BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions standards into Procurement Policies	)))))	R.06-04-009

BEFORE THE CALIFORNIA ENERGY COMMISSION

Order Instituting Informational Proceeding on a Greenhouse Gas Emissions Cap	)))	Docket 07-OIIP-01

REPLY COMMENTS OF FUELCELL ENERGY, INC.

In accordance with the California Public Utilities Commission ("Commission") Rules of Practice and Procedure and the Administrative Law Judges' May 20, 2008 Ruling, FuelCell Energy, Inc. ("FCE") respectfully submits the following reply comments addressing combined heat and power ("CHP") issues raised in the opening comments submitted in this proceeding.

I. The discussion of how to regulate GHG emissions from CHP and associated modeling must include and correctly identify the characteristics of fuel cells.

In reviewing opening comments on CHP issues, it appears that a number of parties do not realize that CHP includes both combustion and non-combustion technologies. For example, Pacific Gas and Electric Company ("PG&E") states that "CHP is not a GHG neutral resource like renewables or energy efficiency."[1] Similarly, Southern California Edison Company ("SCE") claims that "[a]ll GHG emissions from

[1] PG&E Opening Comments at 85.

CHP systems are created by combustion of fuel."[2] These and other generalizations assuming that all CHP operations involve the combustion of natural gas are inaccurate.

Commentary by some parties implies categorically that CHP is less efficient than current central station generation. For example, SCE asserts that it "does not agree that CHP is inherently more efficient than the separate generation of electricity and heat."[3] PG&E provides a table wherein the heat rate of a hypothetical CHP facility is listed as 11,400 Btu/kWh which compares less favorably to a combined cycle gas turbine ("CCGT") with a heat rate of 7,400 Btu/kWh.[4] To set the record straight, FCE's fuel cells have a single cycle heat rate of 7,260 Btu/kWh before accounting for any heat recovery and a heat rate of 5,884 Btu/kWh when waste heat is used to turn a coupled unfired turbine, increasing electrical efficiency to 59%. When used in a CHP application, fuel cells have an inherently higher efficiency than the CCGTs cited by both PG&E and SCE in their respective critiques of CHP efficiency.

FCE understands that historically CHP has been defined as natural gas-fired cogeneration, but this definition needs to be revisited. Particularly as the Commissions and the Air Resources Board ("ARB") develop policies for regulating GHG emissions, allowances and offsets, out-of-date assumptions about CHP must be discarded and the characteristics of newer CHP technologies need to be fully acknowledged and included in all future CHP analyses. A more accurate and inclusive definition of CHP will result in more effective regulation and policy signals that will support innovative solutions to the GHG emissions problem.

---

[2] SCE Opening Comments at 30.
[3] SCE Opening Comments at 34.
[4] PG&E Comments at 76-77.

As discussed in FCE's opening comments, fuel cells are a non-combustion CHP technology. Fuel cells differ according to design and fuel source, but in general a fuel cell emits less GHG and little or no NOx and SOx as compared to combustion facilities of equivalent size, has the capability to displace baseload generation, has a very minimal visual and noise profile, and can be sized to meet thermal or electric load. FCE and other fuel cell manufacturers participating in the California market could provide detailed information on request to assist the Commissions and ARB in profiling and modeling fuel cell CHP facilities.

II. While parties differ on the optimal regulatory approach, there is a substantial consensus that regulation of CHP must accurately reflect both electric and thermal operations and must be appropriately scaled.

A. FCE agrees with comments stating that whatever regulatory approach is adopted must fully reflect both electric and thermal operations.

Numerous parties observe in opening comments that, irrespective of the regulatory approach, it is extremely important to include both electric and thermal outputs in regulating GHG emissions associated with CHP. For example, the Center for Energy Efficiency and Renewable Technologies ("CEERT") recommends that "[r]egardless of the sector treatment used by the CPUC, the full efficiency and emissions benefits of *both* thermal and electrical functions of the unit must be considered, particularly when comparing the GHG benefits of these systems to conventional, central station power plants."[5] FCE agrees. The potential of clean low-emissions CHP technologies to contribute to California's GHG reduction goals will not be realized unless the full value of offset emissions – both on the power generation and on the thermal side of the equation – is recognized.

[5] CEERT Opening Comments at 7.

B. FCE agrees with EPUC/CAC that the E3 Model may understate favorable CHP economics.

EPUC/CAC are correct in observing that the E3 Model's representation of CHP needs to be refined.[6] EPUC/CAC have identified issues related to the representation of capital costs and CHP market access assumptions in the 33% RPS/High Goals EE reference case. EPUC/CAC have further noted that the E3 modeling of CHP is still at an early stage and should be further evaluated. FCE agrees, and specifically recommends that in order to accurately represent the full thermal credit from CHP facilities, the Boiler Efficiency Credit in the E3 Model must be consistently enabled (i.e., set to "TRUE") and, in addition, the underlying formula must be corrected to properly account for the efficiency and losses of the avoided natural gas-fired boiler.

The thermal output of a CHP unit often displaces thermal output from an onsite natural gas-fired boiler. As a consequence, less natural gas is combusted by the boiler, with resultant CO2 emissions reductions from the boiler. Since boilers operate at an efficiency that is less than 100%, the actual amount of natural gas avoided by the boiler must be "grossed up" to reflect the boiler's efficiency losses. Thus, for a boiler operating at an 80% efficiency, one MMBtu of thermal output requires 1.25 (=1/0.80) MMBtu of natural gas input. Therefore, the avoided CO2 emissions from the boiler to be credited to the CHP unit must reflect the fully grossed up 1.25 MMBtu of avoided boiler fuel input.

