

**MURRAY E. BEVAN**  
mbevan@bmgzlaw.com

July 29, 2011

**VIA ELECTRONIC AND REGULAR MAIL**

Michael Winka  
Director, Office of Clean Energy  
44 South Clinton Avenue, 9<sup>th</sup> Floor  
Post Office Box 350  
Trenton, NJ 08625  
[publiccomments@njcleanenergy.com](mailto:publiccomments@njcleanenergy.com)

***Re: Fuel Cell Incentive Proposal—7-18-2011***

Dear Director Winka:

On behalf of our client, Bloom Energy (“Bloom”), we would like to commend the Board of Public Utilities’ (“Board’s”) Energy Efficiency Committee for introducing a new Fuel Cell Incentive Proposal (“Proposal”) on July 18, 2011 that includes all-electric fuel cells. Providing an incentive for these types of fuel cells is long overdue and should have a significant impact in assisting New Jersey to reach its energy efficiency and greenhouse gas reduction goals by encouraging consumers without a thermal load to engage in more energy efficiency projects. As the Proposal recognizes, other states including California and New York, have already modernized their energy efficiency programs to incent all-electric fuel cells, which have previously been under-represented in New Jersey despite exponential growth in customer demand.

Bloom’s energy server is a breakthrough solid oxide fuel cell technology that generates clean, highly-efficient power onsite. These fuel cells operate at a much higher temperature (800°-1000° C) than other distributed generation technologies, including traditional combined

heat and power (“CHP”) systems. This temperature range enables this technology to achieve extremely high electrical efficiencies – exceeding 50% efficiency (LHV net AC). However, achieving such a high electrical efficiency requires capturing the waste heat generated from high temperature operation and recycling it back within the system (internally) to boost overall electrical efficiency. If these high temperature technologies were optimized for combined heat and power, the electrical efficiency of this technology would *decrease* substantially. While these high temperature fuel cells can be engineered to utilize waste heat for external purposes, maximizing the system efficiency in this manner would result in a significant *reduction* in the overall electrical efficiency of the system, and would preclude customers without a thermal need from benefitting from clean, reliable, on-site electricity generation.

Although Bloom is encouraged that the Board is taking an important step forward by including all-electric fuel cells in the incentive program, we are concerned that the incentive level of \$1.00 per watt is simply too low to effectively encourage potential customers to engage this technology. Bloom believes that \$2.00 per watt, as is currently proposed for fuel cells that operate as traditional CHP system, represents a much more appropriate and equitable incentive for many customers, such as office buildings, grocery stores and warehouses, who desire reliable, environmentally-friendly distributed solutions, but have no utilization for the waste heat. Furthermore, increasing the incentive would promote New Jersey’s energy efficiency policy as expressed by the Board and the Energy Master Plan by encouraging greater participation in the program. Indeed, the value that would be gained to New Jersey from the increase would far outweigh the costs.

By creating parity and raising the incentive level for all-electric fuel cells to \$2.00 per watt, as is currently proposed for fuel cells with a waste heat utilization, the Board would also be enabling all promising energy technologies to fairly compete towards achieving scale and commercial viability, rather than picking “winners” and “losers.” Leveling the playing field in this manner will encourage more customers to employ the clean energy technologies that best meet their needs, which, in turn will increase competition and drive down prices.


As further rationale for increasing the incentive level to the same \$2.00 per watt as is offered to traditional CHP, Bloom would like to emphasize that the terms of its service contract far exceed the Proposal’s suggestion that a “five year service contract (which covers stack

Mr. Winka  
July 29, 2011  
Page 3 of 3

replacement) or an all-inclusive five-year system warranty should be required.” The Board correctly recognizes that some historical fuel cell projects did not live up to expectations. It is important to highlight that Bloom offers maintenance of its fuel cell systems for the entire term of its projects, which typically run for ten years or more. Bloom also backs the performance of its fuel cells with a full service warranty throughout the length of the project. This warranty includes all system maintenance (including all stack replacements) and a cash-back based performance guarantee. Such a unique and comprehensive warranty offering results in lower total costs of customer ownership and should mitigate any concerns that the Board has with maintenance costs, including stack replacement.

