment a bottoming cycle plant into two sectors, electricity and, for thermal output, natural gas or industrial.⁵¹ PG&E makes a similar proposal, which would subject all CHP to auction.⁵² ICC, like EPUC/CAC, proposes to include the electric generation process of a bottoming cycle plant in a separate CHP sector, leaving the industrial production of waste heat to fuel the generation in the industrial sector.⁵³

The challenge in addressing both topping and bottoming cycle as “CHP” arises from the significant differences in their configuration and operation. As EPUC/CAC noted in their opening comments, despite the fact that they share the CHP label, they require a different analysis under GHG regulation.

A topping cycle plant produces two energy outputs (heat and electricity) from a single fuel. The efficiency of topping cycle plants arises from the fact that less fuel is needed to produce the same amount of electrical and thermal output than would be needed in stand-alone production. CHP can be viewed as energy efficiency on the supply side.

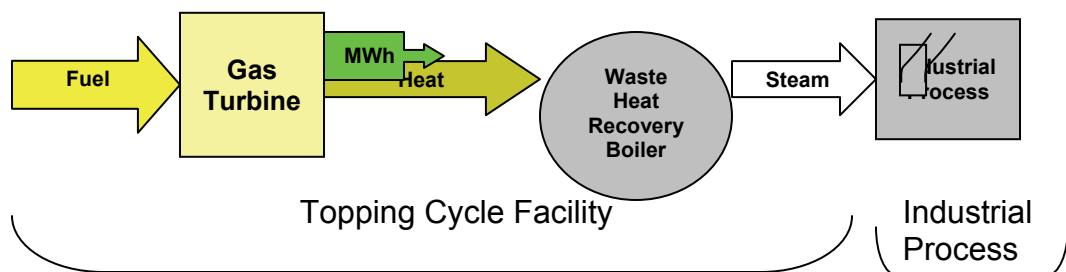
⁴⁹ PG&E Opening Comments, at 70-71.

⁵⁰ SCE Opening Comments at 32-33.

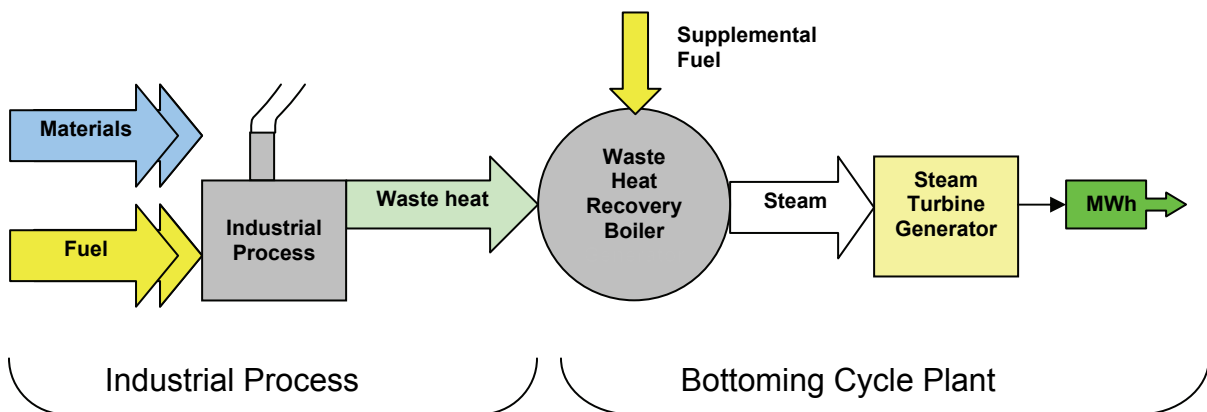
⁵¹ SEU Opening Comments at 17.

⁵² PG&E Opening Comments at 72.

⁵³ ICC Opening Comments at 2.



A bottoming cycle plant, in contrast, produces only one output: electricity. However, it is a combined heat and power plant because the “fuel” used to generate the electricity is waste heat. The efficiency from bottoming cycle plants arises from the capture of waste heat that would otherwise be vented to the atmosphere to produce electricity. This form of CHP, too, can be viewed as energy efficiency on the supply side.



As depicted above, both topping and bottoming cycle plants involve an interface of an industrial process with electricity generation. In the case of topping cycle, thermal energy is an “output”. In the case of bottoming cycle facilities, the industrial process *uses* the thermal output (in the form of steam or other useful heat products) to manufacture other products. In the case of bottoming cycle, therefore, thermal energy is an “input.” The industrial process creates waste heat that is used to fuel the generation process.

A review of opening comments suggests that the Commission must answer three primary questions:

- How should the bottoming cycle “facility” be defined?
- In what sector should bottoming cycle CHP be placed for purposes of GHG regulation?
- Within that sector, how should allowances be allocated to the facility?

While a number of alternatives can be considered, there is one important common thread: industrial facilities installing bottoming cycle generation should receive some benefit to recognize the energy efficiency achieved.

Defining Bottoming Cycle Facility for Regulatory Purposes. For purposes of electricity sector GHG regulations, the scope of the “bottoming cycle facility” should be limited to the electric generation process. The boundary would begin with the waste heat recovery generator and extend through the steam turbine, as depicted in the bottoming cycle diagram. The facilities that precede this process are best viewed as an industrial plant, which generates waste heat that could be either exhausted to the atmosphere or used to fuel the steam turbine. This is consistent with the definition of topping cycle generation, which also does not include the industrial host.

Sector Placement. Bottoming cycle plants could, in theory, be placed in three sectors: the electricity, industrial or separate CHP sector. As a preliminary matter, the only logical place for industrial process emissions is in the industrial sector. The manufacturing output is the driver for the business, not electricity, and GHG regulations should recognize this trait. Placing the industrial plant in the electricity or CHP sector would be to akin to allowing the tail to wag the dog. Using the definition provided above for bottoming cycle facility, the industrial process can easily be separated for regulation.⁵⁴ Second, it would be feasible to consider the bottoming cycle generator as a part of the industrial sector, as an energy efficiency measure on the supply side. The downside to this approach is that these facilities may be exporting power to the grid, splitting the Commissions’ job of tracking electricity-related emissions and CHP reductions. Bottoming cycle generation, instead, would best be placed in the CHP sector. Accounting for bottoming cycle generation in the CHP sector groups these resources with other CHP, to promote focused treatment for these resources as a reduction measure.

Allowance Allocation. Regardless of the sector placement, the allocation question for bottoming cycle plants must be addressed. Absent supplemental firing of the waste heat recovery boiler, a bottoming cycle plant

⁵⁴ Separating electric emissions from thermal emissions is not as easy for topping cycle CHP because it generates two outputs using the same fuel and accurate splitting of emissions is not possible. For a bottoming cycle facility, electric generation relies on manufacturing process waste heat as the input. Because the processes are separate, the electric generation emissions can be easily separated.

causes no emissions incremental to those already arising from the industrial process. Consequently, if there is no supplemental firing, and the generator is not creating incremental emissions, it is not an emitting deliverer and will require no allowance allocation. If supplemental firing is employed, the bottoming cycle generator is adding incremental emissions and an allocation method is necessary to address these emissions. As EPUC/CAC suggested in their opening comments, one approach would be to allocate allowances to these plants based on an output basis, employing an average system emissions rate for fossil resources or natural gas fired generation.⁵⁵

F. Responses To Specific Points Raised By Other Interested Parties

The following comments respond directly to statements made in comments, which may not be addressed above.