The latest version of the E3 Model (E3 GHG Calculator v2b) includes an option for CHP to receive credit for the avoided CO2 emissions that are associated with CHP thermal output, through a calculated Boiler Efficiency Credit (in tonnes per MWh). In order for CHP units to receive the full value of their thermal output, this option should

[6] *See* EPUC/CAC Opening Comments pp. 61-68.

always be enabled. However, even when enabled, the underlying formula used to calculate the Boiler Efficiency Credit in the E3 Model appears to be in error. Rather than grossing up the Boiler Efficiency Credit to recognize the avoided natural gas fuel input plus the 20% efficiency losses associated with the natural gas boiler, the Boiler Efficiency Credit is instead calculated based *only* on the 20% efficiency loss. This calculation error means that the Boiler Efficiency Credit is understated by 625% (=1.25/0.20), significantly understating the contribution that any CHP technology can make to CO2 emissions reductions.

Attachment A contains three sets of results from the "Outputs" tab of the E3 Model that clearly shows the significance of: (i) enabling the Boiler Efficiency Credit even as incorrectly calculated; and (ii) enabling the Boiler Efficiency Credit as correctly calculated. Focusing on the CHP results in the section entitled "Summary of Costs per Tonne ($/Tonne CO2e)," Case 1 indicates that the total cost per tonne for CHP without any Boiler Efficiency Credit is $228/tonne CO2e. Enabling the Boiler Efficiency Credit as calculated in the E3 Model leads to the results in Case 2, which indicates a total cost per tonne of avoided CO2 for CHP of $191/tonne, over 16% less costly than in Case 1. Case 3 provides the results of correcting the Boiler Efficiency Credit (as described above), and indicates that the total cost per tonne of avoided CO2 for CHP with the corrected Boiler Efficiency Credit is $103/tonne, which is *less that half of the total cost per tonne CO2e for CHP without the Boiler Efficiency Credit*. These results clearly demonstrate the importance of ensuring that the full value of thermal credit from CHP units is recognized when calculating GHG emissions.

C. FCE agrees with comments recommending that CHP regulation be simple and straightforward.

Opening comments suggest that parties do not agree on how best to regulate GHG emissions from CHP and how to ensure that CHP owners obtain credits or offsets or payment commensurate with avoided GHG emissions. However, there is a consensus that since most CHP facilities are smaller than central station generating facilities and many owners may not otherwise be regulated entities, regulations and requirements for smaller facilities and those that are designed to serve only on-site load need to be minimized and streamlined. Otherwise, efforts to encourage increased installation of CHP units may be thwarted by customers' fear of burdensome regulation.[7] The Commission should explore in more detail how to regulate GHG from CHP facilities without creating a regulatory disincentive to the installation of clean CHP units.

III. The Commissions and ARB must critically examine how to encourage installation of clean, efficient CHP both in the near-term and through longer-term measures adopted to implement AB 32.

A. Most parties agree that clean and efficient CHP should be encouraged.

There is a considerable consensus between parties representing a wide range of interests that CHP can contribute to meeting the GHG reduction goals of AB 32. For example, Sempra Energy Utilities ("SEU") support "encouraging the increased efficiency that can occur with appropriately placed and sized CHP applications,"[8] and California Large Energy Consumers Association ("CLECA") recommends adoption of "GHG

[7] *See e.g.* NCPA Opening Comments at 31; Calpine Opening Comments at 19; IEP Opening Comments at 39.
[8] SEU Opening Comments at 13.

regulations…that encourage expanded use of CHP."[9] A few parties focus on the possibility that some older, inefficient CHP facilities may not provide net GHG emissions benefits, but these comments do not appear to refute the Joint Staff Paper's conclusion that "CHP has the potential to lead to a significant net decrease in GHG emissions."[10]

Given this consensus recognition that CHP is beneficial, the Commissions and ARB need to focus on how best to encourage the development and deployment of GHG-reducing CHP facilities. Many parties appear to agree that a good starting point would be to identify CHP as a GHG emission reduction measure as defined in AB 32.[11] FCE agrees, and further encourages the Commissions and ARB to use a combination of appropriate regulation, policy initiatives, incentives, as well as market mechanisms to ensure that the benefits provided by CHP are achieved both in the near term and in the future.

B. In the near term, encouraging CHP requires specific policy initiatives and targeted incentives.

As discussed above, the first step in encouraging CHP is to "do no harm," i.e., to ensure that GHG regulation does not provide a disincentive to install new CHP facilities and thereby burden the state with less efficient energy infrastructure. The second step is to preserve and expand policy initiatives that encourage installation of clean, efficient CHP and eliminate regulatory barriers. FCE agrees with parties advocating:

---

[9] CLECA Opening Comments at 11. *See also* CCDC Opening Comments at 2 ("Through implementation of AB 32, the state has a tremendous opportunity to maximize the value of CHP resources and their recognized ability to contribute to reductions in CHP emissions."); WPTF Opening Comments at 22 ("CHP facilities provide GHG and other social benefits."); EPUC/CAC Opening Comments at 35-42 (documenting CHP benefits and state policy endorsing CHP).
[10] Joint Staff Paper at 9.
[11] *See* Public Resources Code § 38505(f).

