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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.	:	Rulemaking 08-03-008 (Filed March 13, 2008)

COMMENTS OF BALANCE ENERGY, A BAE SYSTEMS INITIATIVE, ON ADMINISTRATIVE LAW JUDGE'S RULING REQUESTING COMMENTS ON THE IMPLEMENTATION OF SENATE BILL 412 AND NOTICING WORKSHOP

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I. Introduction

Pursuant to the November 18, 2009 Administrative Law Judge's Ruling Requesting Comments from parties regarding the implementation of Senate Bill (SB) 412 (Stats. 2009, Ch. 182), which amends the Public Utilities Code relating to the Self-Generation Incentive Program (SGIP), Balance Energy (BE), a BAE Systems initiative, submits these Reply Comments.

BE is currently working with BAE Systems, its parent company, to implement self generation fuel cell, biomass gasification, demand response and energy efficiency projects at its campuses and manufacturing facilities throughout the state.

BAE Systems is the premier global defense, security, and aerospace company, delivering a full range of products and services for air, land, and naval forces. The company has a strong focus on smart energy solutions, drawing on 35 years of experience in advanced electronics, power management, information technology, wireless communications, security systems, and customer support services. Its current energy initiatives are focused on ensuring reliable, cost-effective, and sustainable power generation to address emerging utility, municipality, community, and military demands. Key areas include smart microgrids, distributed renewable resources, sustainable communities, hybrid electric heavy vehicles, and sustainable military-deployed and static installations. The company's 106,000 employees serve customers in more than 100 countries and "home markets" in the United States, United Kingdom, Australia, Saudi Arabia, South Africa, and Sweden. BAE Systems' 2008 sales exceeded $34.4 billion. The company's U.S. subsidiary, BAE Systems Inc., is based in Rockville, Maryland, and employs more than 55,000 people in electronics, intelligence, control systems, land vehicles, armaments, and mobility capabilities.

We are also collaborating with multiple third party developers, institutional and industrial facility owners, military bases and system suppliers to support the implementation of bio-

fuels power systems. Our projects focus on two distinct technologies-fuel cell power systems utilizing bio-fuels as the primary fuel and the conversion of biomass into energy through gasification with power produced in a steam cycle or engine generator. For both technologies, we are emphasizing combined heat and power (CHP) wherever possible for the efficiency and pollution reduction benefits.

Current and in process BAE Systems' Balance Energy entails biogas fuel cells and gasification projects:

- BAE campus and manufacturing facilities' projects, including Rancho Bernardo (BE's headquarters).
- Federal government facilities where BAE has strong contractual relationships (including military installations)
- Commercial/industrial projects
- Municipal projects (wastewater plants and landfills)

Balance Energy focuses on the end-to-end design, development and delivery of resilient distributed generation solutions. It was formed with an underlying objective to help customers meet their renewable energy technical and business challenges. BE believes that safe, controllable, reliable MicroGrids and Renewable Generation, coupled with energy efficiency and combined heat and power applications where possible, are complimentary infrastructure customer assets that increase grid reliability, stabilize long-term energy costs, and mitigate negative environmental impact.

II. Lessons Learned and Recommendations

While early versions of the SGIP program were extremely successful in stimulating solar, gas fired cogeneration and other technologies; to date it has not been effective in promoting the implementation of bio-fuels powered fuel cells ("bio-fuel cells") projects. We understand that unlike the previous solar program, which was so effective that a lottery

system had to be utilized to distribute available funding to the multitude of requesting projects, the bio-fuel cell program has never had enough qualified applicants to use up the available funds. This confirms that the program requires significant modification to be effective.

Based on information presented in Itron's SGIP Eighth Year Program Review Report, of the 1,242 total projects funded by the SGIP program, only 19 were fuel cells, of which only 5 projects used bio-fuels. Only about 1% of the total SGIP program generation came from this technology. Yet the bio-fuel cells provided more the double the average greenhouse gas reduction per ton (.55 tons reduced per MWH compared to an average of 0.25). Fuel cells also provided the highest CHP capacity factor (0.612 compared to 0.487 for IC Engines and 0.211 for micro-turbines) and the highest electrical efficiency-40.6 %, compared to 23.5-30.1% for the other technologies.