PG&E (at 67): If CHP truly represents a cost-effective means of GHG abatement, its economic value will increase and no further incentive is necessary.

CHP, from a utility carbon cost perspective, is a low cost resource.⁵⁶ As demonstrated by the E3 results, however, this is largely because consumers (the investors) bear the majority of the costs associated with these investments.⁵⁷ To the extent these investors are faced with increased carbon cost responsibility, there will exist a disincentive that must be mitigated to ensure the state can benefit from the increased efficiency of these resources.

PG&E (at 74): If a CHP unit were efficient and reduced emissions, as compared to other energy sources, then the CHP owner, both as an electricity consumer and a first deliverer, would be rewarded in a market-based cap and trade system.

PG&E (at 81): If a particular CHP installation produces electricity for export to the utility grid with fewer GHG emissions than other available sources of electricity, there will be a natural market for that electricity.

PG&E (at 77-78): A cap and trade program will reward efficient CHP, as the market will internalize the emissions value in electricity prices.

PG&E repeats this theme in its opening comments. PG&E's view, however, seems to be based on an oversimplified assumption that simply because CHP uses less fuel than stand-alone production of the same output, there "will be a

⁵⁵ EPUC/CAC Opening Comments, at 54-55.

⁵⁶ See E3 May 13, 2008 Presentation, at Slide 17; McKinsey and Company, *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost*, at Exhibit 11.

⁵⁷ E3 May 13, 2008 Presentation, at Slide 16.

natural market” for the electricity. The discussion above in Section I.B. and I.D. shows the failure of PG&E’s reasoning: (1) there are no guarantees that the “market” will perfectly reflect carbon value; (2) CHP development is burdened by many barriers, some of which have direct economic implications; (3) the market for CHP power is limited in light of the non-dispatchable nature of the power and the strain evidenced in the QF program. Taking all of these and other factors into account, PG&E’s conclusion cannot be supported.

PG&E (at 81): Likewise, CHP cannot be analogized and considered an emissions reduction “measure” in the same sense that energy efficiency, for example, is an emissions reduction “measure.”

Energy efficiency, as the term is used in the electricity sector, typically reduces the demand for energy. CHP does not reduce the demand for electricity. It is, nonetheless, a pure energy efficiency measure. It can be viewed as demand side reduction in the natural gas sector or supply side efficiency in the electricity sector.

PG&E (at 83): For larger CHP, however, there is no need for special subsidies or programs. The establishment of any subsidy, set-aside, or other program based on an assumption that CHP is automatically beneficial, is likely to distort the market and lead to overinstallation of CHP in California –without producing true GHG emissions reductions.

If the Commissions adopt a double benchmark efficiency standard, only efficient CHP will be promoted. As noted in the comments of several parties (see Section I(A)(2)), efficient CHP can generate emission reductions.

PG&E (at 84-86): Many of the barriers to CHP deployment are beyond the control of regulation. Market barriers preventing deployment of CHP today include: complexity found in Cal ISO tariffs; high payback criteria for capital investment in the commercial and industrial sectors; perceived volatility of the natural gas market; and unwillingness to acquire the necessary skills to own and operate a CHP installation. None of these barriers is likely to be addressed with monetary incentives.

PG&E has done little to support this statement or even fully explain its position. However, while small CHP installations are currently supported by direct financial incentives, EPUC/CAC does not seek to extend those incentives to large CHP. Its recommendations only seek to avoid disincentives and to promote a GHG policy that will encourage CHP as a tool in the state’s GHG emission reduction goals.

SCE (at 37) As the Joint CPUC and CEC Staff Paper on GHG Regulation for CHP, issued May 1, 2008 (“CHP Staff Paper”) notes, it is possible for efficient CHP to reduce emissions associated with separate production of

electricity and heat, however local emissions will increase if the displaced generation was fuel-fired and less efficient. However, today there is no need to fire any fuel to generate electricity on-site. There are GHG generation technologies that can be deployed in a distributed fashion and readily scalable. Southern California is especially blessed with abundant solar energy that is easily converted to either electricity or heat. There are also locations within the state that enjoy geothermal resources. For example, San Bernardino has a geothermal-based district heating and absorption chilling network. There is no reason other communities could not deploy similar technology.

CHP is developed not to meet electric demand, but primarily to serve thermal load, with electricity as a byproduct. Consequently, a pure electricity driven measure, such as solar or wind, cannot solve this equation. More importantly, however, the demand for steam and power in many industrial processes served by CHP is constant and many of these facilities operate 24 hours a day and 7 days a week. Highly intermittent resources, such as solar and wind, simply could not meet this demand with sufficient reliability for a critical manufacturing process such as refining or oil production.

SCE (at 39): The major barrier to increased deployment of CHP is the general lack of any requirements for users of thermal energy to make a showing that their technology choice for supply of that energy is more efficient than CHP or that a process efficiency improvement may reduce the need for any thermal energy.

It is not at all clear how the absence of an obligation on a developer, as SCE suggests, could be a barrier or burden to development. It would seem just the opposite would be true; placing higher standards or obligations on a developer would actually decrease deployment.

SCE (at 39): SCE does not think adding another program, especially one for fossil-fueled resources, would further the State's GHG goals.

It is not clear what program SCE believes the Commission would be adding by advancing CHP. To the extent CHP generates less emissions than a CCGT and a boiler, it furthers the state's GHG goals.

SCE (at 39): A lack of power purchase agreements is driven more by CHP economics and the need for thermal energy, than by a lack of electricity buyers.

It must be acknowledged that there are few buyers for CHP power in California. The very limited scope of retail access limits the number of buyers in the market. If a CHP plant sites in an IOU service territory, the most likely buyer for the power

is the IOU. While other IOUs or POUs may be possibilities, the cost of moving the power may change the equation.

CHPs would have no economic problems, however, if the IOUs simply paid them for their power exports what the IOUs pay themselves or renewable resources. As reflected in Appendix A to EPUC/CAC's Opening Comments, the QF decision sets a price for CHP resources materially lower than current Market Price Referent (MPR) values. In addition, a review of recent contracts suggests that utility or utility affiliate facilities are likewise paid materially more than the QF price AND guaranteed full GHG cost recovery. For example, the QF capacity payment of about \$92/kW-year was based on the 2006 MPR CCGT which reflected a fixed component of about \$157/kW-year. In contrast, SCE in A.07-12-029 is seeking approval for peaking units with an installed cost of over \$1450/kW (which equates to a levelized cost of over \$260/kW-year compared to the \$92/kW-year QF payment). Additionally, SCE is requesting approval of the Walnut Creek power purchase agreement (a peaking power purchase from one of their affiliates) with a capacity payment starting in 2013 of over \$200/kW-year.