1. Establishing targets or portfolio requirements for DG procurement by the investor-owned utilities.

A number of parties support this approach.[12] The primary argument in opposition seems to be that such targets will be unnecessary once a cap and trade program (or its equivalent) is established. As discussed further below, the notion that utilities will purchase or install clean and efficient CHP as a result of market signals certainly is not the case now, and is theoretical and speculative with respect to the period after AB 32 implementation is complete. Given the current recognition that CHP can provide significant near term GHG benefits, a CHP target makes sense and should be implemented as soon as possible.

2. Other measures to encourage utility purchase of CHP output.

FCE agrees with parties advocating the expansion of standard contracts for CHP and for the immediate implementation of AB 1613.[13]

3. Expanding the PU Code Section 218 exemption for "over-the-fence" sales by CHP.

CLECA and CCDC suggest that expanding the regulatory exemption for generators serving unrelated on-site or adjacent loads would encourage wider deployment of CHP, as would eliminating other rules and restrictions that impede the ability of CHP to serve nearby customers.[14] FCE agrees with this suggestion. Fuel cells operate on a continuous basis at full output, and the implementation of reforms enabling delivery of excess electricity not needed on-site into the market would enable significantly greater deployment of these clean and efficient CHP systems.

---

[12] *See e.g.* CEERT Opening Comments at 9.
[13] *See e.g.* IEP Opening Comments at 40; PG&E Opening Comments at 82.
[14] CLECA Opening Comments at 13; CCDC Opening Comments at 8.

4. Eliminating standby and CRS charges for CHP.

There is clearly broad support for eliminating utility standby and CRS charges, which currently serve as an economic disincentive to install clean and efficient CHP.[15] These measures could be initiated by the CPUC and implemented in the near term.

5. Identifying and addressing barriers to interconnection.

The CPUC should take action to address interconnection issues. While the utilities maintain that interconnection procedures are not a barrier to CHP, it is the experience of FCE and other CHP developers, manufacturers and customers that they are. FCE's concern is focused on two problems. First, the lack of continuous funding and institutional support has at times impaired the Rule 21 Working Group's ability to certify equipment in a timely manner. Second, at times utility service representatives have provided prospective distributed generation ("DG") customers incomplete or incorrect information about interconnection-related costs and charges and/or the customer's eligibility for exemption from interconnection or standby charges. As a result, some customers have been confused and reluctant to proceed with plans to invest in clean, efficient fuel cell projects. The CPUC has recently scheduled a meeting to discuss future plans for the Rule 21 Working Group. This forum may provide a good opportunity for discussion of needed improvements.

6. Extending and expanding the SGIP program.

PG&E supports extending the SGIP program to any small CHP that meets certain efficiency standards.[16] FCE appreciates and supports PG&E's recommendation. The SGIP program has been an important vehicle for jump starting small DG in California

---

[15] *See e.g.* CCDC Opening Comments at 7-8; CLECA Opening Comments at 14.
[16] PG&E Opening Comments at 82.

and it should be maintained. However, limiting financial incentives to "small" (as currently defined by SGIP) CHP facilities prevents the program from helping larger (> 1 MW) DG facilities that provide commensurately larger GHG benefits, and that certainly need incentives as much or more than small facilities. The SGIP program should be expanded to encourage deployment of larger technologies, provided they demonstrate need and GHG emissions benefits, and. to encourage long-term planning and investment. the SGIP program should be funded over a period of years rather than surviving on year to year allocations.

C. In the longer term, GHG regulation may result in market incentives to install CHP but this outcome is not guaranteed.

PG&E opposes treating CHP as an emission reduction measure based on a broad assumption that "[a] cap and trade program will reward efficient CHP, as the market will internalize the emissions value in electricity prices," and "because efficient CHP may be lower emitting on a net basis than other sources of GHGs, facilities would have financial incentives to install CHP without the need for special treatment under AB 32 or special subsidies."[17]

It is possible that PG&E's statements will prove to be correct in the long run. However, the theoretical premise that market mechanisms alone will adequately reward customers for installing low carbon emitting CHP facilities has yet to be tested and certainly does not provide any form of readily estimated revenues to support project

[17] PG&E Opening Comments at 77, 82. It should be noted that PG&E's argument for "no special treatment" appears to be primarily directed toward "large" CHP, although some of PG&E's statements are general in nature. Since the definition of "large" and "small" CHP is not clear in context, FCE does not address this distinction. However, the current measures in place to encourage CHP are focused on extremely small facilities. For example, the SGIP program provides incentives only to facilities up to 1 MW (except for the two-year limited pilot exception, which will fund projects up to 3 MW). The wastewater/small DG feed-in tariffs recently approved by the CPUC are capped at 1.5 MW. The exemption from interconnection costs and CRS is capped at 1 MW. And the exemption from standby charges is limited to facilities 5 MW or smaller.

financing. Therefore, the Commission should strive to create a regulatory environment in which accurate market price signals will emerge, and at the same time avoid relying solely on the market to ensure that CHP reaches its potential as a means of avoiding GHG emissions.

Why act now to encourage CHP development? The existing potential for clean, cost-effective CHP is currently unrealized. Notwithstanding existing (albeit limited) financial and regulatory incentives, new commercial and industrial facilities are more often than not constructed using traditional, wasteful and GHG emissions-intensive heating and cooling technologies, thus locking in future GHG emissions that could have been avoided with the deployment of CHP alternatives. Ignoring opportunities for encouraging CHP now based on the hope that GHG regulation will produce incentives for CHP down the road is a suboptimal and speculative approach that does not make sense, given the broad acknowledgement that we need to address climate change immediately and our collective lack of experience with the market impact of GHG regulation.