Through our experience working on related project development and financing, we have come to understand the challenges they face and offer the following list of SGIP modifications for your consideration. If these modifications are enacted, we are confident that our projects, as well as many others that other companies and municipalities are struggling with, will be able to be successfully implemented, and assist in decreasing the number of greenhouse gas emission pollutants in California.

As mentioned in our earlier submittal of comments, Balance Energy requests the following SGIP program modification requests:

1. Include biomass gasification/power generation technologies as eligible for SGIP regardless of the technology utilized for converting the resultant bio-gas into electricity.
2. Allow biogas to be produced at the location where the biomass is produced and transported to the project site, via the utility gas pipeline (regardless of the biomass type, source and location).

3. Increase the base SGIP amount for biogas fueled fuel cells and biomass gasification power technologies to $6.5 million per Megawatt (MW) .
4. Raise the allowable project size for these two technologies to 10 MW, with SGIP incentives available for the first 6MW.
5. Eliminate the financial disincentives for larger systems by allowing 100% of the SGIP payment for the first 3MW and 80% of the payment ($5.2 million per Megawatt) for the next three Megawatts.
6. Provide enhanced benefits for CHP applications of the above technologies in the amount of an additional $1.25Million/MW for the first 3 MW of capacity and $1.0 million for the next three Megawatts.
7. Provide enhanced benefits where energy efficiency measures (EEM) are incorporated in the self generation project that reduces the overall plant size equal to the amount of reduction in the SGIP level that occurred because of the project size reduction resulting from the EEMs.
8. Incorporate other new technologies that show similar levels of efficiency and pollutant reduction, but do not reintroduce the micro-turbine, internal combustion engine and gas turbine technologies, which were once allowed, but are not currently eligible for SGIP financial support.

In particular, Balance Energy emphasizes recommendations number five, three and one as essential to make the SGIP market reach its full potential.

Each of these recommendations are discussed below in more detail.

1. **Include biomass gasification/power generation technologies as eligible for SGIP regardless of the technology utilized for converting the resultant bio-gas into electricity,**

Biomass that could be converted into useful energy comes in many forms. It includes

residues form forestry, agricultural, food and lumber processing and municipal wastes as well as sustainable harvested biomass crops specifically cultivated for power production. To date, biomass utilization for power production has, almost exclusively been through direct combustion of wood and agricultural wastes. While there are a wide variety of more efficient, cleaner gasification technologies available, their relative newness in the market place and higher costs have limited their application to small pilot projects and commercial scale projects .

These available technologies process the biomass into a bio-fuel and then convert that bio-fuel into electric power. They may incorporate CHP as well. However, none of the systems that are, or are close to being commercially available, utilize fuel cells. They are instead based on power generation using steam or rankine cycle, turbine or internal combustion engine power generating systems. Accordingly, they do not presently qualify for SGIP. If they did, several projects that are now stuck in the development/pre-financing stage, could become reality. This would produce more renewable energy for self-generation, while at the same time eliminate greenhouse gases and other pollutants.

BE has and continues to investigate these technologies and as an Engineering/Procurement/Construction (EPC) Contractor has determined that some of them are sufficiently mature to allow BE to stand behind their ability to perform. This removes the technical risk. Therefore, if the SGIP program provides the economic incentives to make these projects financially attractive, the program would be successful and many biomass gasification projects would be implemented statewide.

2. Allow SGIP eligibility for projects where the biomass is converted to bio-gas at one location and transported to the project site, via the utility gas pipeline, regardless of the biomass type, source and location.

Unfortunately, biomass for conversion to bio-fuels is often not available or able to be delivered to the same location as where the self-generated power is needed. Wastewater treatment plants and landfills generate large quantities of bio-gas, but are often far from significant consumers of electricity. Compression and trucking on the bio-gas is technically feasible, but is very expensive and adds traffic impacts with their attendant greenhouse gas and other pollutant production as well as consumption of fossil fuel. So extraction, clean-up and introduction into the exiting gas utility pipeline network, allows self generators wanting biogas based power for environmental and cost reasons, to be able to develop bio-fueled power systems for self use.