II. ALLOWANCE ALLOCATION FOR REMAINING ELECTRICITY SECTOR RESOURCES

The prior section dealt with the treatment of CHP and EPUC/CAC's continuing recommendation that CHP emissions be tracked in its own sector. This section addresses an allocation method for remaining electricity sector resources and the parties' widely varying recommendations. These proposals include allocating allowances:

- to utilities for free (based on sales and energy efficiency) (PG&E);
- to retail providers for free (based on emissions) (LADWP);⁵⁸
- to parties incurring economic harm (SCE)⁵⁹ ;
- to deliverers based on historic emissions (DRA);⁶⁰
- to deliverers using fuel-specific output based allocation (SMUD);⁶¹
- through an auction or to deliverers using an output based approach with no fuel adjustment factor (FPL Energy);⁶²
- through administrative allocation with a gradual transition to auction over time (WPTF).⁶³

While many other factors are mentioned, parties' positions appear to focus largely on the goals of equity and efficiency. As a very general matter, entities

⁵⁸ LADWP Comments, at 16

⁵⁹ SCE Opening Comments, at 2.

⁶⁰ DRA Opening Comments, at 10-13.

⁶¹ SMUD Opening Comments, at 13

⁶² FPL Energy Opening Comments, at 5

⁶³ WPTF Opening Comments, at 7

with concerns over existing higher emitting resources tend to favor approaches that recognize historic emissions in some form, valuing equity over efficiency. Entities that have already achieved some level of efficiency tend to favor approaches that value efficiency over equity.

EPUC/CAC observed in their opening comments that the right choice for the electricity sector will depend upon how regulators see the necessary balance between competing objectives. In striking this balance, the Commissions should consider the following observations:

1. A carbon allowance auction is untested and presents risks to consumers, generators and the economy that have not been adequately assessed.
2. The proposal offered by PG&E, which contemplates administrative allocation of allowances to utilities, would amount to a 100% auction to deliverers. PG&E's proposal thus shares the problems raised by an auction. Its proposal adds to those problems the potential to undermine competition in the generation and retail sales markets.
3. A hybrid allowance allocation method that begins with grandfathering and transitions to an output based allocation (OBA) could reasonably balance the objectives of encouraging efficient production and equity for existing investment. To recognize those that acted early to enhance efficiency during the three year transition period, those entities with emissions less than the average fossil emitters would also be eligible for credit in the form of limited additional allowances. Following the three year initial period, this approach would transition to a single output-based benchmark in 2020.

Each of these issues is discussed below.

A. PG&E's Proposal To Allocate Allowances Administratively To The Utilities Should Be Rejected

PG&E proposes that, *"for the electric sector, the value of emissions allowances should be allocated to utilities for the benefit of their customers."*⁶⁴ They reason that because utility customers *"will bear the ultimate costs of meeting GHG reduction goals"* they should receive the value of the sector's allowances. The utilities, in PG&E's view, are the best vehicle to distribute this value. PG&E further proposes that allowances be allocated among the utilities based on electric sales and adjusted for energy efficiency savings.⁶⁵ The utilities, in turn, would sell their allowances into the market using an auction.⁶⁶

⁶⁴ PG&E Opening Comments, at 25.

⁶⁵ *Id.* at 26.

⁶⁶ *Id.* at 21.

While PG&E's recommendation no doubt has a strong appeal to regulators concerned about consumer costs, this approach is not in California's best interest. This proposal -- for all practical purposes, a full auction -- presents unexamined and unforeseeable risks to consumers, non-utility generators and the economy. In addition, by placing the allowances in the hands of the utilities, ensuring a competitively neutral use of the funds becomes a greater challenge. Not surprisingly, however, the proposal has no downside for utility shareholders or for utility-owned generation, since the utilities will be guaranteed full pass-through of any carbon-related costs in their rates. In light of these shortcomings, PG&E's proposal cannot be advanced as a recommendation to CARB.

1. The Net Effect of PG&E's Proposal on Generators is a Full Auction

While labeled an administrative allocation, PG&E's proposal is nothing less than a 100% auction of allowances from a generator's perspective. The only potential policy goal addressed by the allocation to utilities in advance of auction is to increase the certainty that auction revenues stay within the sector. Consequently, the concerns arising from a 100% auction apply equally to PG&E's proposal for an administrative allocation to local utilities.

2. A Full Auction Presents Unexamined and Unforeseeable Risks to Consumers, Generators and the Economy

PG&E argues that *"there are many studies regarding the best way to maximize the economic efficiency of a cap and trade program, and most have demonstrated that the cost to the economy is minimized when a majority of allowances are auctioned."*⁶⁷ Similarly, NRDC concludes: *"Our work with the E3 model shows that freely allocating allowances to deliverers results in higher overall costs than auctioning allowances with auction revenue recycling."*⁶⁸ The optimism over the efficiency of an auction should be tempered with a full assessment of risks of an auction to consumers, non-utility generators and the economy. As noted in EPUC/CAC's opening comments, the Commissions' strong focus on consumer cost is reasonable, but an expanded view may be necessary to truly understand consumer costs and gauge other industry impacts.⁶⁹

A wide variety of opening comments pointed out that other goals must be considered, including safeguarding reliability and electricity infrastructure.⁷⁰ NCPA observes:

⁶⁷ PG&E Opening Comments at 29.

⁶⁸ NRDC/UCS Opening Comments, at 11.

⁶⁹ EPUC/CAC Opening Comments at 6-24.

⁷⁰ See EPUC/CAC Comments at 6-24; NRDC Comments at 19; IEP Opening Comments, at 8-9; Calpine Corporation Opening Comments, at 10; LADWP Opening Comments, at 17; SMUD,

*At the end of the day, retail providers are responsible for providing safe and reliable electricity to consumers; a mandate that is not ignored in AB 32. Retail providers must also be able to do this, even with the implementation of AB 32, in the most cost-effective manner. Accordingly, it is imperative that all retail providers with compliance obligations not be unduly constrained from being able to provide customers with reliable electricity.*⁷¹

NCPA also notes that:

*“[b]oth the real-time operating reserves and planning criteria annual capacity showings would be impacted by GHG emissions and the ability to procure allowances through the market. It is vitally important that any market for allowances be both liquid and facile enough to meet the operational needs of generators in the California Independent System Operator (ISO) markets and throughout the State.”*⁷²

Other parties share the concern over reliability. SMUD notes that

*“[f]or entities with an obligation to serve such as investor owned utilities (“IOUs”) and publicly owned utilities (“POUs”) as well as generators with the must offer obligation (“MOO”), the possibility of emission allowance shortfalls such as RECLAIM has experienced, is unacceptable to the duty of load serving entities to keep the lights on.”*⁷³

This concern regarding reliability stems, in part, from the fear that generators may not be able to fully recover their costs of carbon. Calpine points out that it is unlikely that generators will be able to recover 100% of their auction-related costs in the wholesale energy market. Calpine further notes that *“a study of the impact of the European emission trading system on the power sector found that, in some wholesale markets, as little as 60% of allowance costs are recovered in the wholesale market.”*⁷⁴ DRA states its concerns regarding auctions succinctly in its opening comments:

Opening Comments, at 9-10; CMUA, at 3-4; Dynegy Opening Comments, at 6, 12; IEP Opening Comments, at 2-3, Attachment A at 2, 9.

⁷¹ NCPA Opening Comments, at 4.

⁷² NCPA Opening Comments, at 7.

⁷³ SMUD Opening Comments, at 9-10.

⁷⁴ Calpine Opening Comments, at 9.