In addition, it is important to recognize that newer emerging CHP technologies such as fuel cells have not had the benefit of decades of subsidies and institutional support, and have not yet established production at a scale that can effectively respond to market price signals. This will certainly change as the technologies and market evolve, but is not yet the case. Therefore it is of critical importance to look both to near-term technology specific solutions while at the same time moving toward improving market signals.

Finally, looking at near and longer-term approaches brings us back to the regulatory bottom line: a purely market-based approach to encouraging expansion of CHP will not optimize the deployment of CHP technologies unless and until it fully and completely reflects the value of the offset non-CHP alternative for both thermal and electrical usage. That means accurate calculation of avoided GHG emissions, plus accurate valuation of avoided emission of other criteria pollutants, plus accurate valuation of other avoided costs such as transmission, distribution, and other costs associated with marginal system resources. These costs/benefits are not adequately reflected in the current regulatory procurement process and so the "market" does not appropriately value CHP. If this can be addressed in the future, then possibly the argument for "no special treatment" of CHP will be justified. In the meantime, CHP should be encouraged through regulatory incentives and by removing barriers to CHP development.

IV. The Commissions and ARB should take steps to enable increased participation in these proceedings by CHP parties.

FCE and some other fuel cell manufacturers are attempting to participate in these proceedings in order to ensure that modeling and program design include appropriate consideration of fuel cell technologies. However, given limitations on resources and the exceedingly broad scope of these proceedings, effective participation has been challenging. The fact that most parties filing opening comments in the proceeding are either ratepayer-funded utilities or large, well-established trade groups, illustrates the need to make the process more accessible to parties that cannot afford to participate in all facets of these proceedings. FCE specifically encourages the Commissions and ARB to hold targeted workshops on CHP issues and to ensure that a broad spectrum of industry participants receive notice of applicable proceedings.

V. Conclusion

FCE appreciates the opportunity to provide these limited reply comments regarding CHP issues and looks forward to participating further in these proceedings.

Dated: June 16, 2008

Respectfully submitted,

By: ________/s/________________

William A. Karambelas
Vice President, Western Region
FuelCell Energy, Inc.
27068 La Paz Road #470
Aliso Viejo, CA 92656
Telephone: 949-305-4595
Karambelas@fce.com

Lynn M. Haug
Andrew B. Brown
ELLISON, SCHNEIDER & HARRIS, LLP
2015 H Street
Sacramento, CA 95811
Telephone: 916-447-2166
lmh@eslawfirm.com

Attorneys for FuelCell Energy, Inc.

CO2 Supply Curves

CASE 1. Boiler Efficiency Credit Calculation Not Enabled; No Boiler Efficiency Credit for CHP

Summary of INCREMENTAL resource CO2, Costs, and Savings

Incremental means those costs and savings that are in addition to the reference case

Display Utility and Customer Costs: FALSE

	EE	DR	CSI	Onsite CHP	Export CHP	Biogas	Biomass	Geotherma	Hydro - Small	Solar	Wind
CO2 Savings	10.2	-	1.7	2.1	2.8	1.1	2.2	2.9	0.0	3.7	2.9
GWh at Generator	20,528	-	3,395	212	308	2,209	4,418	6,165	15	7,359	5,845
Peak MW at Generator	3,695	-	1,077	1,645	2,103	297	593	782	2	1,791	376
Utility Costs	$ 1,334	$ -	$ 119	$ -	$ 1,043	$ 205	$ 754	$ 808	$ 2	$ 1,081	$ 660
Utility Energy Value	$ 1,107	$ -	$ 183	$ 586	$ 850	$ 120	$ 240	$ 335	$ 1	$ 396	$ 311
Utility Capacity Value	$ 388	$ -	$ 115	$ 172	$ 220	$ 31	$ 62	$ 82	$ 0	$ 188	$ 39
Utility Energy and Capacity	$ 1,495	$ -	$ 298	$ 759	$ 1,070	$ 151	$ 302	$ 417	$ 1	$ 585	$ 351
TRC Costs	$ 802	$ -	$ 1,706	$ 775	$ 1,123	$ -	$ -	$ -	$ -	$ -	$ -
Cost $/tonne	(15.78)	-	(105.53)	(365.74)	(9.60)	49.11	205.04	134.49	111.51	135.17	105.96

Summary of Costs per Tonne ($/Tonne CO2e)

	Utility	Consumer	Total	MMt CO2e
Energy Efficiency	$ (16)	$ 78	$ 63	10.2
Renewables	$ 133	$ -	$ 133	12.8
CSI	$ (106)	$ 1,007	$ 902	1.7
CHP	$ (161)	$ 389	$ 228	4.9
Weighted Average	$ 19	$ 149	$ 168	29.6

Incremental Annual Customer Costs of Resources in 2020 ($M per year in 2020) $2008

	PG&E	SCE	SDG&E	SMUD	LADWP	NorCal	SoCal	Water Agen	TOTAL CA
EE	$ 310	$ 231	$ 50	$ 55	$ 46	$ 51	$ 59	$ 802	$ 1,605
SB1	$ 996	$ 456	$ 167	$ 18	$ 33	$ 8	$ 28	$ -	$ 1,706
CHP	$ 578	$ 596	$ 119	$ 95	$ 172	$ 127	$ 174	$ 37	$ 1,898
Total	$ 1,884	$ 1,283	$ 336	$ 168	$ 251	$ 186	$ 260	$ 840	$ 5,208