Once again, we want to express our whole-hearted support for an all-electric fuel cell incentive and hope that it is implemented by the Board at its next agenda meeting. However, before adoption, we urge the Board to raise the incentive level from \$1.00 per watt to \$2.00 per watt, because it creates a level playing field and promotes the energy efficiency and greenhouse gas reduction goals of the Board and Energy Master Plan by encouraging customers without a thermal need to participate in the program. Please do not hesitate to contact me should you have any questions or concerns.

Very truly yours,



Murray E. Bevan

**From:** Peter K Dutta Roy, PE [mailto:info@pdrassoc.com]  
**Sent:** Wednesday, July 20, 2011 4:56 PM  
**To:** publiccomments@njcleanenergy.com  
**Subject:** Fuel Cell incentives Tier I w/nat gas & other w/LF gas

Now that data & info on NJ Biomass inventory and associated energy resources are being developed by BPU, I believe Bio gas as feedstock for Fuel cell should be included along with rate of incentives. Bio gas is cleaner fuel and not "Dirtier" LFG fuel and may be Tier I incentive is appropriate.

Also incentives for energy production with varieties of NJ biomass need to be initiated also.

Thanks,

PDR Assocs Energy Inc  
8 Packard Road, Ste 1  
East Brunswick, NJ 08816  
Peter K Duttaroy, PE  
T: 732 390 8069

**From:** Fred Lange [mailto:[langepower@msn.com](mailto:langepower@msn.com)]  
**Sent:** Wednesday, July 20, 2011 1:52 PM  
**To:** [publiccomments@njcleanenergy.com](mailto:publiccomments@njcleanenergy.com)  
**Subject:** fuels cells

To the study group:

Would it be of interest to have as a feedstock to fuel cells a supply, steady state of methanol?

If so I can be of assistance.

We are embarking on the production of from 10 to 20 million gallons annually of CH<sub>3</sub>OH, in the pure form, from waste wood or biomass or combination of the two.

best regards,

Fred Lange, President  
Electro Source, Inc.  
888 Veterans Memorial Hwy, Suite 120  
Hauppauge, NY 11788

631 232 2727  
631 232 2724 (fax)  
631 988 0968 cell  
Skype BARGETTE73  
[langepower@msn.com](mailto:langepower@msn.com)  
[freddy39@mac.com](mailto:freddy39@mac.com)  
[freddy66@optonline.net](mailto:freddy66@optonline.net)



August 1, 2011

Michael Winka  
New Jersey Board of Public Utilities  
Office of Clean Energy  
P.O. Box 350  
44 South Clinton Street, 9<sup>th</sup> Floor  
Trenton, New Jersey 08625-350

**Re: Fuel Cell Incentive Proposal dated July 18, 2011**

Dear Mr. Winka:

By way of this letter, New Jersey Natural Gas Company (the Company or NJNG) is providing comments in response to the Fuel Cell Incentive Proposal (the Proposal) that was circulated on July 20, 2011 by the New Jersey Board of Public Utilities (the Board or BPU). At the outset, we are pleased that the Board is considering revisions to New Jersey's Clean Energy Program (NJCEP) to broaden the category of distributed generation technologies being supported. As you know, technology advances are occurring rapidly in many forms of energy-efficiency equipment and it is crucial at this time that some of the upfront hurdles that deter customers from investing in energy-efficient generation be addressed. NJNG has been a long-time supporter of fuel cell technology as an additional means of generating electricity. We have followed the ever-increasing technology changes that will provide New Jersey's residents and businesses with low-emission, quiet and clean energy while providing overall benefits to all ratepayers. Recently, the United States Department of Defense (DOD) and Department of Energy (DOE) announced a five-year partnership through which DOD will install and operate 18 fuel cell back-up power systems at 8 military installations throughout the country, including the Picatinny Arsenal in Northern New Jersey. DOD will manage this project and DOE will collect data for analysis. In recognizing the inherent benefits of fuel cells (quiet, fewer emissions and pollutants, and no reliance on petroleum based products), the two agencies also acknowledge the high upfront costs associated with this technology. This project is intended to test the application of fuel cells in day-to-day operations to increase the level of deployment and improve

the associated economics. It is intended that the information gathered by DOE will be made available to technology developers, as well as others interested in fuel cell technology.