*The fact that markets are imperfect is often overlooked in economic theories; this has been the Achilles heel to the California electricity market restructuring experience.*⁷⁵

DRA also points out that a transition period to auction allows first deliverers “to make necessary adjustments to their financial plans to account for GHG compliance obligations on their operating cash flow.”⁷⁶

In addition, despite the findings of some parties in working with the E3 model, a number of parties come to the conclusion that an auction will increase consumer costs as well as greater price volatility. LADWP observes: “*The potential shift of billions of dollars directly from ratepayers to an auction ‘pot’ from which auction revenues would be redistributed back to society in some unknown, non-transparent, indirect way is poor public policy.*”⁷⁷ LADWP further states that with an 80-100% auction and carbon priced at \$50/ton it would be required to pay \$550-700 million annually for allowances.⁷⁸ Pacificorp, while supporting a nominal auction, raises its concern about the price of scarcity that could arise from speculation,⁷⁹ a concern shared by Calpine.⁸⁰ Calpine also points out that an auction-based allocation approach would impose additional costs that are difficult to quantify or predict, such as broker fees, internal G&A costs and the cost of capital – all of which would ultimately be borne by consumers.⁸¹

It is also vitally important that regulators keep in mind that legal authority for an auction is not clear at this point. Moreover, there is **no experience** around the globe with GHG auctions. Finally, an auction will place billions of dollars in play with a “big bang” in the electricity sector. SCPPA points to a Resero analysis, which concludes that if allowance prices were at \$100/ton CO₂, the California electric sector would be required to pay nearly \$100 billion to buy allowances during the period 2012 to 2020.⁸²

Under these circumstances, and even with the most sophisticated modeling available, it is impossible to fully anticipate the impact of any material GHG auction on California’s consumers, generators and economy. As EPUC/CAC observed in their opening comments,⁸³ these conditions call for a cautious, measured approach in determining the method for distribution of GHG allowances in the electricity sector. Set in this context, PG&E’s proposal must be rejected.

⁷⁵ DRA Comments at 4.

⁷⁶ *Id.* at 7.

⁷⁷ LADWP Opening Comments, at 18

⁷⁸ *Id.*

⁷⁹ Pacificorp Opening Comments, at 21.

⁸⁰ Calpine Opening Comments, at 10.

⁸¹ Calpine Opening Comments, at 10.

⁸² SCPPA Opening Comments, at 21.

⁸³ EPUC/CAC Opening Comments at 23.

3. PG&E's Proposal Threatens to Put Other Generators and Retail Providers at a Competitive Disadvantage

It is tempting to see the utilities as a disinterested conduit for delivering allowance value to consumers through an administrative allocation. It is critical, however, to examine their role in the market more closely to prevent creating a disadvantage for competing generators and retail providers.

PG&E proposes to allocate allowances to “utilities” or “local electric utilities” on behalf of consumers. PG&E suggests that “local electric utilities” are uniquely positioned for this role because of their customer service relationships, regulatory oversight and existing energy efficiency and low-income programs.⁸⁴ By giving the allowances solely to the utilities, it may advantage them over their competitors in both the wholesale market (generators) and retail market (non-utility LSEs). As IEP explains, “[t]he effect of allocating allowances directly to retail providers would be to unnecessarily increase costs to consumers; tilt the competitive level playing field between utilities (i.e., retail providers) and IPPs to the detriment of consumers; potentially requiring IPP generation to subsidize UOG; and undermine private sector investment in California generation.”⁸⁵

The rationale proposed for use of the auction revenues received by the utilities highlight the potential for competitive impact. PG&E proposes that the revenues be used for “*CEE programs, direct bill reduction for all customers and targeted rate relief and CEE for low income customers.*” In addition, the utilities could use these funds for “*utility procurement and development of carbon-free technologies.*”⁸⁶ Direct bill reductions and energy efficiency programs would benefit PG&E as a retail supplier over competing LSEs who do not receive an equal allocation. Investment in generation procurement and resource development likewise would benefit PG&E as a generation supplier over other non-utility generators.

The Staff Allocation Paper offers a marginal improvement on PG&E's approach, suggesting that auction revenues be allocated more equitably. Revenues would be allocated not only to utilities, but to “retail providers”⁸⁷ and load served by CHP generation.⁸⁸ While these modifications to PG&E's proposal, if adopted, would be absolutely necessary, they would create additional complication in the oversight of the use of funds.

⁸⁴ PG&E Opening Comments at 21.

⁸⁵ IEP Opening Comments, Attachment A at 12.

⁸⁶ *Id.*, at 24.

⁸⁷ Joint California Public Utilities Commission and California Energy Commission Staff Paper on Options for Allocation of GHG Allowances in the Electricity Sector (Staff Allocation Paper), at 39.

⁸⁸ *Id.*, at 16.

Even if a level playing field could be created for retail providers, PG&E would still have a material advantage relative to its competitors in the wholesale generation market. PG&E suggests that the proposed auction would “*create equal access to allowances for both utility owned and independent generation.*”⁸⁹ Equal access to allowances does not mean equal treatment for competing generators. Providing PG&E access to funds for resource development while not providing non-utility generators equal access can only be seen as discrimination. Non-utility generators, other than those mandated through the Renewable Portfolio Standards (RPS), already are strained to compete with utility acquisition or development of power plants. Adding yet another utility advantage over its competitors would continue to erode wholesale competition in serving the California market.

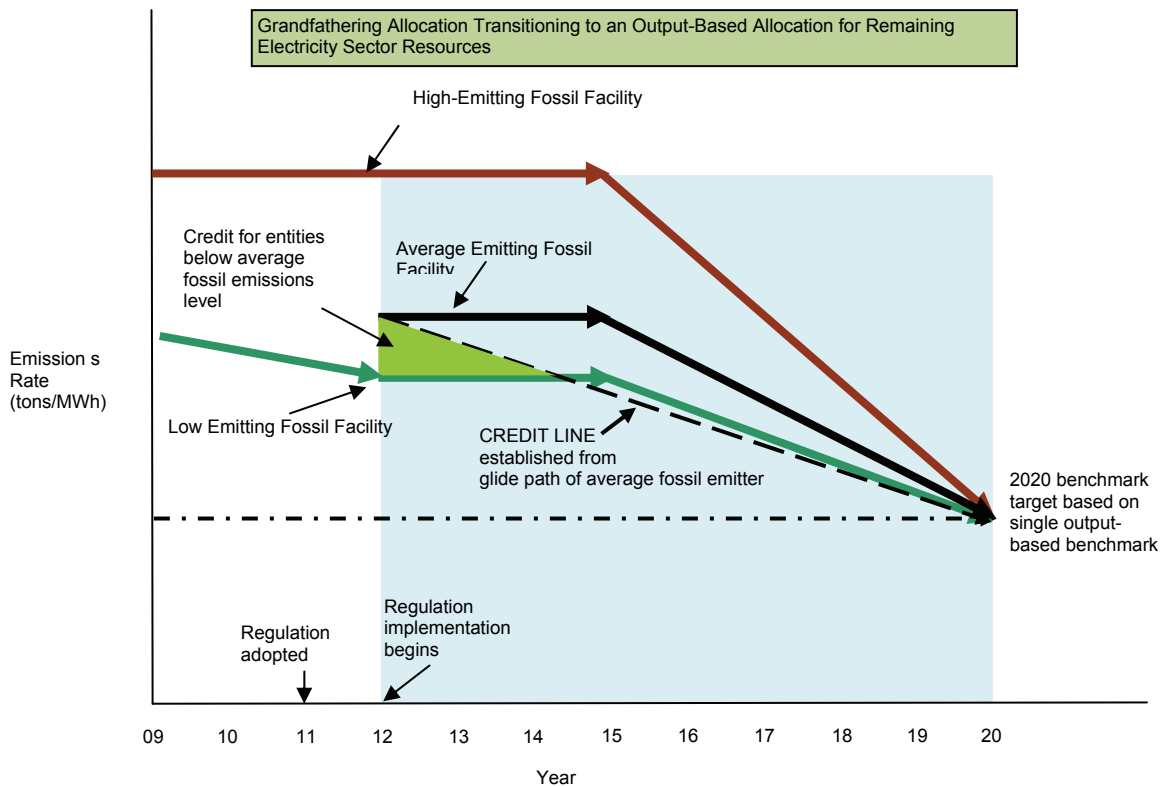
B. An Allocation Starting With Grandfathering And Transitioning To An Output-Based Allocation Could Reasonably Balance The Objectives Of Efficiency And Equity

