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California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

RE: **Docket No. 12-IEP-1D - In Preparation of the 2012 Integrated Energy Policy Report**
Energy Update – Combined Heat and Power Staff Paper

Dear Commissioners:

SDG&E appreciates the opportunity to respond to the CEC request for stakeholder input on the CEC Staff Paper, "A New Generation of Combined Heat and Power: Policy Planning for 2030." (Staff Paper) The Staff Paper stated purpose is raising and attempting "to answer numerous questions that lead up to the penultimate question: How does California reach its MW and greenhouse gas (GHG) reduction goals?" Unfortunately, the paper never considers the ultimate question – Are California's goals for Combined Heat and Power (CHP) appropriate and compatible with its long-term energy and GHG goals.

If California is serious about its 2050 GHG goals, its loading order policies, and maintaining the reliability of the state's electricity grid, then the Air Resources Board's (ARB's) CHP target of 6.7 million metric tons of GHG reduction from new CHP by 2020, and the Governor's CHP target of 6,500 MW by 2030, may need to be reevaluated. SDG&E supports adding efficient CHP [1] in its local area and meeting the near-term goals embodied in the CHP Settlement (D. 10-12-035 at the California Public Utilities Commission (CPUC)). However, adding 6,500 MWs of CHP to the electrical system over the period to 2030 may lock the State into a significant amount of fossil generation that may conflict with the state's GHG goals. While the Staff Paper on CHP policy does not question the ARB and Governor's goals, the CEC has the modeling capabilities and knowledge base to tackle this important question. It should address the longer-term CHP goals in 2013 as part of the 2013 IEPR to aid the ARB in its review of the 2008 Scoping Plan CHP measure, as required by AB 32, and to reconsider State CHP policy goals post-2020.

The Staff Paper recommendations uniformly increase direct or indirect subsidies to CHP developers, everything from higher payments for exported power to a portfolio standard for CHP to net metering for CHP. However, the paper never seriously considers the point at which CHP projects will become incompatible with other State energy and GHG policy goals, simply burying the issue in the Staff Paper at page 47 as a "utility concern."

The utilities all expressed concerns about reaching the state's CHP goal. 'PG&E is concerned that the current analysis is not sufficiently robust to consider CHP in the broader framework of California's energy policies and whether CHP will help achieve California's energy and environmental goals.' SDG&E raises similar concerns: 'Without coordination and analyses of interrelated mandates, California will find itself out of 'degrees of freedom' in resource planning by adopting multiple mandates in isolation of one another.' SDG&E

[1] SDG&E defines "efficient CHP" to be CHP matched to the onsite thermal operating needs, producing the largest GHG reduction relative to separate production of electricity and heat.

continues: 'The focus should be on setting the right targets in light of the state's 2050 goals, the cost-effectiveness of the CHP technology, the desire to avoid stranded costs, and the impact on electricity rates.'

The Staff Paper is about "Policy Planning for 2030" without considering the appropriateness of the policy goals through 2030 and without discussion of long-term resource planning through 2030.

Incorrect Interpretation of Market Assessment

At pages 37-40, the Staff Paper summarizes the results of the study, "Combined Heat and Power: Policy Analysis and 2011-2030 Market Assessment" (ICF Study), a study of the economic potential for CHP in California. The Base Case of the ICF Study, the case that includes only efficient CHP, has the addition of 1,499 MW of new CHP, producing a forecasted GHG reduction of 1.4 million metric tons (MMT) by 2020. Even the High Case in the ICF Study, which includes a substantial amount of over-sized, less-efficient CHP, only forecasts a reduction of 4.5 MMT of GHG, well below the ARB target of 6.7 MMT. The Staff Paper concludes, "...even the most ambitious policy measures considered are insufficient to reach the state's policy goals." The proper interpretation of this data is that the CHP policy goals should be revisited, not that additional and more implicit or explicit subsidies for CHP are needed. The data should lead the Staff Paper to suggest the policy goal of ARB should be modified. A revised CHP policy goal of 1,499 MW producing 1.4 MMT of GHG reductions from new CHP would still be substantial addition to the current level of CHP in the State, but it would be much less likely to conflict with other state energy and environmental goals.

