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Kevin Kennedy
Assistant Executive Officer
Office of Climate Change
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Cap-and-Trade and Reporting Regulations for CHP

Dear Mr. Kennedy,

At the September 9,' 2009 combined heat and power (CHP) workshop, CARB Staff presented options for CHP regulation in a cap-and-trade (C&T) market. It solicited feedback on these options and requested recommendations for alternative approaches. In addition, Staff requested proposals for modification of existing CHP greenhouse gas (GHG) reporting protocols to conform to C&T recommendations. The Western States Petroleum Association, the Energy Producers and Users Coalition[1] and the Cogeneration Association of California[2] (WSPA/EPUC/CAC) provide in these comments recommendations on both issues.

Two primary goals should be set by CARB in designing the CHP regulations. First, and most importantly, the regulations should encourage CHP development to enable achievement of the Scoping Plan CHP goals. While WSPA/EPUC/CAC favor a regulation that provides active incentives to CHP development, CARB should at a minimum ensure that the regulations do not place CHP at a disadvantage relative to the separate heat and power (SHP) alternative. Second, the regulations should provide administrative simplicity for both the CHP facility and CARB. Administrative simplicity will also mitigate the risk of overlapping or duplicative regulation of CHP emissions.

[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 LL, ConocoPhillips Company, ExxonMobil Power and Gas Services Inc., Shell Oil Products US, THUMS Long Beach Company, and Occidental Elk Hills, Inc.., ConocoPhillips Company, Shell Oil Products US, THUMS Long Beach Company, and Occidental Elk Hills, Inc.

[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

These comments recommend CHP C&T regulatory options and corresponding reporting protocols that would encourage or, at a minimum, avoid discouraging CHP operation and development. An executive summary of WSPA/EPUC/CAC's allowance distribution recommendations is attached at Appendix A. Briefly, however, WSPA/EPUC/CAC's Preferred Option contemplates a separate CHP sector, which focuses on a facility's total emissions; this approach avoids the need to artificially allocate emissions between thermal and electricity products and ensures that a CHP owner will not face different regulations for each of its outputs. If CARB chooses not to establish a CHP sector, it could use the CPUC/CEC electricity sector recommendations in D.08-10-037 as a foundation for the Alternative Option discussed in these comments. While this approach would not promote CHP, it could mitigate the creation of further CHP barriers and disincentives. Reliance on the Alternative Option, however, requires CARB to resolve several open issues to provide sufficient regulatory certainty to ensure investment in new CHP will take place. Most importantly, if CARB adopts the CPUC/CEC proposed revenue recycling for retail providers to mitigate rates or support AB 32 compliance, CHP serving retail load should similarly benefit.

These comments also provide additional information to help clarify certain issues raised in CARB's September 9, 2009 presentation.

CARB C&T CHP Allowance Distribution Scheme Should Facilitate Achievement of Scoping Plan Targets

CARB's goal with C&T CHP allowance distribution should be to ensure the regulatory infrastructure it establishes will promote the addition of new CHP to meet its Scoping Plan Target of 6.7 $MMTCO_2e$ in reductions. To achieve this target, CARB must as a preliminary matter avoid the creation of disincentives. Preferably, however, it should consider how to use the cap-and-trade allowance distribution to encourage the investment required to secure these resources. In addition, CARB's adopted methodology should simplify AB 32 compliance, benefitting both the agency and the CHP facility. A single-sector approach thus would be preferable to an approach that bifurcates (or, worse yet, trifurcates) a CHP plant into multiple regulatory pieces.

C&T Regulation of CHP

To ensure that a CHP C&T allocation scheme does not create disincentives to CHP investment and to promote simplicity, CARB must consider in which sector(s) CHP should be regulated. WSPA/EPUC/CAC recommend that CHP be treated as a separate sector for purposes of allowance allocation and tracking. While the CPUC did not recommend a separate CHP sector, the discussion below highlights its simplicity. In addition, CARB must determine an appropriate allocation scheme. WSPA/EPUC/CAC recommend an administrative allocation of allowances to CHP facilities using a SHP "double benchmark."

CHP Sector Classification

To promote simplicity and preclude CHP disincentives, CARB should create a separate CHP sector. As illustrated by the discussion below, the creation of a separate CHP sector would best ensure simplicity and promotion of CHP. A separate CHP sector would allow a focus on total emissions and completely avoid the imprecise allocation methodologies that are required when emissions must be split based on use (export vs. on-site) or type (electric vs. thermal output). A separate sector would also most effectively recognize the primary energy savings (PES) generated by CHP. Finally, the regulations would be much easier to develop.

If CARB chooses not to create a separate CHP sector, it should rely on the CPUC/CEC's recommendations as a starting point. In the CPUC/CEC's final decision on GHG regulatory strategies, the CPUC/CEC recommended two types of treatment for CHP depending on whether MW generated were delivered to the grid or used to serve on-site load. It also recommends that CHP thermal emissions be addressed by industrial sector regulations.

Allowance Distribution Proposals

Allowance distribution proposals will depend in part on CARB's determination whether to create a separate sector or to fragment the regulation of CHP outputs. The following discussion presents Preferred and Alternative Options for allowance allocation, which are based respectively on the single CHP sector proposal and the CPUC/CEC recommendations. For each option, the comments present an allocation scheme for (1) topping cycle (TC) CHP, (2) bottoming cycle (BC) CHP not engaged in supplemental firing and (3) BC engaged in supplemental firing. Note that these recommendations assume the administrative allocation of allowances by CARB to CHP facilities, rather than auction.