The comments today will address three main points: NJNG's agreement with and support of the positions set out in the EMP concerning further support for and assessments of fuel cell technology; the need for incentives to spur interest in fuel cells that encourage market competition with the resulting economic development opportunities, and help overcome the current high cost barriers; and, the importance of establishing appropriate incentive levels that do not distinguish between various technologies.

As noted in the recently released Draft Energy Master Plan (EMP), fuel cells are being viewed as promising emission free sources of electricity. Because these units can run at any time, peak demand needs can be alleviated for those customers utilizing on-site fuel cell technology which serves to benefit other customers. Since the units are located at or near the facility receiving the energy, costs associated with electricity consumption are lowered. Importantly, the use of fuel cells by participating customers will provide benefits to other customers by alleviating the need for additional transmission and distribution asset investments. "DG resources, such as fuel cells and emergency generators, produce power at or near the location where it is consumed, offsetting the host facility's electric load." (EMP, pages 8 and 80). Furthermore, fuel cells are more efficient than other generation sources and produce fewer emissions. "The nature of this electrochemical reaction means that fuel cells are not subject to the thermodynamic cycle efficiency limits that are characteristic of steam or combustion-based generating technologies. Hence, the potential generation efficiency of fuel cells can be high. In addition, the low operating temperature produces comparatively low NO<sub>x</sub> emissions." (EMP, page 116).

However, as with all developing technologies, there currently exists an inherent financial barrier that discourages customers from making the necessary up-front investments in fuel cell technology. Although significant advances over the past 10 years in fuel cell technology have already lowered costs and increased efficiency levels, the required investment is still often unacceptably high to many commercial customers, in light of the longer payback period. Because of that, it is imperative that financial incentives at the appropriate monetary levels be made available in New Jersey, at least for the time being, to encourage at least some customers to install the technology so the state's energy efficiency programs can gain additional insight into

their actual performance. Advances in the technology continue which is increasing customer interest in utilizing the clean, quiet fuel cell products; however, financial factors frequently overwhelm a customer's interest in testing new er technology. As New Jersey has done with other renewable energy and energy-efficient products, providing incentives serves to jump-start the industry which increases customer participation, encouraging further technology development and, importantly, bringing additional jobs and e conomic growth to New Jersey.

NJNG supports the language in the Proposal to provide the necessary financial incentives related to further utilization of fuel cell technology but is concerned with both the level of the proposed incentives and the distinction made between fuel cells that provide heat and those that do not. By incenting a developing market, customer participation will increase which, in turn, provides both the marketplace and the BPU with a viable opportunity to accurately assess the benefits provided through fuel cells. If the incentives are too low, the payback period becomes unreasonably long for New Jersey businesses and they cannot justify making the necessary investments. Additionally, NJNG disagrees with the different incentive levels proposed for fuel cells that generate heat and those that do not. There are customers for whom the fuel cell that generates heat is not appropriate. If the business, for example, does not have a thermal load, the fuel cell without waste heat is more appropriate. For example an office building is a prime example of a location that can benefit from utilizing a fuel cell but does not need the waste heat since their electricity is generally used for such things as data storage and computer equipment. Since install prices for the two technologies do not differ greatly, this distinction effectively punishes a commercial customer who does not need the waste heat and will discourage investment in this technology. As such, NJNG suggests that a standard incentive level be initially established at the higher end of the range proposed and be applicable to both forms of fuel cell technology. Based upon some rough modeling NJNG believes that even at a \$2.00 per watt incentive level, customers are likely to face a payback period in excess of 5 years. As New Jersey has successfully done with other technologies, that incentive are frequently set higher at the outset and subsequently modified as the market develops, competition grows, and the technology continues to advance to benefit more customers. Finally, while NJNG supports and encourages businesses to take advantage of the benefits provided through the Pay for Performance (P4P) offers, we are concerned that the requirement of participation in P4P in order to obtain the fuel cell incentives will deter certain entities from investing in this technology.

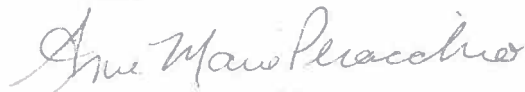


Many businesses have already installed energy-efficiency measures and won't meet the energy saving requirements of P4P and it is not appropriate to limit the opportunities of businesses which may have already made significant efforts to improve the energy efficiency of their facilities.