As discussed above, the Commissions face a wide range of allowance allocation proposals from parties. The Commission could consider a hybrid allowance allocation method to balance the dual objectives of efficiency and equity.⁹⁰ The method would begin with a three-year period of allocation based on historic emissions (grandfathering). In addition, those resources with emissions less than the average fossil emitter should be given some credit for efficiency and early action, in the form of limited additional allowances. Following the three-year period, the allocation would transition to an output-based allocation (OBA) based on annual operational data of a modern CCGT.

The following diagram illustrates the hybrid allocation process.

⁸⁹ *Id.*, at 21.

⁹⁰ Despite the merits of the hybrid allocation method, it does not sufficiently accommodate the dual output and other unique circumstances of CHP. Treatment required to accommodate these resources is discussed in Section I.



The diagram demonstrates that all entities in the first three years will be entitled to an allocation based on historic emissions. New entrants would be entitled to allowances on the same basis. Those entities whose emissions fall below the average fossil emitter can additionally receive credit in an amount that will be determined by the glidepath of the average fossil emitter (see lime green triangle in diagram). This credit can be used to ease compliance in future years, in recognition of past investments to increase efficiency and decrease emissions (this assumes banking of allowances is permitted). Such an allocation of credits, during the transition period, would require additional allowances. The source of these allowances can be evaluated at a later date.

In developing this approach, a baseline period of no fewer than five years, drawn from a period of 2008 or earlier, would be used to determine the allocation. A five-year average will help ensure that, to some extent, the variability in hydro deliveries will be smoothed out. Likewise, a longer period will mitigate the effect a plant turn-around might have on the allocation if a single year were used. This period should be close to the start of the GHG trading program, but before the announcement of the program details to prevent gaming the system.

A hybrid allocation method could balance the objectives of efficiency and equity if properly designed. In the early years, the grandfathering approach would provide greater protection to existing investment and permit an orderly transition to lower emitting resources. It would also provide credit for the

cleanest fossil emitting resources in recognition of past investments that promote AB 32 objectives. This method would thereafter have a strong ratcheting effect on the most inefficient resources, ultimately landing at a highly efficient benchmark.

The use of a hybrid allocation method makes sense in the electricity sector for a number of reasons.

1. It balances the interests of equity and efficiency.
2. A hybrid is relatively simple when applied to electricity sector resources. With the exception of imports, a complication under any model, solid data should be available for a baseline calculation. Moreover, using a five year average for the baseline will help smooth out material fluctuations for hydro and plant turnarounds.
3. It recognizes those who acted early in enhancing efficiency.

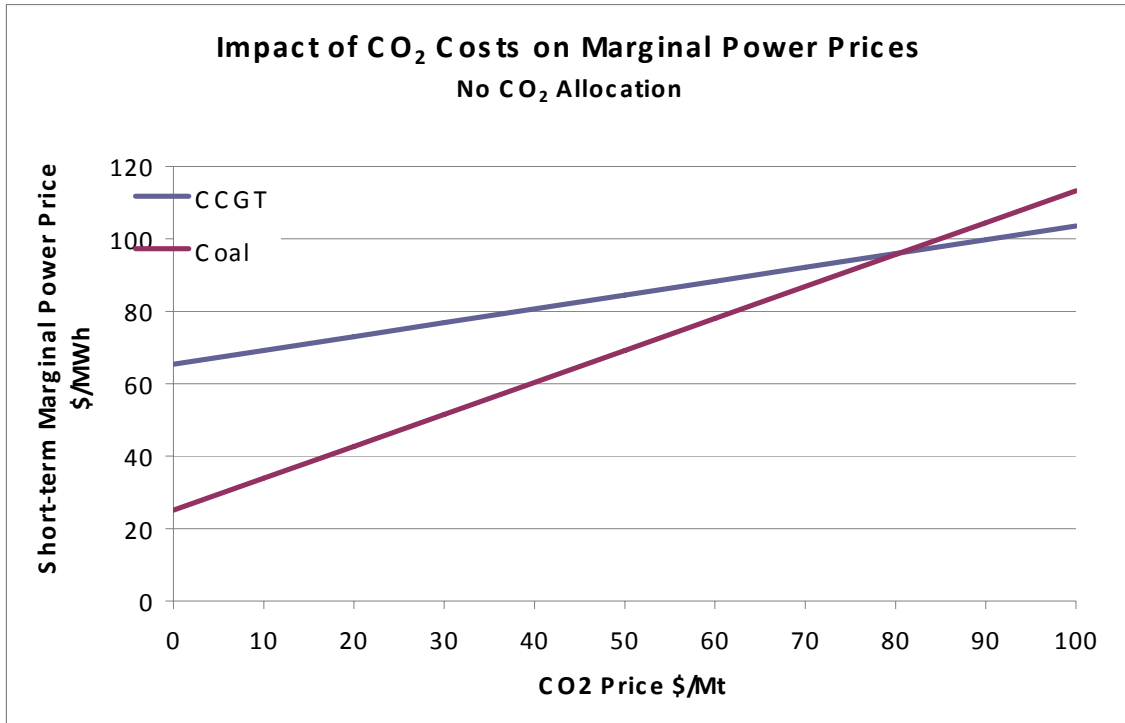
Employing the hybrid method for electricity sector resources, also mitigates the risks that arise with 100% auctioning as discussed in greater detail in Section II.A.2.