Preferred Option: Separate CHP Sector + Administrative Allocation Using Separate Heat and Power "Double Benchmark"

(a) Treatment of Topping Cycle CHP in a CHP Sector

Within a CHP sector, CARB could allocate allowances to a TC CHP on the basis of a SHP double-benchmark. The use of a double benchmark would create an explicit incentive to retain and develop CHP resources.

Double benchmarking, in general, contemplates a comparison of a topping cycle CHP plant's actual emissions to the emissions that would have resulted had the same amount of electric and thermal energy been produced using separate electric and heat production facilities. To derive the double benchmark, a plant's electric output is multiplied by an electric reference emissions rate, and the plant's thermal output is multiplied by a thermal reference emissions rate. Once the benchmark is calculated, it is compared with the plant's actual emissions for the same quantity of thermal and

electric energy. To the extent the plant's actual emissions are less than the double benchmark emissions, a CHP has produced PES equal to the difference in emissions.

If 100% of allowances were allocated administratively, a topping cycle CHP would receive allowances to cover the following quantity of emissions:

Total Double Benchmarking Emissions =

Electric reference emissions rate (in $MTCO_2e/MWh$)	x	electric output (in MWh)
	+	
Thermal reference emissions rate (in $MTCO_2e/MMBtu$)	x	thermal output (in MMBtu)

If, for example, 95% of allowances were allocated administratively, a topping cycle CHP would receive allowances to cover 95% of the total calculated using the formula illustrated above.

Depending on the relationship between a CHP facility efficiency and the electricity reference, a 95% allocation could cover more or less than 95% of a CHP facility's emissions. The more efficient a facility is, the more likely the administrative allocation is to cover the facility's emissions.

By allocating allowances to a CHP plant using a double benchmark, the plant receives an incentive to install or continue operating an efficient CHP resource because it will receive allowances for its PES. The PES is the difference between the emissions that would have been generated through SHP and the emissions that are generated through CHP:

PES = (Avoided SHP Emissions) – (Actual CHP Emissions)

As noted above, the PES reflects an equivalent amount of GHG reduction.

A variety of approaches, particularly in the determination of the electric reference, can be taken in crafting the benchmark. 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. The thermal reference varies less, but can be influenced slightly by design elections. Approaches that can be used in a 100% administrative allocation are discussed below.

(i) Average Fossil Generation Benchmarking is Appropriate for the Electric Reference

The statewide average fossil generation rate should be used as the SHP electric reference. Although CHP will generally displace the oldest and least efficient marginal generators on the system today, the selection of an emissions rate for a marginal generator for allowance allocation is a contentious issue. For this reason, WSPA/EPUC/CAC recommend the use of an average fossil emissions rate to resolve this debate.

Using this approach, which could be applied on a statewide or utility-specific basis, would provide CHP allowances for electric output equal to the emissions that would have occurred if the same amount of electricity was produced by the "average fossil generator." CARB can derive the average fossil emissions rate using its own 2006 emissions data.[3] Using CARB's 2006 data, the average fossil emissions rate of power used to serve California load is 0.5085 $MtCO_2e/MWh$. This number can be derived by taking the total electric sector $MTCO_2e$ emitted by in-state resources, adding emissions from imported electricity from CARB's GHG Inventory for 2006 and then dividing this sum by the total fossil MWh taken from the CEC's data.[4] Thus the allowance allocation for CHP's electrical emissions would be calculated using the following formula:

$$(.5085\ MtCO_2e/MWh \times MWh\ Output_E)$$

This allocation scheme will cover some or all of a CHP facility's actual emissions depending on the plant's actual efficiency. The allocation would cover a greater share of actual emissions for a more efficient CHP and a smaller share of actual emissions for a less efficient CHP. Note this method does not make any adjustment for the avoidance of grid losses. If grid losses are accounted for at the rate of 4%

An alternative electric reference would be the electricity reference used in the California Energy Commission's draft AB 1613 guidelines. Eligibility for the small CHP program is based on a minimum efficiency of 8,358 Btu/kWh heat rate on an HHV (high heating value) basis, which equates to 978 lbs CO2e/Mwh or 0.4435 Mt CO2e/Mwh.[5]

(ii) 80% HHV Efficiency Is Appropriate for the Thermal Reference

A widely accepted thermal benchmark would be the emissions associated with a 80% HHV efficiency boiler. This is the default thermal efficiency value used in CARB's current reporting regulations and fairly represents the efficiency of existing industrial-

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[3] [reference]

[4] The MWh data was taken from the CEC's electric generation total production data from 1997-2008.

[5] Some have argued that the electric reference should be based on a CCGT (combined cycle gas turbine) emissions rate. Should CARB decide to base its electric reference on a CCGT, it must consider whether it is applicable for all vintages of CHP. For example, a vintaged CCGT value could be used for existing CHP and a more current value for new CHP. Importantly, however, any reference must ensure that the emissions rate is based on *existing* operational data, rather than *assumptions* of future CCGT efficiencies.

scale boilers. To calculate the emissions rate associated with this thermal reference, one would undertake the following calculations:

1MMBtu Thermal Output ÷ 0.80 x 05305 $MtCO_2e$/MMBtu = 0.066313 Mt/MMBtu

Accordingly, the allocation of allowances for thermal emissions would be done using the following calculation:

(.066 Mt/MMBtu x MMBtu $Output_T$)

This quantity of emissions would then be added to the emissions calculated using the electric reference in section (i) for a total allowance allocation to the CHP facility.