3. Increase the base SGIP amount for biogas fueled fuel cells and biomass gasification power technologies to $6.5 million per Megawatt .

Biomass gasification technologies and bio-fuel cells are significantly more expensive to install then conventional power generating equipment. For self generation projects of the size typically considered for self generation applications, the costs are in the $8 to $11 million/installed megawatt range when the cost of bio-gas production, clean-up and delivery are included. Conventional reciprocating engines and gas turbine systems can be installed for $2 million per MW or less. As indicated by the low level of interest in implementing these systems, the current incentive level is too low to stimulate the market. Based on our project evaluations and experience, we have calculated that by including biomass gasification and setting the base incentive rate for gasification and bio-fuel cells at $6.5 million per MW. Any less, will likely not be sufficient to make the projects viable at current pricing levels. This level should be reconsidered every two or three years and the pricing adjusted to appropriately. This suggested funding level, especially when coupled with our other recommendations that follow, should be adequate to stimulate a robust bio-fuel cell and biomass gasification SGIP contribution.

4. Raise the allowable project size for these two technologies to ten MW with SGIP benefits available on up to six MW.

Current projects in BE's pipeline cover a range of sizes from less then 1MW to up to 10 MW. However, the current SGIP payment is limited to projects of 5MW or less, provides benefits only for the first three MW and substantially reduces the benefit after the first MW.

In general, the larger the project, the more cost effectively the biomass can be converted to bio-fuels and the bio-fuels cleaned up and converted into clean, renewable power. Also, the cost of the development process, (permits, equipment selection, legal and financing fees etc) are generally as much for a small project as a large project. Raising the limit to ten MW would allow these larger projects to be developed increasing both the number of projects implemented and the total self-generation capacity, key goals of the SGIP program.

For example, BAE's campus in Rancho Bernardo could utilize up to 2 MW. Other BAE facilities around CA are larger in size including manufacturing facilities in state and our programs at projects at military bases.

5. Eliminate the financial disincentives for larger systems by allowing 100% of the SGIP payment for the first 3MW and 80% of the payment ($5.2 million per Megawatt) for the next three MW of peak system capacity.

One of the reasons that the SGIP program has failed to stimulate significant development of bio-fuels projects in the current system, is the disincentives for projects greater then 1 MW The largest fuel cell project funded under the SGIP program is only 1.2 MW. However, BE is aware of a number of interested bio-fuel cell project sites, with self generation needs well in excess of 5 MW.

Because fuel cells and biomass gasifiers are typically modular assemblies of smaller units, there isn't as much economy of scale as in traditional power plants and certainly not the extent of capital cost reduction (50% for the second MW and 75% for the third MW) as is embodied in the current SGIP program. Thus, the benefit reduces too quickly to mirror project cost economies of scale.

While BE understands the need to spread the available funding over many projects, the way the benefit is currently structured creates a financial preference for small projects regardless of the need of the host site. A larger project may better match the host site's needs, be more cost effective and have enhanced environmental benefits than multiple smaller projects.

To successfully make these projects economic, given today's system costs, we recommend that the full $6.5 million per MW payment be made on up to the first three MW and 80% of that amount ($5.2 million per MW) be granted on the next three MW up to a total incentivized capacity of 6 MW.

6. Provide enhanced benefits for CHP applications of the above technologies in the amount of an additional $1.25Million/MW for the first 3 MW of capacity and $1.0 million for the next three Megawatts.

The SGIP is a great program and should expand to again include CHP to maximize the full benefits. Biogas sourced CHP (both through fuel cells and biomass gasification) is reliable and can reduce fossil fuel demand while providing energy efficiency. CHP also assists with reducing green house gas emissions and decrease toxins in the air and water. It is one more source to recycle unwanted bio-products and turn them into productive energy. Because of these attributes and others, combined heat and power units do meet the SB 412 greenhouse reduction gas goals. Bio-fuel cells had both the highest capacity factors (0.612) and combined electrical/thermal efficiency (48.8%) of

the various prime movers funded in the eight years of the SGIP program covered in the ITRON Report.[1]

While fuel cell power generation alone is significantly more efficient then traditional power generation, and gasification of biomass is more efficient then direct combustion as is the current practice, utilizing the waste heat generated dramatically increases overall system efficiency providing more efficient use of the biofuels and a corresponding decrease in fossil fuel consumption and air pollution emission generation. CHP applications for fuel cell projects funded under the SGIP program raised their overall efficiency by almost 20%, from an electrical efficiency average of 40.6% to a CHP efficiency average of 48.3%.[2] However, there is increased cost for the heat recovery equipment and thermal delivery systems.