CO2 Supply Curves

CASE 2. Boiler Efficiency Credit Calculation Enabled, but as Incorrectly Calculated in v2b

Summary of INCREMENTAL resource CO2, Costs, and Savings Display Utility and Customer Costs FALSE

Incremental means those costs and savings that are in addition to the reference case

	EE	DR	CSI	Onsite CHP	Export CHP	Biogas	Biomass	Geotherma	Hydro - Small	Solar	Wind
CO2 Savings	10.2	-	1.7	2.5	3.3	1.1	2.2	2.9	0.0	3.7	2.9
GWh at Generator	20,528	-	3,395	212	308	2,209	4,418	6,165	15	7,359	5,845
Peak MW at Generator	3,695	-	1,077	1,645	2,103	297	593	782	2	1,791	376
Utility Costs	$ 1,334	$ -	$ 119	$ -	$ 1,043	$ 205	$ 754	$ 808	$ 2	$ 1,081	$ 660
Utility Energy Value	$ 1,107	$ -	$ 183	$ 586	$ 850	$ 120	$ 240	$ 335	$ 1	$ 396	$ 311
Utility Capacity Value	$ 388	$ -	$ 115	$ 172	$ 220	$ 31	$ 62	$ 82	$ 0	$ 188	$ 39
Utility Energy and Capacity	$ 1,495	$ -	$ 298	$ 759	$ 1,070	$ 151	$ 302	$ 417	$ 1	$ 585	$ 351
TRC Costs	$ 802	$ -	$ 1,706	$ 775	$ 1,123	$ -	$ -	$ -	$ -	$ -	$ -
Cost $/tonne	(15.78)	-	(105.53)	(303.95)	(8.07)	49.11	205.04	134.49	111.51	135.17	105.96

Summary of Costs per Tonne ($/Tonne CO2e)

	Utility	Consumer	Total	MMt CO2e
Energy Efficiency	$ (16)	$ 78	$ 63	10.2
Renewables	$ 133	$ -	$ 133	12.8
CSI	$ (106)	$ 1,007	$ 902	1.7
CHP	$ (135)	$ 325	$ 191	5.8
Weighted Average	$ 19	$ 144	$ 163	30.6

Incremental Annual Customer Costs of Resources in 2020 ($M per year in 2020) $2008

	PG&E	SCE	SDG&E	SMUD	LADWP	NorCal	SoCal	Water Agen	TOTAL CA
EE	$ 310	$ 231	$ 50	$ 55	$ 46	$ 51	$ 59	$ 802	$ 1,605
SB1	$ 996	$ 456	$ 167	$ 18	$ 33	$ 8	$ 28	$ -	$ 1,706
CHP	$ 578	$ 596	$ 119	$ 95	$ 172	$ 127	$ 174	$ 37	$ 1,898
Total	$ 1,884	$ 1,283	$ 336	$ 168	$ 251	$ 186	$ 260	$ 840	$ 5,208

CO2 Supply Curves

CASE 3. Boiler Efficiency Credit Calculation Corrected (Divided by 0.80 rather than Multiplied by 0.20)

Summary of INCREMENTAL resource CO2, Costs, and Savings
Incremental means those costs and savings that are in addition to the reference case

Display Utility and Customer Costs: FALSE

	EE	DR	CSI	Onsite CHP	Export CHP	Biogas	Biomass	Geotherma	Hydro - Small	Solar	Wind
CO2 Savings	10.2	-	1.7	4.7	6.1	1.1	2.2	2.9	0.0	3.7	2.9
GWh at Generator	20,528	-	3,395	212	308	2,209	4,418	6,165	15	7,359	5,845
Peak MW at Generator	3,695	-	1,077	1,645	2,103	297	593	782	2	1,791	376
Utility Costs	$ 1,334	$ -	$ 119	$ -	$ 1,043	$ 205	$ 754	$ 808	$ 2	$ 1,081	$ 660
Utility Energy Value	$ 1,107	$ -	$ 183	$ 586	$ 850	$ 120	$ 240	$ 335	$ 1	$ 396	$ 311
Utility Capacity Value	$ 388	$ -	$ 115	$ 172	$ 220	$ 31	$ 62	$ 82	$ 0	$ 188	$ 39
Utility Energy and Capacity	$ 1,495	$ -	$ 298	$ 759	$ 1,070	$ 151	$ 302	$ 417	$ 1	$ 585	$ 351
TRC Costs	$ 802	$ -	$ 1,706	$ 775	$ 1,123	$ -	$ -	$ -	$ -	$ -	$ -
Cost $/tonne	(15.78)	-	(105.53)	(161.09)	(4.40)	49.11	205.04	134.49	111.51	135.17	105.96

Summary of Costs per Tonne ($/Tonne CO2e)

	Utility	Consumer	Total	MMt CO2e
Energy Efficiency	$ (16)	$ 78	$ 63	10.2
Renewables	$ 133	$ -	$ 133	12.8
CSI	$ (106)	$ 1,007	$ 902	1.7
CHP	$ (73)	$ 175	$ 103	10.8
Weighted Average	$ 16	$ 124	$ 140	35.6

Incremental Annual Customer Costs of Resources in 2020 ($M per year in 2020) $2008