(b) Treatment of Bottoming Cycle CHP in a CHP Sector

Treatment of bottoming cycle CHP in a CHP sector would vary depending on whether the facility is engaged in supplemental firing. If it is not engaged in supplemental firing, the facility relies solely on waste heat to generate electricity and does not add incremental fuel to the process. Accordingly, the bottoming cycle CHP generates no incremental emissions by generating electricity.[6] Thus, it is a non-emitter and would not receive an allocation of allowances for electricity generated similar to a renewable resource.

A bottoming cycle CHP engaged in supplemental firing is a net emitter and should receive allowances based on the MWh associated with supplemental firing. CARB should allocate allowances for each MWh associated with supplemental firing. CARB can calculate the number of MWh that should be attributed to supplemental firing as follows:

Step One: Create a ratio of supplemental fuel to total fuel (used in the industrial process).

$$\text{Ratio of Fuel} = \frac{\text{Supplemental Fuel (in MMBtu)}}{\text{Total Fuel used in Industrial Process + Supplemental Fuel (in MMBtu)}}$$

For example, a petroleum coke calciner would have 3 fuel inputs: gas into the kiln, feedstock into the kiln and supplemental fuel. To create the ratio, divide the supplemental fuel by the sum of the gas and feedstock going into the kiln.

Step Two: Multiply the ratio by the total number of MWh generated.

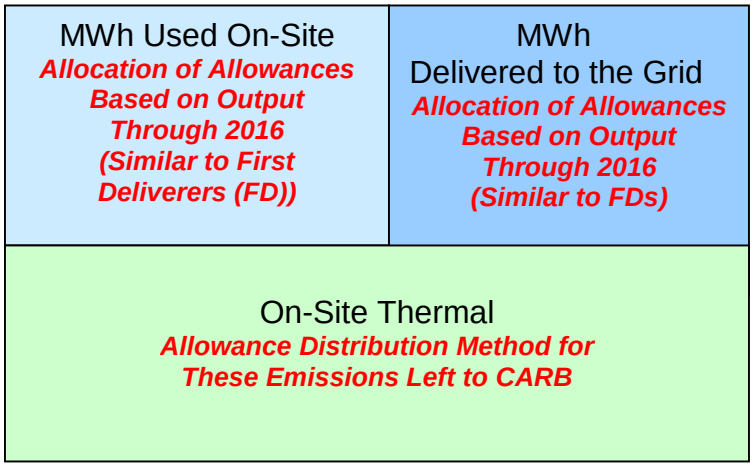
[6] CARB's current mandatory reporting regulations mistakenly attribute some emissions to the BC facility's electricity output. In Section III, these comments propose changes to the mandatory reporting regulations for CHP to fix this problem. The changes to the BC facility reporting regulations are consistent with recent findings made by the CPUC in Decision 09-06-051.

MWh associated with Supplemental Firing= (Ratio of Fuel) x (total MWh generated by BC facility)

***Alternative Option*: Bifurcated Allocation Under Electricity and Industrial Sector Schemes**

The CPUC/CEC recommendations provide guidance on a CHP's electricity emissions. In particular, they propose to separate treatment of CHP electric and thermal emissions to ensure treatment of CHP's electricity emissions on par with other electricity entities and treatment of CHP thermal emissions similar to industrial sector entities. The CPUC/CEC recommendations further delineate treatment of CHP electricity emissions depending on whether electricity is supplied to the grid or used to serve on-site load.

The following diagram illustrates the different treatment for CHP emissions contemplated by the CPUC/CEC recommendations. As revealed in the diagram, the CPUC/CEC program design reserves recommendations for the treatment of thermal emissions to the discretion of CARB.



In addition, for on-site electrical use, CHP generators would receive a share of allowances for the benefit of their load in the same way other retail providers would receive to offset the cost of compliance or other AB 32 purposes.

The CPUC/CEC recommended treatment of CHP emissions is discussed in more detail below.

(a) Treatment of Topping Cycle CHP MW Delivered to the Grid

The CPUC/CEC recommends that CHP MWs delivered to the grid be treated similar to other electric generators. Accordingly, the MWh delivered to the grid would be subject

to the same regulatory treatment as first deliverers (FD). Similar to FDs, CHP would get an allocation of allowances based on MWh delivered to the grid through 2016.[7] The allocation would be output based, dividing the electricity sector allowances pro rata based on MWh delivered to California end-users.

The CPUC/CEC have recommended that the output-based allocation be differentiated by fuel type to prevent a "rate shock" to customers served by utilities with more highly emitting resources. The fuel differentiation would be gradually eliminated as the number of administratively allocated allowances declines, providing for a gradual transition for more carbon intensive utilities. Roughly speaking, a coal plant would receive twice the number of allowances per MWh that a gas-fired plant would receive. If a fuel-differentiated allocation is adopted, as the CPUC/CEC proposed, a CHP facility's allocation will additionally depend on the fuel that is combusted to generate electricity.