Recognizing that this method will provide an early protection to coal-fired generation, the Commissions must be clear about the implications of their policy choice. Even if the Commission were to start with an OBA approach, while the purchase of coal-fired resources may result in increased carbon costs, the total cost of this power will still fall below the cost of gas-fired generation. The fact is short-run marginal cost (SRMC) of energy produced by a coal plant, with carbon regulation, remains lower than the SRMC of energy produced by a natural gas plant. (This general conclusion is validated in presentations given by Gary Stern of SCE and Julie Fitch⁹¹ in the course of this proceeding.) Using assumptions taken from LADWP's Inter-Mountain plant and actual California border natural gas prices under three allocation scenarios, the following conclusions can be drawn:⁹²

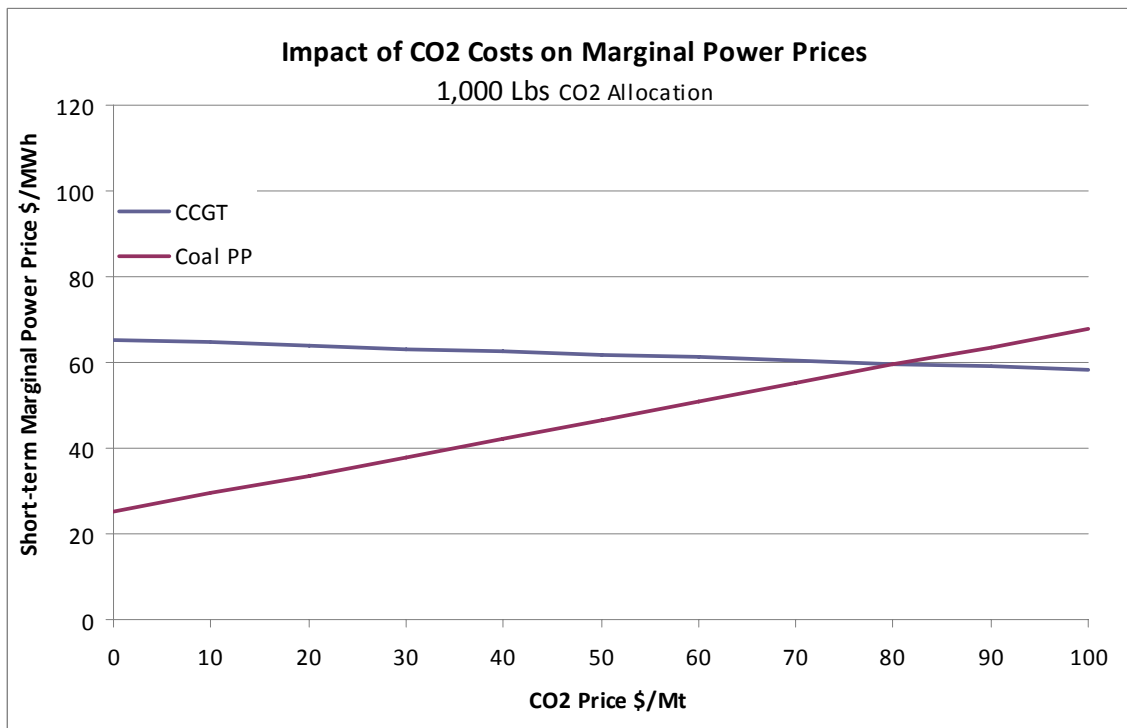
- Under a full auction scenario, the SRMC of coal generation remains below the SRMC of gas generation until the carbon price nears \$80/tCO₂e. This means that because of coal's lower fuel price, it is economical to switch from coal to natural gas only when the carbon allowance price exceeds \$80/ tCO₂e.

⁹¹ April 21 and 22, 2008 Presentation by Julie Fitch Entitled, Context, Principles, and Key Questions for Allowance Allocation in the Electricity Sector, at Slide 11 (presentation located at <http://www.cpuc.ca.gov/NR/rdonlyres/DB61BDAE-98DB-4B9F-892C-4008DC9F586D/0/Allocationprinciplesandkeyquestions.ppt>); SCE Chart Presented at August 21, 2007 Workshop, located at <ftp://ftp.cpuc.ca.gov/puc/energy/electric/climate+change/GaryStern.ppt>.

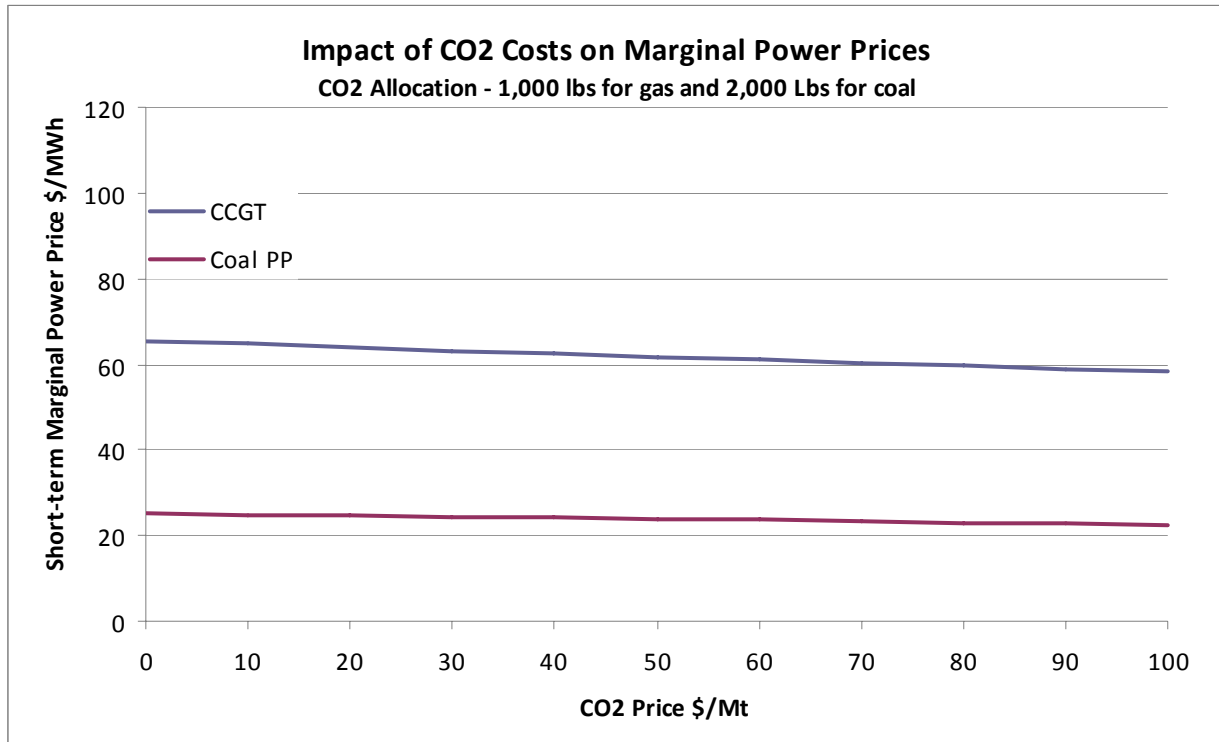
⁹² A spreadsheet identifying assumptions and output is attached as Appendix A to these comments.



- Under a scenario providing coal and gas generation an OBA allocation of 1,000 lbs per MWh, the coal once again remains below the gas SRMC until the carbon price reaches approximately \$80/tCO₂e.



- If a fuel-specific OBA allocation is used, under which allowances are allocated to coal generation on the basis of 2,000 lbs/MWh and gas generation on the basis of 1,000 lbs/MWh, the margin between the gas SRMC and the coal SRMC stays relatively fixed. Under this allocation method, it remains economical to purchase coal-fired power regardless of the carbon allowance price.



With these considerations in mind, following a short grandfathering period to ease the transition, there is little or no basis to continue to provide advantages to these higher emitting resources.

III. MODELING

While generally acknowledging the E3 model as a useful tool to evaluate GHG economics, PG&E and SCE observe that certain assumptions regarding CHP resources require modification. In particular:

- PG&E recommends the CEC's base case to be used in the model's aggressive policy reference case on the basis that new CHP additions through 2020 are likely to be no higher than 393 MW of large CHP; and
- SCE recommends that CHP assumptions reflect marginal compliance with PURPA efficiency standards.