California GHG Policy Goals and CHP Characteristics

For CHP to reduce GHG in the State, it must be optimally sized to use the waste heat to meet the thermal load requirements at the industrial or commercial facility. When optimally sized, CHP can produce GHG savings of 10 to 30 percent depending on the application. These significant GHG savings should be pursued to the extent they are cost-effective and compatible with other State energy and GHG goals. However, there are a number of drawbacks to CHP in the future (that may occur due to other GHG policies) including contribution to "over-generation," lack of ability to integrate renewables, and reduced GHG emissions as grid electricity becomes less GHG intensive.

The Staff Paper quotes one LADWP concern, "CHP provides excess power off peak when least needed".[2] The electricity production that produces the useful thermal energy can be used onsite or exported to the grid. In most industries, onsite power needs vary throughout the day, with the least onsite needs occurring through the middle of the night. This CHP-produced generation at night occurs at the same time as customer demand in California is low and wind energy is at a maximum. Given limited overnight energy needs in the State, especially with significant improvements in lighting efficiency, CHP creates a potential "over-generation" issue as more wind power comes on line and with flexible gas generation needed to provide regulation and ramping to accommodate fluctuations in the wind energy. The combination of the "must-take" CHP energy, wind, nuclear, and required flexible gas resources may threaten the reliability of the grid.[3] It is also important to remember, that while this potential problem remains, it is primarily created by adding wind energy to the electric grid. In any case, efficient CHP without curtailment rights is an issue deserving of discussion in setting long-term California CHP goals.

[2] Staff Paper, p. 48.

[3] It is recognized that CHP can be forced to shut down in response to grid problems, but then the efficiency and GHG benefits are to some extent lost. The near-term potential problem has been mitigated to some extent by two recent regulatory changes. The first is FERC's elimination of the utility mandatory must-take requirement of QF energy production. The second is the FERC's approval of the CAISO limiting CHP's regulatory must-take capacity to meet existing contracts or its thermal host's needs. Any residual capacity must be bid into the market, effectively making this capacity dispatchable. So existing CHP that is not optimally sized is now partially dispatchable. Finally, it is also recognized that some efficient CHP operate only during on-peak hours and would not lead to future problems.

The second aspect of efficient CHP designed to meet the operating needs of the host facilityis not a flexible resource that can be used to meet grid reliability requirements when variable renewable energy becomes a bigger portion of the electric system. CHP power from an efficient facility is fossil generation that is surplus to onsite electricity needs and cannot change in response to grid reliability needs since it is meeting the onsite thermal need.[4] In contrast, a combined cycle gas turbine (CCGT) can provide regulation and ramping ability needed to integrate renewables. The Staff Paper suggests "considering oversizing CHP generation for a more dispatchable resource," but notes that it "will change the emissions profile of the CHP resource…these facilities may appear to be more polluting."[5] Oversizing a CHP unit simply turns the excess MWs into the equivalent of conventional gas-fired plants, but with significantly more contractual difficulties in dispatch. While some retail providers may have a current need for baseload fossil generation, as more renewables are added, there may not be room in procurement portfolios for added fossil generation beyond 2020 except to provide flexible operations. The CEC should analyze this possibility as part of its 2013 IEPR.