(b) Treatment of Topping Cycle CHP MW Used to Serve On-Site Load

The CPUC/CEC recommend that CHP MWs used to serve on-site or "over the fence" load receive an allowance allocation in the same manner other electricity generators will receive them: on the basis of output. In addition, the CPUC/CEC contemplate that, when an auction comes into play, CHP generators will receive an allocation of allowances for the benefit of their load in a manner similar to other retail providers. The allowances must be sold in the auction, however, leaving the retail provider with revenues from the auction. If CARB builds its allowance allocation program on the CPUC/CEC recommendations, implementing this portion of the decision is critical to CHP. If customers served by RPs (retail providers) receive the benefit of revenues to reduce their rates or comply with AB 32 and customers served by CHP do not, it creates a significant disincentive to retain existing or install new CHP

In 2012, RPs including CHP would share the revenues associated with 20% of the allowances provided to the electricity sector. By 2016, RPs and CHP would share the revenues associated with 100% of the allowances auctioned in the electricity sector. While all generators will get a decreasing share of administratively allocated allowances, the loads they serve will get the benefit of an increasing share of auction revenues over time.

Like other RPs, CHP serving on-site or over-the-fence load, will receive ownership of an increasing amount of allowances, which it will increasingly need to commit to auction. The CPUC/CEC recommendations propose that retail providers initially receive auction

[7] The CPUC recommends starting with an administrative allocation of 80% of allowances in 2012 and auctioning the remaining 20%. Each year the percentage of allowances administratively allocated will decrease by 20% while the amount auctioned will proportionately increase. By 2016, the CPUC/CEC recommend that 100% of allowances be distributed through the auction. The CPUC/CEC also make recommendations about the allocation of allowances to the electricity sector. The merits of these recommendations are not addressed in this set of comments.

revenues on the basis of historic emissions. It recommends that auction revenues eventually be distributed on the basis of retail sales. The decision does not clarify how the auction revenue mechanism will transition from historic emissions to retail sales, but impliedly eliminates fuel-based differentiation in allowance allocation by 2016.

The final decision clarifies that CHP facilities can use auction revenue in a manner that comports with AB 32. This includes using the resulting revenues to offset CHP compliance obligations. The CPUC/CEC decision notes that CARB may require CHP facilities to report on their use of auction revenues.

(c) Treatment of Topping Cycle CHP Thermal Emissions

The CPUC/CEC refrains from making recommendations for the treatment of CHP thermal emissions noting that "*CARB would attribute those emissions to industrial or commercial sector as appropriate*." The CPUC/CEC recommendations suggest that CHP thermal emissions should be treated in a manner that comports with treatment of other industrial sector emissions. Clarifying treatment of CHP thermal emissions will provide the regulatory certainty required to further investment.

(d) Treatment of Bottoming Cycle CHP Emissions

The CPUC/CEC recommends that BC facilities that are not engaged in supplemental firing receive no allowance allocation. Where a BC facility engages in supplemental firing, it acknowledges that an allocation would be required. However, it defers consideration of this issue to a future rulemaking.

2. CARB Must Address Issues Not Resolved in the CPUC/CEC Recommendations

The CPUC/CEC recommendations provide guidance on the overall regulatory scheme for the electricity sector but leaves important issues unanswered. First, the CPUC/CEC recommend a fuel-differentiated output-based allocation scheme but do not clarify the details of the allocation. Accordingly, it is not clear from the decision how allocations would initially be provided to coal and natural gas generation. Second, the CPUC/CEC decision does not clarify how allowances would be allocated to new CHP serving on-site load. The decision indicates that the retail allocation would initially take place on the basis of historic emissions, but a new CHP facility would have no historic emissions. Third, the decision does not clarify how allowances would be allocated to a bottoming cycle facility. Finally, the CPUC/CEC recommendations do not establish a new entrant reserve that would ensure new more efficient generation (including CHP) would have the incentive to come online. CARB's regulations must address these issues to provide regulatory certainty and further its emission reduction goals.

(a) Reliance on Fuel-Differentiated Output-Based Allocation Will Impact Incentives

CARB's reliance on a single output based allocation, one undifferentiated by fuel, would best promote the objectives of AB 32. Use of a fuel-differentiated output-based allocation scheme would initially reward those generating units that rely on higher emitting fuels. In contrast, under a single-output-based allocation scheme, all MWh of fossil-fired electricity delivered to the grid would be treated equally and thus would receive the same allocation of allowances.

If CARB chooses to consider a fuel-differentiated output-based allocation scheme, those generators relying on higher emitting fuel would receive a larger proportion of allowances. This would leave the generators who invested in technologies utilizing cleaner fuels with fewer allowances. Relying solely on emissions factors, some have suggested that an appropriate coal:gas fuel-differentiated output-based allocation ratio be 2:1. However, if the goal of using such an allocation scheme is to force generators to transition to a market that considers carbon content, it should not supply allowance allocations that cover all of a coal-fired generator's allowances. As a compromise, CARB should consider the use of a coal/natural gas ration of less than 2:1. While this is not entirely consistent with the objectives of AB 32, this would make more allowances available to cleaner natural gas-fired generation and thus send the right market signal to all electricity generators.

(b) CARB Regulations Must Clarify the Allocation Policy for New CHP

The CPUC/CEC recommendations acknowledge that some provision for new retail providers will be required:

> *Allowance distributions based on historical emissions of retail providers, or historical emissions of deliverers, would place new retail providers or new deliverers, respectively, at a competitive disadvantage unless appropriate set-asides were established for them.*[8]

However, the CPUC/CEC recommendations do not clarify how auction revenue would be allocated to new CHP serving on-site load. They also do not state how the auction revenue allocation will transition from a historic emissions basis to one based on retail sales. Finally, the recommendations also do not establish a new entrant reserve. These issues require resolution to provide the regulatory certainty necessary to promote investment in new and repowered CHP.