Capture and beneficial use of the waste heat provides better overall efficiency, reduces fossil fuel consumption for heat production and lowers greenhouse gas and other pollution levels. Accordingly, BE recommends that a special incentive be made available if the biomass gasification or bio-fuel cell project combine heat and power delivery to the host site. Based on our experience, a supplemental incentive of $1.25 Million per megawatt for up to the first three MW, plus an additional $1.0 million/MW would be adequate to incentivize the incorporation of the heat recovery and delivery system. To create the opportunity for CHP at facilities where the power and heat loads don't match well, it would be helpful if the self-generation site were allowed to transmit the heat to another, nearby user(s) and still qualify for the supplemental funding.

7. Provide enhanced benefits where energy efficiency measures (EEM) are incorporated in the self generation project that reduce the overall plant size equal to the amount of reduction in the SGIP level that occurred because of the

[1] Itron CPUC Self-generation Incentive Program Eight-Year impact evaluations Revised final report, July 2009.
[2] Ibid…Itron report.

project size reduction resulting from the EEMs.

Doing the right thing entails looking at project in a unified manner, and applying EEM to allow the SGIP to be fully utilized. Making the most of one's energy use in the most effective manner is in everyone's best interests. Rates are lower for customers because there is less waste and emissions are decreased dramatically because energy is used intelligently. It makes sense to use bundle EEM with self generation to reduce plant size and energy consumption, because they contribute to the big picture of a reliable system. Plus, it is cost effective to include all your development measures up front rather than pay additional costs later on, while also avoiding overbuilt construction costs.

Unless a facility has completed a thorough energy audit and implemented the recommended EEM's in the last three or four years, there are usually significant opportunities to reduce energy power capacity and consumption. Eliminating power needs (called "negawatts") is a significant strategy for cost effectively reducing cost, fossil fuel consumption and eliminating the greenhouse gas and other pollution associated with the negawatt. Coupling energy efficiency, with self generation is the most effective way of accomplishing these goals.

The existing SGIP program does not encourage coupling of EEM's with generation. Since the payment amount is based on the peak capacity, there is actually a disincentive, as the SGIP payment would be lowered to the extent there is a reduction in project size. Biomass gasification and bio-fuel cells are designed to provide a fairly constant level of power output. Since there is limited ability to sell excess power, not needed during certain times of the day or season, it is very inefficient use of capital to invest in a plant designed to meet the facility's peak needs. Thus EEM's that reduce the peak demand, yet have no on-going fuel need or pollution production, provide a strategy that could be much more cost effective and pollution reducing use of SGIP funds.