The third aspect of CHP that is changing is the level of GHG emissions it is avoiding. The ARB analysis, which was also used by the CEC in the analysis of AB 1613 CHP efficiency, looks at the emissions from the separate production of heat and power. The GHG emissions of the thermal energy was assumed to be produced by an 80 percent efficient boiler, while the electrical energy was assumed to be produced by gas-fired generation with a heat rate of roughly 8,300 btu/kWh. The largest contribution of the ICF Study was to evaluate the GHG savings provided by CHP. The ICF study presents the ARB calculations, but also produces results that account for the improving emissions of the marginal electric generation. Specifically, the fact is that the electricity grid is becoming less GHG-intensive over time. With the renewable portfolio standard (RPS), for every increase in sales, a portion is natural gas-fired generation and a portion is renewable energy. For example, for SDG&E, less than one percent of its generation was renewable energy in 2003, but is 20 percent currently and by 2020, if not earlier, will be 33 percent renewable. Once the 33 percent RPS is reached, the marginal generation will be two-thirds natural gas and one-third renewable energy. ICF presented an analysis with this composition of the marginal generation and showed that there are no GHG savings from CHP if the ARB calculation is adjusted to the change in the marginal generation.[6]

The change in the marginal generation from simply natural gas generation to a mix that is quickly becoming two-thirds natural gas and one-third renewables should change the thinking on the benefits of GHG reduction from CHP. The CPUC thinking has evolved over time so that now the cost effectiveness analyses of energy efficiency and distributed generation treat marginal energy as mix of natural gas plus renewables with the mix based on the current level of the RPS requirements.[7]

As the Staff Paper rightly points out, "CHP will be forced to compete with grid electricity that is ever increasing in its percentage of renewable resources. This is a competition that CHP cannot win." What is the policy reason that electric utilities should acquire CHP post -2020 that does not reduce its GHG emissions footprint and has higher emissions than its marginal generation? The Staff Paper fails to address these important long-term questions in its analysis of CHP policy planning to 2030.

[4] As noted in the Staff Paper, CHP can only provide dispatchability at the expense of lower efficiency and lower GHG savings. In essence, CHP can be oversized and then it simply becomes less efficient and looks like a combination of an efficient CHP plus an amount of conventional gas generation.
[5] Staff Paper, p. 50.
[6] Unfortunately, the ICF methodology was flawed and the analysis as presented left the incorrect perceptions that exports to the grid were different from electricity used on site. All CHP-produced electricity and heat should be compared to the separate production of thermal and electrical energy.
[7] D.12-05-015, pages 35-36.

California's Potentially Conflicting Energy Policy Goals

The "I" in the acronym "IEPR" stands for "integrated," yet this Staff Paper ignores the interaction of multiple, potentially conflicting State energy and environmental policy goals. The Staff Paper takes a "silo" approach – uncritically assuming that the current Governor's and ARB's CHP goals are the correct ones for the State – and focuses on how to meet the stated CHP goals. However, the installation of CHP should not be viewed in isolation; somewhere, someplace, someone needs to address the future of CHP in light the following California goals:

- 2050 GHG reduction goals.
- Energy Efficiency (EE) goals
- 33 percent RPS requirement
- Governor's 12,000 MW distributed renewable goal
- The California Independent System Operator (CAISO) requirements for flexible generation to maintain reliability of the electricity grid
- Local Air Quality Districts' goals to reduce criteria pollutants

The fact that most of the CHP facilities seeking contracts under the QF Settlement are between 20 years and 30 years old suggest that CHP facilities built after 2020 have a good chance of still being in service and operating in 2050. Is this must-take fossil generation compatible with the State's 2050 goals? None of the analyses of the path to the 2050 goals appears to include CHP. One study, "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity," found the following in order to maintain the stability of the electric grid:

Some studies suggest that 100% of future electricity requirements could be met by renewable energy, but our analysis found this level of penetration to be infeasible for California (20, 21). We found a maximum of 74% renewable energy penetration despite California's large endowment of renewable resources, even assuming perfect renewable generation forecasting, breakthroughs in storage technology, replacement of steam generation with fast-response gas generation, and a major shift in load curves by smart charging of vehicles. Using historical solar and wind resource profiles in California and surrounding states, the electricity system required 26% nonrenewable generation from nuclear, natural gas, and hydroelectricity, plus high storage capacity to maintain operability.[8]

Natural gas generation is needed to "maintain operability." Efficient CHP does not have that capability. As a result, stranded costs may occur for CHP generation that go into operation after 2020. This fact should be considered in reviewing the Governor's 2030 CHP goals.