The CPUC/CEC recommendations propose to initially allocate RP auction revenues on the basis of historic emissions. To ensure that new CHP generators are not disadvantaged by this policy, new CHP facilities should receive a share of allowances

[8] D.08-10-037, at 201.

based on facility-specific forecast emissions. Forecast emissions would be based on the anticipated total efficiency of the new CHP. The regulations must also clarify how the allocation of auction revenue will transition from a historic emissions basis to a retail sales basis.

CARB should also establish a new entrant reserve for new generation that takes into account generation needs associated with load growth, anticipated plant retirements, and increased efficiency from repowering. Consistent with the goals of AB 32, low-carbon generation, including CHP, should be given priority in a new entrant reserve to recognize their efficient fuel use and carbon reduction benefits.

(c) Allocation of Allowances to Bottoming Cycle CHP

The CPUC/CEC recommendations do not clarify how allocations would be made to a bottoming cycle CHP facility engaged in supplemental firing. Bottoming cycle facilities not engaged in supplemental firing generate no additional emissions in the process of generating electricity. As a non-emitter, it makes sense not to provide an allocation of allowances to those facilities. Bottoming cycle facilities that are engaged in supplemental firing, however, do generate incremental emissions. These facilities should receive an allocation of allowances as discussed in Section II(B)(1)(b).

Importantly, the allowance allocation recommendations are made under the assumption that no emissions are attributed to BC electricity output unless a facility engages in supplemental firing. Existing reporting requirements for BC CHP thus would require modification to ensure that only emissions associated with supplemental firing are attributed to the electrical output of a BC CHP.

CHP Reporting Protocols Can Be Simplified

Existing CARB CHP reporting protocols should be consistent with the C&T allocation scheme that is adopted by CARB. Consistent with this recommendation, a change to the reporting regulations under each allocation option is discussed below. The discussion again highlights the simplicity of establishing a CHP sector. With a CHP sector, the focus could be on fuel combusted rather than the fuel attributed to electric, thermal, or manufacturing outputs. If CARB chooses not to establish a CHP sector, it can still simplify existing CHP regulations to ensure accuracy and administrative ease.

Existing Protocols

Topping Cycle

Under the current reporting regulations, TC CHP allocate their emissions between thermal and power outputs using a formula that relies on the relative efficiencies of the processes. A standardized approach would be preferable.

Bottoming Cycle

CARB's BC regulations require a facility to allocate total emissions to manufacturing and electric outputs. However, the current regulations errantly attribute a portion of manufacturing emissions to electric output. As a result, regardless of whether a facility engages in supplemental firing, it always appears to have emissions associated with electric output. For example, even if a BC facility generates 50 MW and none of the MW result from supplemental firing, CARB's current reporting protocol would attribute a portion of manufacturing emissions to electric output. This is unrealistic. If a BC facility without supplemental firing shuts down, the emissions remain exactly the same; there simply are no emissions associated with the BC's electricity production.

Proposed Reporting Protocols Under Preferred Option

The benefit of creating a CHP sector is that CARB could focus on CHP's total emissions. There will be no need to develop a methodology to allocate emissions between CHP's different outputs. The emissions associated with topping cycle CHP would be just the emissions associated with total fuel combusted. A bottoming cycle facility not engaged in supplemental firing would have no emissions to report. Finally, a facility engaged in supplemental firing would report those emissions associated with the fuel used for supplemental firing. In short, emissions reported would be calculated in the following manner:

TC CHP: emissions associated with total fuel combustion

BC CHP: emissions associated with fuel combusted for supplemental firing

WSPA/EPUC/CAC strongly support this approach.

Proposed Reporting Protocols Under Alternative Option

The Alternative Option will require CHP facilities to use allocation methodologies but to promote administrative ease, there are a few changes that can be incorporated. First, rather than allocating emissions between electrical and thermal outputs based on relative efficiency, CARB can rely on a default thermal efficiency of 80% HHV in all cases to establish the thermal emissions. The remaining emissions would be attributed to electric output. In short, the emissions of CHP would be calculated in the manner described below:

TC CHP:

Total emissions= thermal emissions + electric emissions

Step 1: Calculate Thermal Emissions

Thermal emissions= (80% HHV efficiency) x (05305 $MtCO_2e$/MMBtu) x

(MMBtu consumed)

Step 2: Calculate Electric Emissions

Electric emissions = total emissions –thermal emissions

The emissions of a BC CHP would be calculated using the following:

Total emissions=emissions associated with fuel combusted for supplemental firing

If CARB builds a scheme that requires allocation of emissions to thermal and electric outputs, WSPA/EPUC/CAC recommend the approach described above.