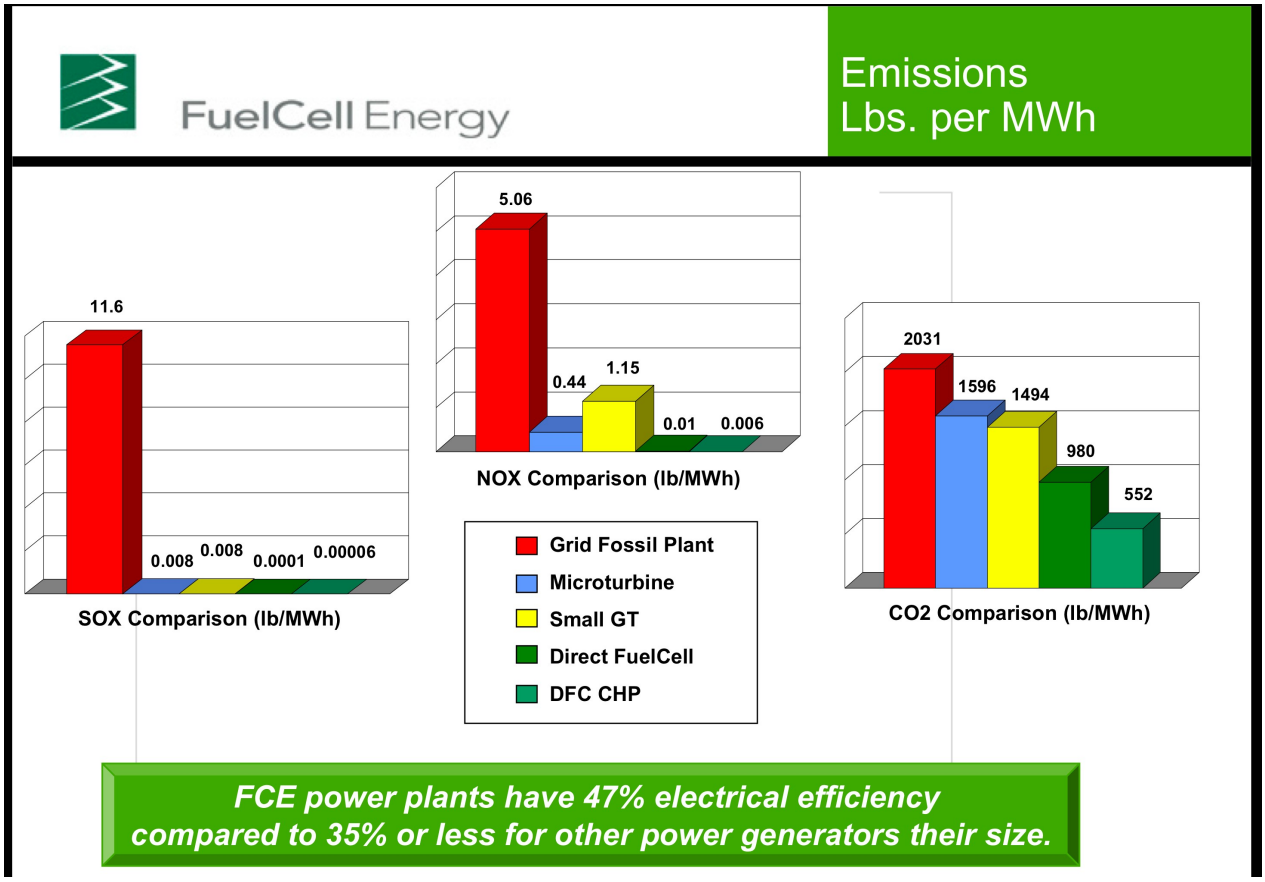
If the program was structured as we have suggested, where EEM's that reduce the self generation project size be eligible for SGIP payment equal only to the grant reduction resulting from the EEM's, this more efficient strategy (from both a cost and pollution reduction standpoint) could be funded at no additional cost to the SGIP program.

Overall, EEM provides better management of your small generation system while protecting the environment . The benefits of EEM display show promise of being clean and support other clean energy technologies– it is another piece of the puzzle.

8. Incorporate other new technologies that show similar levels of efficiency and pollutant reduction, but do not reintroduce the micro-turbine, internal combustion engine and gas turbine technologies, which were once allowed, but are not currently eligible for SGIP financial support.

While BE's business strategy focuses on bio-fuel cells and biomass gasification, we are supportive of the use of other SGIP funds to promote the demonstration and implementation of other promising, low pollution technologies. However, we are not supportive of re-instating the use of micro-turbines, internal combustion engines and small gas turbines, as was previously allowed. These technologies have been adequately demonstrated in the self generation market-place and do not need further funding. They are fully technically demonstrated and economically feasible, without renewed SGIP funding.

As shown in the chart below, Fuel cells dramatically reduce CO2 and other pollutants compared to conventional power generation technologies. Accordingly, BE recommends that SGIP funding be limited to the lower polluting technologies like fuel cells and biomass gasification.



Information provided by Fuel Cells Energy LLC from NREL data.

III. Discussion

BE provides answers to the four questions asked by the Commission.

1. How do the new program requirements in SB 412 impact the existing SGIP? Should SGIP continue to offer technology differentiated incentives, or should the program consider a single incentive structure based on reductions in greenhouse gas emissions? What process should the Commission and CARB use to determine whether technologies meet the greenhouse gas emissions reduction requirement in SB 412?