A second potential conflict is how to combine the following goals - a high level of energy efficiency, the 33 percent RPS, and the Governor's 12,000 local renewable DG goal, and a significant CHP goal that results in the lowest cost portfolio for serving the state's electricity needs. The Staff Paper does not address whether goals of an added 4,000 or 6,500 MW of CHP are possible without impacting the other State goals, such as for distributed renewables. The CEC should consider whether the Governor's CHP and/or renewable DG goals should be reduced as part of the 2013 IEPR analysis. .

A third potential conflict is with the State's air quality goals. As the Staff Paper recognizes, most new CHP opportunities, outside enhanced oil recovery, are located near load centers. Part of the efficiency gains are in the onsite generation, providing local capacity and eliminating transmission and distribution line losses. This fact also means that even as advances in CHP will make them much cleaner, CHP may still increase criteria pollutants in those load centers, most of which are non-attainment areas. At page 41 of the Staff Paper it raises the issue of compliance with criteria pollutant issues in the "Barriers to Development" section, but does not

[8] The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity, P.54.

address whether the small increase in criteria pollutants associated with CHP in non-attainment areas is an acceptable policy outcome given the benefits of efficient locally generated power.

Comments on the Staff Paper

The above comments were focused on the important issues ignored by the Staff Paper. The following provides comments on what the Staff Paper did address. The comments are organized in the order they appear in the Staff Paper.

- Page 26. The Staff Paper states 82 percent of energy demand is met by the State's three largest IOUs. However, based on CEC data, the parties to the QF Settlement found 72% of energy sales were in IOU service areas, and IOU bundled customers were less than 65% of State energy demand. See page 28 of the Staff Paper for the 72% number.
- Pages 32-35. Cap-and-Trade Implementation. The section needs to be updated based on the ARB announcement indicating that the two-year problem of CHP installations having a compliance obligation for thermal energy they would not have had except for installing CHP is taken care of. Further, SB 1018 eliminates the CHP imbalance by not providing large commercial and industrial customers with bill offsets from electricity allowance revenues unless the customer is emissions-intensive and trade-exposed.
- Page 41. Barriers to Development. Generally, "barriers" do not include costs that make the technology economic or not. Rather, they are inefficiencies that prohibit cost effective decisions from being made. This section of the Staff Paper appears to be a mix of "barriers" and public policies that could promote additional CHP. Questioning whether the CAISO has the right requirements for metering to increase its awareness of resources on the grid or if standby charges are above cost-based levels are examples of potential barriers. But simply increased subsidies such as ignoring costs to provide utility service in demand charges or standby charges or expanding the net energy metering (NEM) program are not "barriers," they are simply policies to promote CHP.
- Page 52. The recommendation to include CHP in the NEM program should be eliminated. AB 1613 contracts were provided to be able to sell excess power to the grid. Inclusion in the NEM program would change sizing of CHP from the optimal based on thermal needs to basing decisions upon total onsite electric needs. The change could convert an efficient CHP to an inefficient unit and increase GHG emissions. Further, the NEM subsidy is hard to calculate and is not transparent like the AB 1613 contract since it depends on the rate schedule. Finally, the Staff Paper makes no policy argument as to why a distributed technology with small GHG reductions should receive the same treatment as one that has close to 100 percent GHG reduction.
- Page 53. The recommendation to consider a portfolio standard should be eliminated for the difficulties cited in the Staff Paper – distribution of opportunities, requiring the use of customer facilities – as well as the problems created to try to keep the efficiency high and costs under control. There are too many variables outside utility control to make a CHP portfolio standard feasible.

Thank you for the opportunity to provide these comments in this proceeding.

Sincerely,