CPUC/CEC Revenue Recycling Recommendation

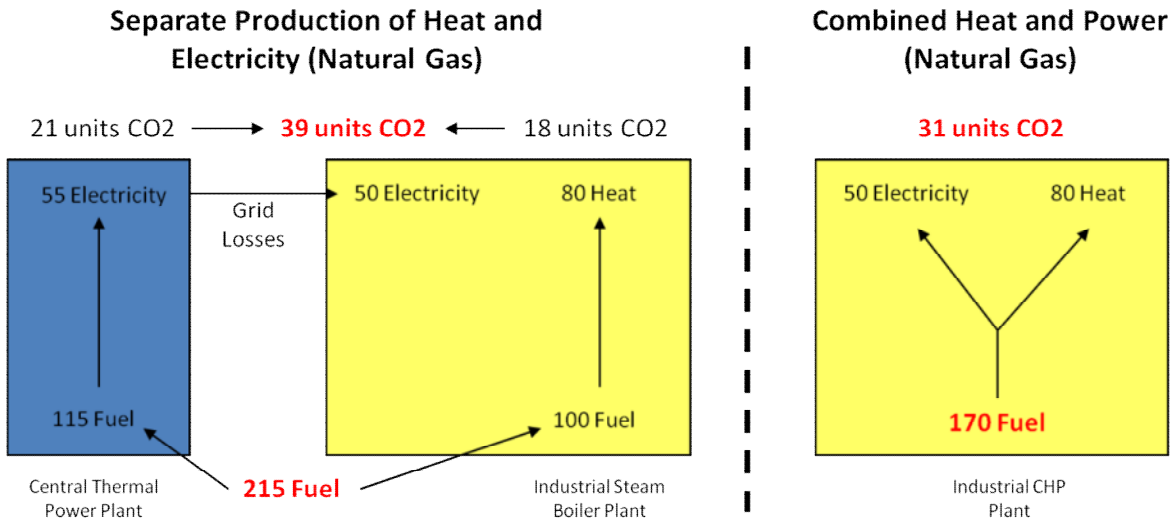
Regardless of the regulations CARB adopts for the electricity sector, it must ensure that all load will be treated equally. The CPUC/CEC recommendations for the electricity sector recommended that the revenues from allowances allocated to the electricity sector be allocated to RPs. Recognizing that most CHP serves on-site load, the CPUC/CEC recommended that CHP also receive a share of the electricity sector auction revenues. These recommendations assume that CARB will allocate a set number of allowances to each sector. However, at the September 9, 2009 workshop, CARB seemed to suggest that it does not intend to make sector-specific allocations. Notwithstanding the regulatory scheme adopted, CARB must establish a scheme that treats all *electric load* in the same manner regardless of which generator or retail provider serves the load. Accordingly, if RPs receive auction revenues for the benefit of their load, CHP serving on-site or over-the-fence load, should also receive auction revenues for the benefit of the load it serves.

V. Comments on CARB Presentations Highlight Importance of Using C&T Allocation to Encourage CHP Resources

At the workshop, some parties questioned CARB's recommendations to use the cap-and-trade allowance allocation to incentivize CHP resources. In particular, utilities and certain municipalities argued that CHP does not require incentives to ensure development. However, as noted by CHP advocates at the workshop and in several other regulatory forums, the criticism of CHP does not take account of the fact that while CHP *decreases* societal emissions, an industrial facility's investment in CHP *increases* its direct, on-site emission responsibility (the CHP Paradox). It also assumes that all power generated by a CHP facility is sold to the grid in a liquid and competitive market, rather than a hybrid, regulated market. Finally, it ignores numerous existing CHP market barriers that continue to exist. In short, as explained below, there are several reasons why CARB should use the C&T allowance distribution scheme to ensure CHP development will take place.

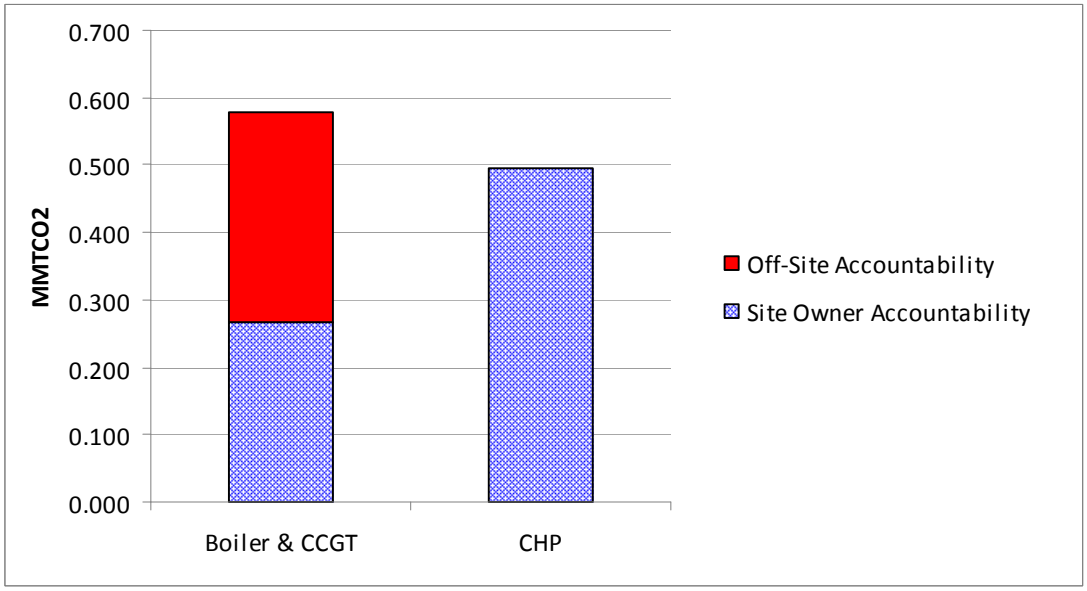
Investment in CHP Increases CHP Owner GHG Compliance Costs Despite Decreasing Societal Emissions

While installation of CHP decreases *societal GHG emissions, an investment in CHP* increases *the CHP investor's direct emissions responsibility. This is referred to as the "CHP Paradox." As illustrated by the diagram below, compared to the separate generation of electricity by a gas-fired generator and steam production by a boiler, CHP generates fewer total GHG emissions:*