BE finds the new program requirements in SB 412 impact the SGIP in a promising way because now there is an opportunity to use more efficient and effective technologies,

including biomass fuel cells and combined heat and power units. Since CHP is considered a unit recycling energy, and are smaller than conventional structures, they have the aptitude to expand their energy efficiency. Coupling CHP with biomass gasification and bio-fuel cells opens the door to more environmentally friendly technologies while at the same time increasing the amount of jobs in California.

The SGIP program should continue to offer technology differentiated incentives for several reasons. Accordingly, BE recommends the Commission not create a single incentive structure, but rather look at more diverse biofuels and bio-gasification technologies. This also allows the tailoring of the project to best utilize the available resources available to the site.

Also, to be effective in reaching the GHG goal stated in SB 412, the low hanging fruit, such as energy efficiency and demand side management should be fully utilized in conjunction with SGIP projects utilizing various fuel sources like biogas. The most effective way to reduce greenhouse gas and other pollutants and reduce power demand on the utility grid system is to eliminate demand and consumption through the implementation of Energy Efficiency Measures (EEM's) This allows the generation system installed at the site to be downsized resulting in cost and pollution savings. If the reduced grant amount resulting from this reduced sized SGIP project, were made available to the project owner, these increased pollution and cast benefits would occur at no additional cost to the SGIP program. As previously described, utilization of SGIP funds to create "negawatts" completely eliminates the greenhouse gas emissions (as well as other pollutants). If the program was structured as we have suggested where EEM's that reduce the self gen project size, be eligible for SGIP payment equal only to the grant reduction resulting from the EEM's, this could be funded at no additional cost to the SGIP program.

However, if SGIP continues to limit CHP units the benefit of receiving incentives, then new technologies to improve the systems and use them in the marketplace will be lost. It is

crucial to incorporate CHP units and allow them to use biofuels (just like the fuel cell regulations) and be considered an integrated component.
New technologies such as biomass gasification have positive environmental attributes. BE systems does not support reallocated polluting technology. It is important to not include gas engines and turbines in the SGIP.

Accordingly, BE recommends the following modifications to the Tier 2 Renewable Program. No changes are recommended for the Tier 3 technologies. Our recommended modifications to the Tier 2 Technologies are presented in the following Table.

ELIGIBLE TECHNOLOGY	CURRENT INCENTIVE ($/watt)	RECOMMENDED INCENTIVE ($/watt)
Wind Turbines	$1.50	$1.50
Bio-fuel Fuel Cells up to 1MW	$4.50	$6.50
Bio-fuel Fuel Cells for next 1MW (up to 2 MW)	$2.25	$6.50
Bio-fuel Fuel Cells for next 1MW (up to 3 MW)	$1.25	$6.50
Bio-fuel Fuel Cells for next 3MW (up to 6 MW	$0	$5.20
Biomass gasification up to 1MW	$0	$6.50
Biomass gasification for next 1MW (up to 2 MW)	$0	$6.50
Biomass gasification for next 1MW (up to 3 MW)	$0	$6.50
Biomass gasification for next 3MW (up to 6 MW	$0	$5.20
Additional Payment for CHP (up to 3 MW)	$0	$1.25
Additional Payment for CHP (from 3 up to 6 MW)	$0	$1.0
Energy Efficiency Coupled to Self Generation	$0	Amount equal to SGIP Payment reduction resulting from Efficiency measures

The criteria above should maintain the tier approach to allocating incentives by fuel source and capacity. Biomass gasification should be added and special incentives for energy efficiency and CHP and should included as described above and be fairly tiered and regulated. It is essential to allow a dedicated budget, which acknowledges the higher greenhouse gas reduction and other value of these technologies.

2. Given SB 412, what new technologies should be considered for SGIP eligibility? Parties interested in proposing specific technologies for consideration should submit proposals in the format described in Attachment A to this Ruling. Proposals should pay particular attention to addressing how the technology meets the greenhouse gas emissions reductions requirement in SB 412. Parties representing the same or similar technologies should collaborate to develop joint proposals to avoid duplication.

Biomass gasification is a new technology, which should be considered for SGIP eligibility. It has the following attributes, which lend it to a clean reliable contributor.