	PG&E	SCE	SDG&E	SMUD	LADWP	NorCal	SoCal	Water Agen	TOTAL CA
EE	$ 310	$ 231	$ 50	$ 55	$ 46	$ 51	$ 59	$ 802	$ 1,605
SB1	$ 996	$ 456	$ 167	$ 18	$ 33	$ 8	$ 28	$ -	$ 1,706
CHP	$ 578	$ 596	$ 119	$ 95	$ 172	$ 127	$ 174	$ 37	$ 1,898
Total	$ 1,884	$ 1,283	$ 336	$ 168	$ 251	$ 186	$ 260	$ 840	$ 5,208

PROOF OF SERVICE

I declare that:

I am employed in the County of Sacramento, State of California. I am over the age of eighteen years and am not a party to the within action. My business address is ELLISON, SCHNEIDER & HARRIS; 2015 H Street; Sacramento, California 95811-3109; telephone (916) 447-2166.

On June 16, 2008, I served the attached *Reply Comments of FuelCell Energy, Inc.* by electronic mail or, if no e-mail address was provided, by United States mail at Sacramento, California, addressed to each person shown on the attached service list.

I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed on June 16, 2008, at Sacramento, California.

/s/

Karen A. Mitchell

SERVICE LIST
R.06-04-009

abb@eslawfirm.com
abonds@thelen.com
achang@nrdc.org
adamb@greenlining.org
aeg@cpuc.ca.gov
agc@cpuc.ca.gov
agrimaldi@mckennalong.com
ahendrickson@commerceenergy.com
ahl@cpuc.ca.gov
aimee.barnes@ecosecurities.com
akbar.jazayeri@sce.com
akelly@climatetrust.org
alan.comnes@nrgenergy.com
alex.kang@itron.com
alho@pge.com
amber@ethree.com
andrew.mcallister@energycenter.org
andy.vanhorn@vhcenergy.com
anita.hart@swgas.com
annabelle.malins@fco.gov.uk
apak@sempraglobal.com
atrial@sempra.com
atrowbridge@daycartermurphy.com
Audra.Hartmann@Dynegy.com
aweller@sel.com
ayk@cpuc.ca.gov
bbaker@summitblue.com
bbc@cpuc.ca.gov
bbeebe@smud.org
bcragg@goodinmacbride.com
bdicapo@caiso.com
bernardo@braunlegal.com
beth@beth411.com
Betty.Seto@kema.com
bill.chen@constellation.com
bill.schrand@swgas.com
bjeider@ci.burbank.ca.us
bjones@mjbradley.com
bkc7@pge.com
blm@cpuc.ca.gov
bmcc@mccarthylaw.com
bmcquown@reliant.com
Bob.lucas@calobby.com
bpotts@foley.com
bpurewal@water.ca.gov
brabe@umich.edu
brbarkovich@earthlink.net
brbc@pge.com
brenda.lemay@horizonwind.com
burtraw@rff.org
bushinskyj@pewclimate.org
bwallerstein@aqmd.gov
bwetstone@hotmail.com
C_Marnay@lbl.gov
californiadockets@pacificorp.com
carla.peterman@gmail.com
carter@ieta.org
case.admin@sce.com
cathy.karlstad@sce.com
cbaskette@enernoc.com
cbreidenich@yahoo.com
cchen@ucsusa.org
cem@newsdata.com
cf1@cpuc.ca.gov
cft@cpuc.ca.gov
charlie.blair@delta-ee.com
chilen@sppc.com
cjw5@pge.com
ckmitchell1@sbcglobal.net
clarence.binninger@doj.ca.gov
clark.bernier@rlw.com
clyde.murley@comcast.net
cmkehrein@ems-ca.com
cpe@cpuc.ca.gov
cpechman@powereconomics.com
cswoollums@midamerican.com
curt.barry@iwpnews.com
curtis.kebler@gs.com
cweddington@commerceenergy.com
Cynthia.A.Fonner@constellation.com
cynthia.schultz@pacificorp.com
daking@sempra.com
Dan.adler@calcef.org
dansvec@hdo.net
dave@ppallc.com
david.reynolds@ncpa.com
david.zonana@doj.ca.gov
david@branchcomb.com
david@nemtzow.com
dbrooks@nevp.com
dbwalker@edf.org
deborah.slon@doj.ca.gov
dehling@klng.com
derek@climateregistry.org
dhecht@sempratrading.com
dhuard@manatt.com
Diane_Fellman@fpl.com
dietrichlaw2@earthlink.net
dil@cpuc.ca.gov
dkk@eslawfirm.com
dks@cpuc.ca.gov
dmacmull@water.ca.gov
dmetz@energy.state.ca.us
dniehaus@semprautilities.com
douglass@energyattorney.com
dschwyze@energy.state.ca.us