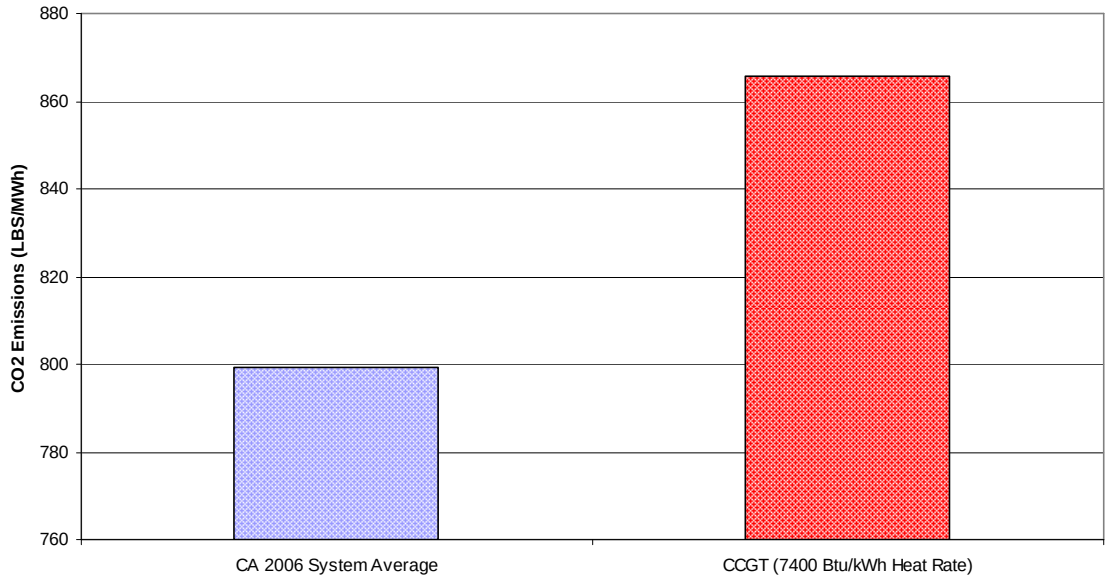
As revealed by the diagram, before CHP investment, an industrial facility would directly bear GHG responsibility for 18 units. Once investment in CHP takes place, the industrial facility bears the responsibility for 31 units of CO_2. Thus while, CHP decreases societal emissions from 39 units of CO_2 to 31 units of CO_2, the CHP owners will see an increase in direct GHG compliance responsibility from 18 units to 31 units of CO_2.

From a societal standpoint, CHP's efficiency can be quantified when its emissions are compared to the GHG emissions generated from the separate production of heat and power as illustrated below.



As demonstrated above, the total emissions of a CHP facility will be less than that of a separate boiler and CCGT. CHP's efficiency is appropriately compared to these resources in evaluating GHG benefit because CHP actually displaces marginal, fossil generation on the grid as well as the emissions from an industrial boiler.

A CHP investor, however, evaluates CHP investment potential differently. Rather than examining societal benefit, it evaluates the option from an economic standpoint, including potential GHG compliance costs. Prior to CHP investment, it was securing thermal energy from a stand-alone boiler and electricity from its interconnected utility. It thus would be directly responsible solely for the boiler emissions; the indirect electricity emissions would be accounted for in some uniform manner in its electricity rate. Moreover, the average emissions rate of an interconnected utility in many cases is lower than a pure fossil emissions rate of a CHP plant, when the utility portfolio includes a large of amount of non-emitting generation such as hydropower and nuclear power. Even though the CHP resource would displace the dirtiest, marginal resource, the investor would be concerned from a cost standpoint only with the avoided utility portfolio emissions.



Thus, from an investor's perspective, investment in CHP will increase total GHG compliance costs even though from a societal perspective, CHP is more efficient than fossil-fired generation. This is precisely why CHP investment requires the right regulatory signals and incentives.

B. CHP Cost Recovery in the "Market" is Not Guaranteed

At the workshop, utilities repeatedly claimed that CHP will recover GHG compliance costs "in the market" and therefore did not require any form of regulatory incentive. No such recovery is guaranteed.

The utilities seem to suggest that CHP should be able to recover their GHG costs through the CAISO day ahead markets. However, most of California's generation is priced outside of these markets. The CAISO itself admits that this market is really an "optimization" market, not a market that will sustain new generation. In reality, only utilities, whose generation receives cost-of-service treatment, and merchants selling power under negotiated bilateral contracts have an opportunity today for full GHG cost pass-through. While the CPUC could make the same provision for CHP, thus far it has not.

Regulators must take steps to increase the certainty of recovery. Ensuring CHP facilities can pass through GHG compliance costs in contracts would ensure that GHG, in addition to other barriers, do not close the door to new CHP investment. If the CPUC fails to make this provision, CARB should step in to remove this barrier.