These comments are discussed below.

A. PG&E's Recommendation To Use The CEC's Base Case To Estimate CHP Growth In 2020 Under An Aggressive Policy Reference Case Must Be Rejected

PG&E states that "*E3 has assumed CHP penetration in the Aggressive Case that may not be realistic given the number of available sites where large CHP potential still exists.*"⁹³ This statement comes with no documented support or analysis. This subjective preference must be rejected.

E3's selection of the moderate market access scenario is reasonable, albeit conservative. The goal of the E3 model is to evaluate tools that can generate emission reductions and evaluate the relative costs of using these tools. To evaluate the utility and cost of CHP deployment, the E3 model uses the moderate market access scenario in its aggressive policy reference case. E3's reliance on the moderate market access scenario is supported by the CEC's Assessment of the CHP Market Potential report – the only report that exists which has evaluated the CHP potential in California. As noted in EPUC/CAC's opening comments, while this scenario does not reflect the full growth potential of CHP in California, it is a reasonable choice. What is unrealistic, given CHP's contribution to emissions reductions, is to limit the evaluation of the model to the addition of 343 MW of large CHP through the year 2020. Unless PG&E can affirmatively demonstrate that the development of large CHP is limited to 343 MW through the year 2020, therefore, the Commission must dismiss this argument.

⁹³ PG&E's opening comments, at 117.

B. SCE's Recommendation To Modify Actual CHP Input Data To Reflect Its Belief That CHP Only Marginally Satisfies Efficiency Standards Must Be Rejected

SCE asserts that the CHP data used in the model should be modified to reflect only marginal compliance with PURPA efficiency standards.⁹⁴ Such a modification should be rejected. The E3 model relies upon CHP data in the EIA database. This data reflects reported operational data. To replace it due to SCE's belief that CHP only marginally comply with efficiency standards is inappropriate. As a preliminary matter, as EPUC/CAC pointed out during a conference call with E3 (a call on which SCE participated), the EIA data reflected some obvious reporting errors. As a result, the use of a "screen" to remove those projects reporting suspect data could have been used to improve the quality of the data. Had E3 followed the EPUC/CAC recommendation, the overall CHP efficiencies calculated from the EIA data would have more closely reflected that of SCE's 2003 QF Monitoring data. With the screen, the adjusted EIA data would have reflected LHV efficiencies of about 73% which is dramatically higher (i.e., better) than the PURPA efficiency standards. This is consistent with data from SCE's own QF monitoring data, which, as demonstrated below, reveals that CHP projects of different sizes and applications exhibit efficiencies significantly better than the PURPA efficiency standards.

Illustration of Efficiency for Diverse CHP Sizes and Applications

<u>Line</u>	<u>DESCRIPTION</u>	<u>Sample CHP Data</u> ⁹⁶
	CHP Data From SCE QF Monitoring Reports ⁹⁵	
1	Electricity Produced (kWh)	11,823,047,349
2	Electricity Produced and Used (kWh)	2,065,339,808
3	Electricity Exported (kWh)	9,757,707,541
4	Thermal Output (MMBtu)	62,079,110
5	Fuel Used HHV (MMBtu)	145,231,861
6	Overall Efficiency (LHV)	78%

⁹⁴ SCE Opening Comments, at 46-47 (*"The assumptions used by E3 for existing CHP under a PURPA contract should be changed to reflect a topping cycle cogeneration facility that obeys the QF Rules. . . . These operating characteristic changes are necessary to make the model reflect that most installed CHP operates no better than what is required by applicable rules."*).

⁹⁵ This is an aggregate of individual CHP data inappropriately released by SCE in CEC IEPR 2007 Proceeding.

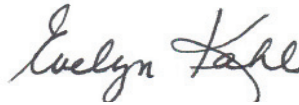
⁹⁶ Sample of 21 diverse CHP Projects: 3 Refinery; 2 Municipal; 4 EOR; 8 High School; 2 Medical/Hospital; 1 Chemical; 1 Tennis Club. Projects range in size from less than a kW to over 300 MW.

SCE notes that its “*conservative recommendation is based upon thousands of unit-years of operating and efficiency data collected under the QFEM program. This program has collected data on SCE’s PURPA contracts since 1988.*”⁹⁷ As demonstrated above, SCE’s own data demonstrates that many CHP facilities have efficiencies dramatically higher than required of PURPA. In short, SCE has not provided any data to support their contention that CHP operate “*no better than what is required by applicable rules.*”⁹⁸ Under the circumstances, therefore, no changes to CHP data are warranted.

IV. CONCLUSION

EPUC/CAC respectfully urge the Commissions to consider the issues raised in these reply comments in addition to the opening comments in developing its recommendations to CARB.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Evelyn Kahl". The signature is fluid and cursive, with the first name "Evelyn" written in a larger, more prominent script than the last name "Kahl".

Evelyn Kahl
Michael Alcantar

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

⁹⁷ SCE Opening Comments, at 47.

⁹⁸ *Id.*

ALLOCATION PROPOSAL

Appendix A

Assumptions

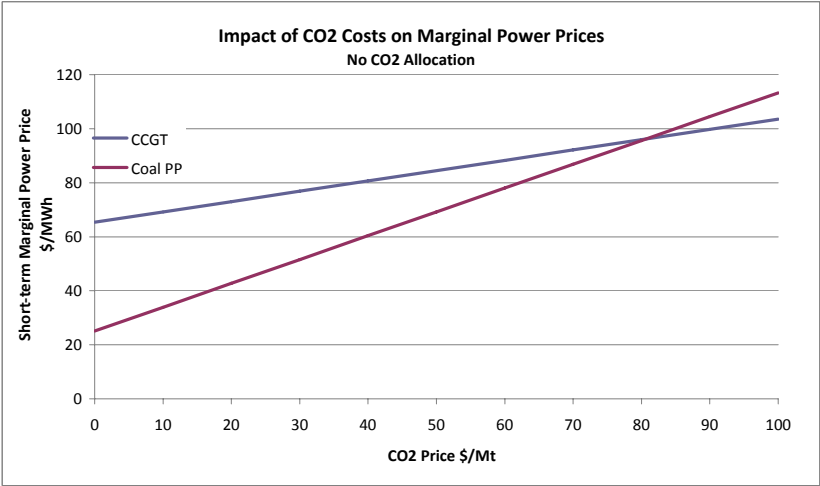
Coal Price	1.66 \$/Mbtu (HHV)	Inter-Mountain Avg 2007 coal price
Gas Price	8.67 \$/Mbtu (HHV)	May 30, 2008 Cal-border gas price +\$0.30 / MBTU Transportation
CCGT	7.200 Mbtu / Mwh (HHV)	
Coal PP	9.491 Mbtu / Mwh (HHV)	Inter-Mountain Avg 2007 heat rate
Coal O&M	9.310 \$/MWh	Inter-Mountain Avg 2007 variable operating costs
Gas O&M	3.000 \$/MWh	
CO2 in Gas	117.000 Lbs / MBTU (HHV)	
CO2 in Coal	205.000 Lbs / MBTU (HHV)	

Short-run marginal cost - no CO2

CCGT	65.39 \$/MWh
Coal PP	25.07 \$/MWh

Short-run marginal cost - with CO2 \$/MWh (No CO2 Allocation)