dseperas@calpine.com
dsh@cpuc.ca.gov
dsoyars@sppc.com
dtibbs@aes4u.com
dwood8@cox.net
dws@r-c-s-inc.com
echiang@elementmarkets.com
edm@cpuc.ca.gov
edwardoneill@dwt.com
egw@a-klaw.com
ehadley@reupower.com
ej_wright@oxy.com
ek@a-klaw.com
ekgrubaugh@iid.com
eks@cpuc.ca.gov
ELL5@pge.com
elvine@lbl.gov
emahlon@ecoact.org
emello@sppc.com
epoelsterl@sunpowercorp.com
epoole@adplaw.com
e-recipient@caiso.com
etiedemann@kmtg.com
ewolfe@resero.com
fiji.george@elpaso.com
filings@a-klaw.com
fjs@cpuc.ca.gov
fred.wellington@navigantconsulting.com
fstern@summitblue.com
fwmonier@tid.org
garson_knapp@fpl.com
gbarch@knowledgeinenergy.com
gblue@enxco.com
gcollord@arb.ca.gov
george.hopley@barcap.com
ghinners@reliant.com
GloriaB@anzaelectric.org
glw@eslawfirm.com
gmorris@emf.net
gpickering@navigantconsulting.com
grosenblum@caiso.com
gsmith@adamsbroadwell.com
GXL2@pge.com
harveyederpspc@hotmail.com
hayley@turn.org
hcronin@water.ca.gov
hgolub@nixonpeabody.com
hlouie@energy.state.ca.us
hoerner@redefiningprogress.org
hurlock@water.ca.gov
HYao@SempraUtilities.com
hym@cpuc.ca.gov
info@calseia.org
Jairam.gopal@sce.com
james.keating@bp.com
janill.richards@doj.ca.gov
jarmstrong@goodinmacbride.com
jason.dubchak@niskags.com
jbf@cpuc.ca.gov
jbw@slwplc.com
jchamberlin@strategicenergy.com
jci@cpuc.ca.gov
JDF1@PGE.COM
jdh@eslawfirm.com
jdoll@arb.ca.gov
jeanne.sole@sfgov.org
jeffreyGray@dwt.com
jen@cnt.org
jenine.schenk@apses.com
jennifer.porter@energycenter.org
JerryL@abag.ca.gov
jesus.arredondo@nrgenergy.com
jf2@cpuc.ca.gov
jgreco@terra-genpower.com
jhahn@covantaenergy.com
jholtkamp@hollandhart.com
jimross@r-c-s-inc.com
jj.prucnal@swgas.com
jk1@cpuc.ca.gov
jkarp@winston.com
jkloberdanz@semprautilities.com
jlaun@apogee.net
jleslie@luce.com
jluckhardt@downeybrand.com
jm3@cpuc.ca.gov
jnelson@psrec.coop
jnm@cpuc.ca.gov
jody_london_consulting@earthlink.net
joe.paul@dynegy.com
john.hughes@sce.com
johnrredding@earthlink.net
jol@cpuc.ca.gov
jose@ceert.org
josephhenri@hotmail.com
joyw@mid.org
jrathke@capstoneturbine.com
jsanders@caiso.com
jscancarelli@flk.com
jsqueri@gmssr.com
jst@cpuc.ca.gov
jtp@cpuc.ca.gov
julie.martin@bp.com
jwiedman@goodinmacbride.com
jwmctarnaghan@duanemorris.com
jwmctarnaghan@duanemorris.com
jwoodruff@nextlightrp.com
jxa2@pge.com
jzr@cpuc.ca.gov
karambelas@fce.com
karen@klindh.com
karla.dailey@cityofpaloalto.org
Kathryn.Wig@nrgenergy.com

kbowen@winston.com
kcolburn@symbioticstrategies.com
kdusel@navigantconsulting.com
kdw@woodruff-expert-services.com
KEBD@pge.com
keith.mccrea@sablaw.com
kellie.smith@sen.ca.gov
kelly.barr@srpnet.com
ken.alex@doj.ca.gov
ken.alex@doj.ca.gov
kenneth.swain@navigantconsulting.com
kerry.hattevik@nrgenergy.com
kevin.boudreaux@calpine.com
kfox@wsgr.com
kgough@calpine.com
kgrenfell@nrdc.org
kgriffin@energy.state.ca.us
kjinnovation@earthlink.net
kjsimonsen@ems-ca.com
kkhoja@thelenreid.com
klatt@energyattorney.com
kmills@cfbf.com
kmkiener@fox.net
koconnor@winston.com
kowalewskia@calpine.com
krd@cpuc.ca.gov
ksmith@sunpowercorp.com
kyle.l.davis@pacificorp.com
kyle.silon@ecosecurities.com
kyle_boudreaux@fpl.com
lars@resource-solutions.org
Laura.Genao@sce.com
lcottle@winston.com
ldecarlo@energy.state.ca.us
LeeWallach@SolelUS.com
leilani.johnson@ladwp.com
lfletcher@nrdc.org
liddell@energyattorney.com
lisa.c.schwartz@state.or.us
lisa_weinzimer@platts.com
llorenz@semprautilities.com
llund@commerceenergy.com
lmh@eslawfirm.com
lmiles@adamsbroadwell.com
Lorraine.Paskett@ladwp.com
lpark@navigantconsulting.com
lrm@cpuc.ca.gov
lschavrien@semprautilities.com
ltenhope@energy.state.ca.us
ltt@cpuc.ca.gov
lwisland@ucsusa.org
marcel@turn.org
marcie.milner@shell.com
mary.lynch@constellation.com
mc3@cpuc.ca.gov
mclaughlin@braunlegal.com
mday@goodinmacbride.com
mdjoseph@adamsbroadwell.com
mdorn@mwe.com
mflorio@turn.org
mgillette@enernoc.com
mhyams@sfwater.org
Mike@alpinenaturalgas.com
mjd@cpuc.ca.gov
mmattes@nossaman.com
mmazur@3phasesRenewables.com
mona@landsiteinc.net
monica.schwebs@bingham.com
mpa@a-klaw.com
mpryor@energy.state.ca.us
mrw@mrwassoc.com
mscheibl@arb.ca.gov
myuffee@mwe.com
nenbar@energy-insights.com
nes@a-klaw.com
nlenssen@energy-insights.com
norman.furuta@navy.mil
npedersen@hanmor.com
nrader@calwea.org
nsuetake@turn.org
ntronaas@energy.state.ca.us
nwhang@manatt.com
obartho@smud.org
obystrom@cera.com
pbarthol@energy.state.ca.us
pburmich@arb.ca.gov
pduvair@energy.state.ca.us
pepper@cleanpowermarkets.com
phanschen@mofo.com
Philip.H.Carver@state.or.us
philm@scdenergy.com
pmaxwell@navigantconsulting.com
policy@recurrentenergy.com
pperez@energy.state.ca.us
ppettingill@caiso.com
psp@cpuc.ca.gov
pssed@adelphia.net
pstoner@lgc.org
pthompson@summitblue.com
pvallen@thelen.com
pw1@cpuc.ca.gov
pzs@cpuc.ca.gov
rachel@ceert.org
ralf1241a@cs.com
ram@cpuc.ca.gov
randy.howard@ladwp.com
randy.sable@swgas.com
rapcowart@aol.com
ray.welch@navigantconsulting.com
rhelgeson@scppa.org
rhwiser@lbl.gov
richards@mid.org