In closing, NJNG applauds the BPU for its ongoing assessment of renewable energy and energy-efficiency products as those markets evolve and technologies develop so that New Jersey residents and businesses are provided with the opportunities to make the necessary investments in clean energy.

Thank you for providing the opportunity to offer our comments on this beneficial and evolving technology.

Sincerely,



Anne-Marie Peracchio

Director- Conservation and Clean Energy Policy

Cc: Michael Winka, BPU  
Michael Ambrosio, AEG  
Mona Mosser, BPU  
[oce@bpu.state.nj.us](mailto:oce@bpu.state.nj.us)



State of New Jersey  
DIVISION OF RATE COUNSEL  
31 CLINTON STREET, 11<sup>TH</sup> FL  
P. O. BOX 46005  
NEWARK, NEW JERSEY 07101

CHRIS CHRISTIE  
*Governor*

KIM GUADAGNO  
*Lt. Governor*

STEFANIE A. BRAND  
*Director*

August 1, 2011

**Via Overnight Delivery and Electronic Mail**

Honorable Kristi Izzo, Secretary  
NJ Board of Public Utilities  
44 South Clinton Avenue, 9<sup>th</sup> Floor,  
P.O. Box 350  
Trenton, NJ 08625

Re: In the Matter of Comprehensive Energy Efficiency  
and Renewable Energy Resource Analysis for 2009-2012:  
2011 Programs and Budgets: Compliance Filings  
Proposed Budget Changes  
BPU Docket Nos.: E007030203 and E010110865

Dear Secretary Izzo:

Enclosed please find an original and ten copies of comments submitted on behalf of the New Jersey Division of Rate Counsel in connection with the above-captioned matter. Copies of the comments are being provided to all parties by electronic mail and hard copies will be provided upon request to our office.

We are enclosing one additional copy of the comments. Please stamp and date the extra copy as "filed" and return it in the enclosed self-addressed stamped envelope.

Honorable Kristi Izzo, Secretary

August 1, 2011

Page 2

Thank you for your consideration and assistance.

Respectfully submitted,

STEFANIE A. BRAND

Director, Division of Rate Counsel

By:



Kurt S. Lewandowski, Esq.

Assistant Deputy Rate Counsel

C: [publiccomment@njcleanenergy.com](mailto:publiccomment@njcleanenergy.com)

[OCE@bpu.state.nj.us](mailto:OCE@bpu.state.nj.us)

Mike Winka, BPU

Mona Mosser, BPU

Benjamin Hunter, BPU

Anne Marie McShea, BPU

**In the Matter of Comprehensive Energy Efficiency  
and Renewable Energy Resource Analysis  
for 2009-2012 Clean Energy Program:  
2011 Programs and Budgets: Compliance Filings  
BPU Docket Nos. EO07030203 and EO10110865**

**Proposed Budget Changes**

**Comments of the New Jersey  
Division of Rate Counsel**

**August 1, 2011**

**Introduction**

The Division of Rate Counsel (“Rate Counsel”) would like to thank the Board of Public Utilities (“BPU” or “Board”) for the opportunity to present our comments on the proposed changes to the Board-approved 2011 Clean Energy Program (“CEP”) budget which were circulated to stakeholders for comment by the Applied Energy Group on behalf of the Office of Clean Energy (“OCE”) in an e-mail notice issued July 25, 2011 (the “July 25 Notice”). The proposed changes and Rate Counsel’s recommendations are set forth below.

**1. Transfer: \$445,000 from the CORE Program Budget to the Sustainable Jersey Budget.**

The OCE proposes to transfer \$445,000 from the CORE program to the Sustainable Jersey budget line to pay expenses for Sustainable Jersey services provided in 2010 that will be or have been invoiced in 2011. The CORE program has been closed since 2008, and the remaining budgeted CORE funds are now available due to the cancellation of renewable energy projects that were previously approved for CORE rebates. Rate Counsel does not oppose the proposed transfer.