D. CHP Incentives and Policy Should Focus on Efficiency, Not Size

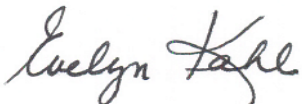
CHP discussions and measures often turn on the question of size. Namely, should large and small scale CHP be treated similarly? Even CARB's Option 3 proposes different treatment under its C&T regulatory scheme for smaller facilities. Although size distinctions were not made for nearly 20 years of CHP development, these distinctions have found more favor in recent years. While WSPA/EPUC/CAC do not seek to erode existing benefits for small CHP, using size as qualifying criteria for incentives detracts from the objectives of AB 32. Stated differently, if the state's objective is to materially lower GHG emissions, policy should favor those facilities, regardless of size, that are capable of greatest fuel efficiency. As the CEC's 2007 IEPR observes:

> *Combined heat and power in particular offers low greenhouse gas emissions rates for electricity generation taking advantage of a fuel that is already being used for other purposes.* ***Large combined heat and power units appear to offer the greatest fuel efficiency of available distributed generation technologies.*** *Because combined heat and power systems are located close to the load, transmission*

and distribution line losses are minimized, further reducing greenhouse gas impacts.[9]

Equally noteworthy, the PIER Collaborative Report, produced in 2005, observed that *"[t]here are already 9,120 MW of active CHP in California at 776 sites. Nearly **90%** of this capacity resides in large systems with site capacities over 20 MW."* [10] To maximize GHG reduction and other environmental benefits, the efficiency of a CHP facility, rather than an arbitrary MW threshold, should be the focus of policy.

Very truly yours,



Evelyn Kahl

cc: Dave Mehl
Gary Collard
Manpreet Mattu

[9] 2007 IEPR, at 162.

[10] Assessment of California CHP Market and Policy Options for Increased Penetration, dated July 2005, at v.

APPENDIX A

Overview of CHP Cap-and-Trade Allowance Distribution Recommendations

CARB's C&T CHP allowance distribution scheme should be designed to ensure that the infrastructure required to promote the addition of 4,000 MW of new CHP exists. The comments provide two options for C&T allowance distribution that will promote simplicity and preclude disadvantage to CHP:

Preferred Option: Place CHP in a separate CHP sector and create an allocation scheme just for CHP

- *Sector Placement*: All CHP would be in a separate CHP Sector.

- *Allowance Allocation*: Under this option, allocation to topping cycle (TC) CHP is done through a separate heat and power double benchmark. The electric reference for the double benchmark is the average fossil emissions rate of 0.5085MTCO2e/MWh. The alternative electric reference emissions rate would be based on the electric reference used in the California Energy Commission's draft AB 1613 regulations: a 8,358 Btu/kWh HHV heat rate facility. The thermal reference would be an 80% HHV stand-alone boiler.

- *Reporting Regulation*: In a separate CHP sector, there would be no need to allocation CHP emissions between its thermal and electric outputs. Instead, TC CHP would merely report total fuel use. Emissions would be calculated from the fuel use. Bottoming cycle (BC) CHP would report emissions associated with supplemental fuel. Where a BC CHP is not engaged in supplemental firing, no electricity emissions should be attributed to electric output.

Alternative Option: Use the CPUC/CEC GHG electricity sector recommendations as a starting point to develop an allowance distribution scheme that at a minimum does not disadvantage CHP. Under this scheme, CHP emissions are split into three categories. Electricity emissions would regulated on the basis of emissions/MWh while thermal emissions would be subject to industrial sector regulations.

- *Sector Placement*: CHP's electric emissions would be subject to electricity sector regulations while CHP thermal emissions would likely be subject to industrial sector regulations.

- *Allowance Allocation*: CPUC/CEC electricity sector recommendations require that CHP emissions be separated into three buckets: MWs delivered to the grid, MWs used to serve on-site load, and thermal emissions. All CHP MWs would receive an allocation of allowances based on MWh delivered to the grid and/or used to serve on-site load not less favorably than the allocation provided to other

generators. The CPUC/CEC recommend that initially 80% of allowances be administratively allocated while the remaining 20% be auctioned. Each year the percentage of allowances that will be auctioned will increase by 20%. In 2016, all allowances would be auctioned. CHP MWs used to serve on-site load will also receive a share of auction revenue similar to other retail providers.[11] In 2012, auction revenue will be allocated among retail providers and CHP on the basis of historic emissions. Gradually the allocation of auction revenue will be allocated to retail providers on the basis of retail sales. The amount of allowances that CHP MW will receive could be further impacted by the adoption of a fuel-differentiated output-based allocation.

CHP thermal emissions would be subject to industrial sector regulations which have not yet been developed.

- *Reporting Regulation*: Even if CARB chooses to establish an allocation scheme that uses the CPUC/CEC recommendations as a starting point, it can greatly simplify existing CHP reporting regulations. Rather than the existing regulations, CARB should assume that a TC CHP's thermal emissions are equal to those of an 80% HHV boiler. A TC CHP's electricity emissions would just be total emissions minus the calculated thermal emissions. A BC CHP's electricity emissions would be those associated with supplemental fuel use.

- *Other Issues Requiring Resolution*: If CARB chooses to rely on the CPUC/CEC recommendations, it must resolve several issues in order to provide regulatory certainty:

  (1) *Use of a Fuel-Differentiated Output-Based Allocation Scheme*: Use of such an allocation scheme will detract from AB 32 objectives to lower emissions. The comments recommend a single output-based allocation scheme to ensure that all MWs receive the same allocation.

  (2) *CARB Regulations Must Clarify the Allocation Policy for New CHP*: The regulations should establish that while retail providers receive auction revenue on the basis of historic emissions, new CHP will receive auction revenue on the basis of facility-specific forecast emissions. CARB must also create a new entrant reserve. Finally, CARB must clarify how the auction revenue allocation will transition from a historic emissions basis to one based on retail sales.

  (3) *Allocation to BC CHP Engaged in Supplemental Firing*: CARB must clarify how allowances will be allocated to BC CHP engaged in supplemental firing.

[11] The comments recommend equal treatment of all load. If retail provider load receives auction revenue, therefore, CHP load should also receive revenue on the same basis.