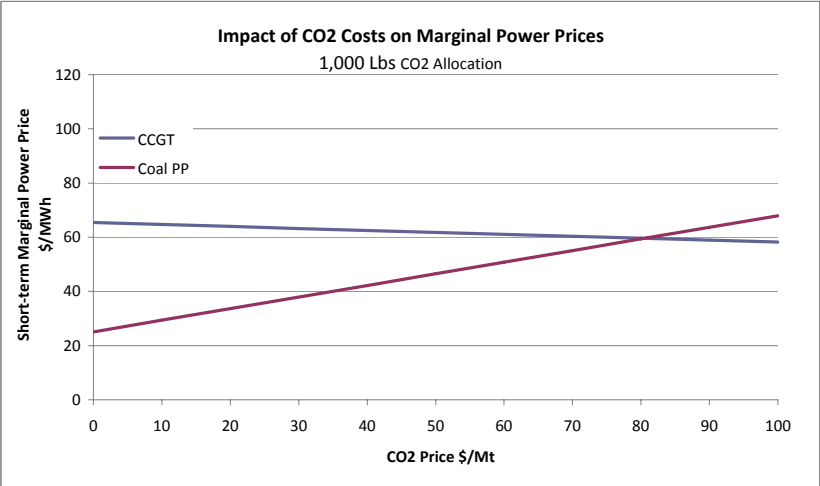
CO2 Price \$/Mt	0	10	20	30	40	50	60	70	80
CCGT	65.39	69.21	73.03	76.85	80.67	84.49	88.31	92.13	95.95
Coal PP	25.07	33.89	42.71	51.54	60.36	69.18	78.01	86.83	95.66



Short-run marginal cost - with CO2 \$/MWh (1,000 Lbs / MWh CO2 Allocation)

1,000

CO2 Price \$/Mt	0	10	20	30	40	50	60	70	80
CCGT	65.39	64.67	63.96	63.24	62.53	61.81	61.10	60.38	59.67
Coal PP	25.07	29.35	33.64	37.93	42.22	46.51	50.80	55.09	59.37



Short-run marginal cost - with CO2 \$/MWh (1KLbs & 2KLbs / MWh CO2 Allocation)

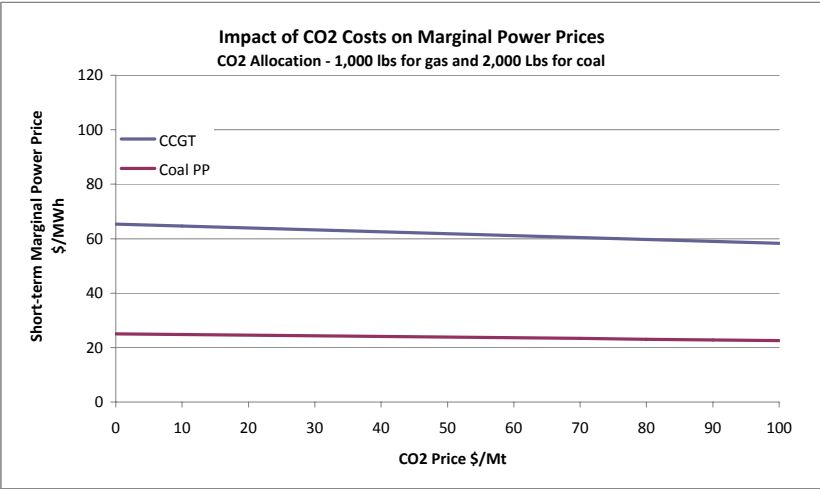
Gas

1,000

Coal

2,000

CO2 Price \$/Mt	0	10	20	30	40	50	60	70	80
CCGT	65.39	64.67	63.96	63.24	62.53	61.81	61.10	60.38	59.67
Coal PP	25.07	24.82	24.57	24.33	24.08	23.83	23.59	23.34	23.09



APPENDIX B

Errata to Opening Comments

Page 3:

Auction. The lawfulness of an allowance auction remains untested and should be determined within the scope of the broader, multi-sector program. To the extent that an auction is lawful and California's regulators mandate an auction for the electricity sector, the percentage of auction should be phased in at a measured pace to avoid industry disruption and supply constraints. All available allowances would be allocated administratively ~~using the modified OBA~~ for 2012-13. In each of the subsequent two years, allowances would be allocated administratively, with a minimal amount of allowances distributed by auction. At the conclusion of this two-year trial auction, regulators should determine whether and to what extent an increased auction percentage is warranted.

Page 33:

Beyond the broad scope of regulatory price control, other measures can be used to mitigate the potential for windfall profits. ~~As discussed in Section III.A, the use of a modified output-based allocation, which would allocate allowances to generators based on the lower of their actual or an average emissions benchmark, would provide a degree of mitigation for price increases and windfall profits.~~ Further mitigation could be achieved using some form of updating or true-up annually, to limit the potential for excess allowances being provided.

Page 35:

The Staff Paper rightly recommends that program alternatives provide for the set-aside of allowances to accommodate new entry into the generation market. Any amount of reserve proposed today would be arbitrary. Instead, the reserve should be sized sufficiently to accommodate new generation needs, taking into account load growth, anticipated plant retirements and increased efficiency from repowering. ~~The average OBA, as proposed in these comments, should naturally result in an excess of allowances above allocation, which could be used as a foundation in the new entrant reserve.~~ Combined heat and power and biomass generation, along with other low-carbon resources, should be given priority in the new entrant reserve to recognize the carbon reduction benefits of these technologies.

Page 44:

1. The degree to which utility portfolio carbon costs flow, ~~if at all~~, to industrial and other consumers through utility rates is a highly complex and uncertain question. The answer will depend upon market design, allocation methodologies and the efficiency with which the market translates the carbon price signal. Moreover, flowing auction revenues back through utility rates, without providing a similar benefit to CHP, would amplify this problem.

Page 52:

~~As noted above in the discussion of general allocation methodologies for the electricity sector,~~ an OBA can be developed using an average fossil generation factor. For illustrative purposes, a value of .48 tCO_{2e} per MWh can be used for the electrical reference; a reasonable thermal benchmark would be .066313 MtCO_{2e} per MMBtu. A double benchmark for CHP, against which actual emissions would be compared, could be employed using this average fossil value:

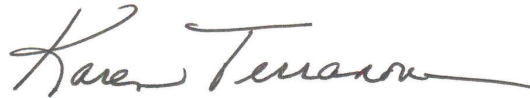
Page 70:

As a general proposition, longer compliance periods offer greater flexibility and certainty to regulated entities, enabling better capital planning. Consequently, compliance periods should gradually increase in duration. EPUC/CAC recommend that the program initially have two compliance periods. A two-year “learn by doing” compliance period, with no auction, will provide an opportunity for regulated parties to gain experience with the regulations while bringing little risk to the market. Thereafter, the interests of certainty are best served by a 6 year compliance period, ~~with graduating auction percentages reaching 60% by 2020.~~

CERTIFICATE OF SERVICE

I, Karen Terranova hereby certify that I have on this date caused the attached **Reply Comments of the Energy Producers & Users Coalition and the Cogeneration Association Of California** 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 June 16, 2008, at San Francisco, California.

A handwritten signature in dark ink, appearing to read "Karen Terranova", with a long horizontal flourish extending to the right.

Karen Terranova