**2. Transfer: \$495,000 from the Rebate Component of the REIP Budget to the Rebate Processing, Inspections and Other Quality Control Component of the REIP budget.**

The OCE proposes to increase the budget for “Rebate Processing, Inspections and Other Quality Control” by \$495,000.00, from \$2,325,666.05 to \$2,820,666.05. The OCE further states that the increase is needed to cover the increase in processing costs as a result of the large increase in the quantity of new SREC Registration Program (“SRP”) applications that have been received and approved so far, with the expectation that this level of activity will continue into the last quarter of 2011. The total Renewable Energy Incentive Program (“REIP”) budget remains unchanged at \$41,612,455.10, and the additional funds available for processing SRP applications are a result of REIP project cancellations. Rate Counsel does not oppose the proposed transfer.

**3. Transfer: \$50,000 from the Rebates, Grants and Other Direct Incentives Budget Category to the Training and Technical Support Budget Category of the TEACH Program.**

The OCE states that sufficient funds remain in the Rebates, Grants and Other Direct Incentives budget category to meet its anticipated expenses in 2011. The TEACH program was closed to new applicants in 2010 and the 2011 budget is for completing projects that submitted applications in 2010. The OCE proposes to transfer \$50,000 from the “Rebates, Grants and Other Direct Incentives” budget category to the “Training and Technical Support” budget category of the TEACH Program. Rate Counsel does not oppose the proposed transfer.

**Conclusion**

Rate Counsel does not oppose the proposed transfers set forth in the July 25 Notice.



State of New Jersey  
DIVISION OF RATE COUNSEL  
31 CLINTON STREET, 11<sup>TH</sup> FL  
P. O. Box 46005  
NEWARK, NEW JERSEY 07101

CHRIS CHRISTIE  
*Governor*

KIM GUADAGNO  
*Lt. Governor*

STEFANIE A. BRAND  
*Director*

July 29, 2011

**Via Hand Delivery and Electronic Mail**

Honorable Kristi Izzo, Secretary  
New Jersey Board of Public Utilities  
Two Gateway Center  
Newark, NJ 07102

**Re: In the Matter of Comprehensive Energy Efficiency  
and Renewable Energy Resource Analysis for 2009-2012:  
2011 Programs and Budgets: Compliance Filings  
Fuel Cell Incentive Proposal  
BPU Docket Nos.: EO07030203 and EO10110865**

Dear Secretary Izzo:

Enclosed please find an original and ten copies of comments submitted on behalf of the New Jersey Division of Rate Counsel in connection with the above-captioned matter. Copies of the comments are being provided to all parties by electronic mail and hard copies will be provided upon request to our office.

We are enclosing one additional copy of the comments. Please stamp and date the extra copy as "filed" and return it to our courier.


Honorable Kristi Izzo, Secretary  
July 29, 2011  
Page 2

Thank you for your consideration and assistance.

Respectfully submitted,

STEFANIE A. BRAND  
Director, Division of Rate Counsel

By:

  
\_\_\_\_\_  
Kurt S. Lewandowski, Esq.  
Assistant Deputy Rate Counsel

c: [publiccomment@njcleanenergy.com](mailto:publiccomment@njcleanenergy.com)  
[OCE@bpu.state.nj.us](mailto:OCE@bpu.state.nj.us)  
Mike Winka, BPU  
Mona Mosser, BPU  
Benjamin Hunter, BPU  
Anne Marie McShea, BPU

**In the Matter of Comprehensive Energy Efficiency  
and Renewable Energy Resource Analysis  
for 2009-2012 Clean Energy Program:  
2011 Programs and Budgets: Compliance Filings  
BPU Docket Nos. EO07030203 and EO10110865**

**Fuel Cell Incentive Proposal**

**Comments of the New Jersey  
Division of Rate Counsel**

**July 29, 2011**

**Introduction**

The Division of Rate Counsel (“Rate Counsel”) would like to thank the Board of Public Utilities (“BPU” or “Board”) for the opportunity to present our comments on the proposed modifications to the 2011 Clean Energy Program (“CEP”) incentives for fuel cells which were submitted to stakeholders for comment by the Office of Clean Energy (“OCE”) in an e-mail notice issued July 20, 2011 (the “July 20 Notice”). OCE has requested comments on its proposal to (1) institute a new incentive for fuel cells without heat recovery and (2) modify the current incentive for fuel cells with heat recovery.