rick_noger@praxair.com
rita@ritanortonconsulting.com
rkeen@manatt.com
rkmoore@gswater.com
rmccann@umich.edu
rmiller@energy.state.ca.us
rmm@cpuc.ca.gov
rmorillo@ci.burbank.ca.us
robert.pettinato@ladwp.com
Robert.Rozanski@ladwp.com
roger.montgomery@swgas.com
rogerv@mid.org
ron.deaton@ladwp.com
rprince@semprautilities.com
rreinhard@mofo.com
rrtaylor@srpnet.com
rsa@a-klaw.com
rschmidt@bartlewells.com
rsmutny-jones@caiso.com
rwinthrop@pilotpowergroup.com
ryan.flynn@pacificorp.com
S1L7@pge.com
saeed.farrokhpay@ferc.gov
samuel.r.sadler@state.or.us
sandra.carolina@swgas.com
Sandra.ely@state.nm.us
sas@a-klaw.com
sasteriadis@apx.com
sbeatty@cwclaw.com
sberlin@mccarthylaw.com
sbeserra@sbcglobal.net
scarter@nrdc.org
schansouk@semprasolutions.com
scohn@smud.org
scott.tomashefsky@ncpa.com
scottanders@sandiego.edu
scr@cpuc.ca.gov
sdhilton@stoel.com
SEHC@pge.com
sellis@fypower.org
sephra.ninow@energycenter.org
sgillette@capstoneturbine.com
sgm@cpuc.ca.gov
slins@ci.glendale.ca.us
sls@a-klaw.com
smichel@westernresources.org
smindel@knowledgeinenergy.com
smk@cpuc.ca.gov
snewsom@semprautilities.com
spauker@wsgr.com
sscb@pge.com
ssmyers@att.net
steve.koerner@elpaso.com
steve@schiller.com
stevek@kromer.com
steven.huhman@morganstanley.com
steven.schleimer@barclayscapital.com
steven@iepa.com
steven@lipmanconsulting.com
steven@moss.net
svn@cpuc.ca.gov
svs6@pge.com
tam@cpuc.ca.gov
tandy.mcmannes@solar.abengoa.com
tburke@sfwater.org
tcarlson@reliant.com
tcorr@sempraglobal.com
tcx@cpuc.ca.gov
tdarton@pilotpowergroup.com
tdelfino@earthlink.net
tdillard@sppc.com
THAMILTON5@CHARTER.NET
thunt@cecmail.org
tiffany.rau@bp.com
tim.hemig@nrgenergy.com
todil@mckennalong.com
Tom.Elgie@powerex.com
tomb@crossborderenergy.com
tomk@mid.org
trdill@westernhubs.com
troberts@sempra.com
UHelman@caiso.com
vb@pointcarbon.com
vitaly.lee@aes.com
vjw3@pge.com
vprabhakaran@goodinmacbride.com
vwelch@environmentaldefense.org
wamer@kirkwood.com
wbooth@booth-law.com
westgas@aol.com
wetstone@alamedapt.com
william.tomlinson@elpaso.com
wsm@cpuc.ca.gov
wtasat@arb.ca.gov
wwester@smud.org
wynne@braunlegal.com
ygross@sempraglobal.com
zac@cpuc.ca.gov
zaiontj@bp.com

CINDY ADAMS
COVANTA ENERGY CORPORATION
40 LANE ROAD
FAIRFIELD NJ 7004

STEPHEN E. DOYLE
CLEAN ENERGY SYSTEMS, INC.
3035 PROSPECT PARK DRIVE, STE 150
RANCHO CORDOVA CA 95670-6071

DOWNEY BRAND
555 CAPITOL MALL, 10TH FLOOR
SACRAMENTO CA 95814-4686

MARY MCDONALD
CALIFORNIA INDEPENDENT SYSTEM
OPERATOR
151 BLUE RAVINE ROAD
FOLSOM CA 95630

MELISSA JONES
CALIFORNIA ENERGY COMMISSION
1516 9TH STREET, MS-39
SACRAMENTO CA 95814