**OCE’s Proposed Modifications**

CEP currently offers a \$4 per watt incentive for fuel cells with waste heat recovery through the Pay-for-Performance Program (“P4P”) with a cap of 60% of total project cost or \$1 million (whichever is less). The OCE proposed the following modification to this program, shown in the table below:

| <b>Application Type</b>             | <b>Minimum Efficiency</b>           | <b>Incentive</b> | <b>Cap</b>  |
|-------------------------------------|-------------------------------------|------------------|---|
| Fuel Cell w/ waste heat utilization | 60% (combined electric and thermal) | \$2.00/watt      | 60% of total project cost or \$1million (lesser of) |
| Fuel Cell (natural gas powered)     | 45% (electric only)                 | \$1.00/watt      | 60% of total project cost or \$1million (lesser of) |



## **Rate Counsel's Recommended Modifications**

Rate Counsel supports the OCE's proposed reduction in the P4P program incentive levels for fuel cell systems "with waste heat recovery." However, Rate Counsel recommends the following modifications to the OCE's incentive proposal for fuel cell systems "without waste heat recovery" (which are listed as "Fuel Cell (natural gas powered)" in the above table):

- \$1.00 per watt incentive for fuel cell systems above 25 kW without waste heat utilization
- \$0.20 per kWh performance incentive for fuel cell systems up to 25 kW without waste heat utilization. Incentives would be capped at \$70,000 per project site during the first three years. A minimum capacity factor of 50% would be required.

Rate Counsel proposes a separate incentive structure for small scale fuel cell projects (under 25 kW, without waste heat recovery) for two reasons. First, performance incentives will encourage installation of fuel cells that will be used to displace power generated by fossil fuel plants. Small scale fuel cells such as Proton Exchange Membrane ("PEM") fuel cells (available in the range of 5 to 10 kW) are often used as back-up systems. If incentives are offered on a per watt basis, the OCE's proposed incentives will likely operate to promote back-up systems that will run infrequently and, thus, will produce few environmental benefits. Apparently, the New York State Energy Research and Development Authority ("NYSERDA") recognized this and modified its small scale fuel cell incentive program last year to include a performance-based incentive structure. Note that the NYSERDA fuel cell program does not require fuel cells to recover waste heat as PEM systems - the NYSERDA program's only eligible type of fuel cell system - rarely utilize waste heat.<sup>1</sup>

---

<sup>1</sup> Descriptions of NYSERDA's small scale fuel cell incentive program are available at <http://www.nyseda.org/funding/2157summary2.pdf> and [http://www.dsireusa.org/incentives/incentive.cfm?Incentive\\_Code=NY44F&re=1&ee=1](http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NY44F&re=1&ee=1).

Second, small fuel cell systems are significantly more expensive on a per kW basis than large scale fuel cell systems. Thus, it would make sense to provide slightly higher incentives to small systems. According to a report prepared for the US EPA in 2008, the smallest fuel cell system (10 kW) suitable for residential and small commercial customers is the most expensive on a per kW basis, costing over \$9,000 per kW while larger installations cost between \$5,000 to \$6,000 per kW.<sup>2</sup> A table of fuel cell costs is provided as an Attachment to these comments.<sup>3</sup>

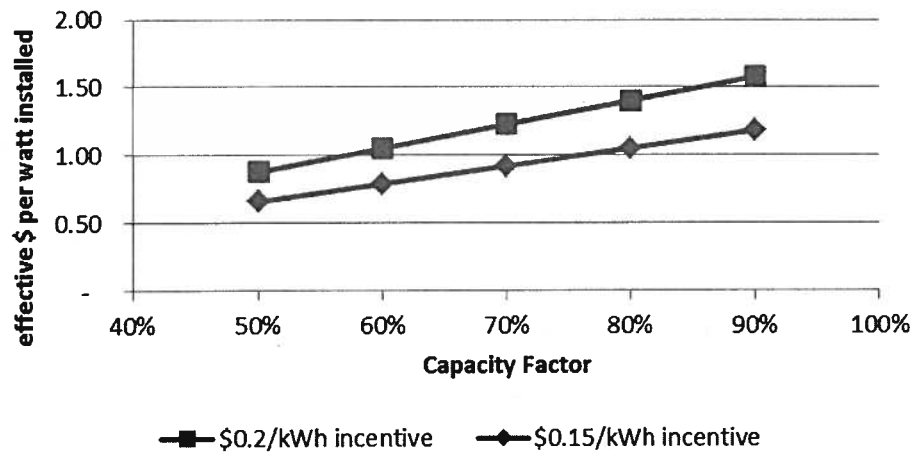
Rate Counsel's proposed incentive structure for small systems is based on NYSERDA's small fuel cell program. However, Rate Counsel proposes a slightly higher incentive level of \$0.20 per kWh (instead of \$0.15 per kWh) to better promote smaller systems. The \$0.20 per kWh incentive provides slightly higher total incentives per watt than the \$1 per watt incentive currently proposed by OCE for fuel cells without waste heat recovery. The following chart shows effective incentive per watt installed based on performance incentives of \$0.15 per kWh and \$0.20 per kWh over the first three years at various capacity factors.

---

<sup>2</sup> "Technology Characteristics: Fuel Cells", a report prepared by Energy and Environmental Analysis, Inc. for the US Environmental Protection Agency (December 2008), p. 14. This report is a part of the US EPA's "Catalog of CHP Technologies" available at <http://www.epa.gov/chp/basic/catalog.html>.

<sup>3</sup> While the cost estimates are a few years old, we believe the cost difference among different fuel cell technologies has not changed significantly.

### Effective incentives per watt installed for fuel cells at different capacity factors



It is our understanding that NYSERDA received no new applications for the small fuel cell program since the program's launch last year. While no study was conducted to examine reasons for the lack of applications, the incentive level is likely to be one of the major reasons. As noted in OCE's fuel cell incentive proposal, California has a higher incentive for smaller systems as well: \$2.5 per watt for systems  $\leq 1$  MW, and \$1.25 per watt for  $>1$  MW to 2 MW systems. In sum, Rate Counsel proposed incentives for small fuel cell systems without heat recovery would be more in line with the incentives for such systems offered by New York and California.

### **Conclusion and Recommendations**

Rate Counsel's comments are summarized as follows:

- Adopt the OCE's proposed reduction in the incentive level for fuel cells with heat utilization; and
- Modify the OCE's proposed incentive for fuel cell systems without waste heat utilization by implementing a larger incentive for small systems.

## ATTACHMENT

**TABLE: Estimated Capital Cost for Typical Fuel Cell Systems in Grid Interconnected CHP Applications (2007 \$/kW)**

| Installed Cost Components                        | System 1 | System 2 | System 4 | System 5 |
|--|----------|----------|----------|----------|
| Fuel Cell Type                                   | PAFC     | PEM      | MCFC     | MCFC     |
| Nominal Capacity (kW)                            | 200      | 10       | 300      | 1200     |
| Equipment  |          |          |          |          |
| Fuel Cell Package                                | \$4,500  | \$8,000  | \$4,000  | \$3,870  |
| Heat Recovery and other equipment                | \$80     | \$0      | \$60     | \$30     |
| Interconnect/Electrical                          | \$150    | \$500    | \$120    | \$40     |
| Total Equipment                                  | \$4,730  | \$8,500  | \$4,180  | \$3,930  |
| Labor/Materials                                  | \$0      | \$0      | \$0      | \$0      |
| Labor/Materials                                  | \$330    | \$600    | \$290    | \$280    |
| Total Process Capital                            | \$5,060  | \$9,100  | \$4,470  | \$4,210  |
| Project and Construction Management              | \$710    |          | \$630    | \$590    |
| Engineering and Fees                             | \$240    |          | \$210    | \$200    |
| Project Contingency                              | \$240    |          | \$210    | \$200    |
| Project Financing (interest during construction) | \$70     |          | \$60     | \$60     |
| Total Plant Cost \$/kW                           | \$6,310  | \$9,100  | \$5,580  | \$5,250  |

Source: "Technology Characteristics: Fuel Cells", a report prepared by Energy and Environmental Analysis, Inc. for the US Environmental Protection Agency (December 2008), p. 14. This report is a part of the US EPA's "Catalog of CHP Technologies" available at <http://www.epa.gov/chp/basic/catalog.html>