1. Eliminates a waste stream, such as agricultural of forest resides, food processing by-products, manures and municipal wastes that would otherwise require disposal and create greenhouse gasses and other pollutants.
2. Use advanced gasification and pollution control strategies that allow the conversion process to take place without harmful emissions.
3. Convert a reliable, sustainable source of fuel into clean, renewable energy.

Also, as the SGIP handbook explains current 'program participants' can apply for incentives for multiple types of generating technologies installed at one Site. The program defines these as "Hybrid Systems". These hybrid systems could entail a microgrid composing of fuel cells and CHP units (as one example), and can promote the values intrinsic to a reliable system such as flexibility and durability.

The definition of Hybrid should be expanded to include both bio-fuel cells and biomass gasification, including either or both in CHP mode and within an integrated system. Creating an integrated system is another way to define the hybrid technologies at a higher level – combining their attributes to promote a secure and robust system.

An integrated system (also known as a microgrid) does meet the California renewable portfolio standard (RPS) requirements. The generation units creating the microgrid should fall under the SGIP program because they meet the goals of reducing peak demand, improving the environment and decreasing costs for ratepayers.

Current BE initiatives

Balance Energy is working with its parent company, BAE Systems, to implement SGIP systems at its campuses and manufacturing facilities statewide. We are also working with developers and third party financiers to facilitate the financing and construction of commercial and industrial systems utilizing the biomass and/or biogas produced, improve self-generation and renewable energy production capacity.

BE Systems is also working with a major engineering consulting firm to support the financing and implementation of fuel cell projects that utilize bio-gas from wastewater treatment plants on-site to help satisfy their electrical and thermal needs.

In addition, BE is working with companies interested in using biomass as a resource for power production, utilizing clean, efficient technologies such as gasification for self-generation and utility interconnected renewable power production.

3. What additional program modifications, if any, should be made to the SGIP in light of SB 412? Specifically, how should the Commission consider other public policy interests besides greenhouse gas emissions reductions in implementing SGIP? Public Utilities Code Section 379.6 (e) authorizes the Commission, in administering SGIP, to "evaluate other public policy interests, including, but not limited to, ratepayers, and energy efficiency, peak load reduction, load management, and environmental interests." In an effort to align the incentives with these policy objectives, should the SGIP consider performance- based incentives, where projects are

paid incentives based on actual production as opposed to an up-front, capacity-based incentive?

In order to provide the most efficient and cost effective up front benefits, capacity based incentives are more targeted. As stated earlier, expanding the program to include up to 10MW, will allow a more reliable system to allow for efficient energy production and delivery.

As outlined earlier, expanding the program to include up to 10MW, will allow a more reliable system to allow for efficient energy production and delivery. Also, as stated in SB 412 decreasing use of natural gas is preferable and biofuels provide a strong alternative. Waste heat recovery of CHP facilities provides a net reduction in GHG emissions by displacement of natural gas that would have otherwise been consumed onsite. Waste heat recovery is important to consider in establishing CHP programs that reduce GHG emissions.

BE also requests consideration of the following strategic issues, to improve the SGIP program's level of support to the State's mandates regarding Renewable Portfolio Standards and greenhouse gas reduction.

Ensure Information Technology "command and control systems" that support distributed energy resources (DER) are covered. Over capacity to enable load-serving entities (LSE) to meet their renewable portfolio goals should also qualify for incentives (laying the foundation to sell back energy to meet state RPS), and providing an overall integration of the abovementioned items including CHP at the SGIP project site.

Taken as a whole, the SGIP program should be designed to stimulate both the highly efficient and extremely low emission fuel cell technology as well the conversion of wasted biomass resources (such as agricultural, farm, food processing and municipal wastes), which are currently disposed of and provide significant sources of air, water and land pollution. The program should encourage systems to be as efficient and cost effective as

possible and integrated, so an entity can efficiently use the materials and technologies for on-site power generation. For example, using a biogas fuel cell with a combined heat power unit the combined system will allow effective fuel use and storage capacity. Having an efficient, integrated system is healthy for the environment, does not waste energy, and because of increased efficiency brings costs down for ratepayers.

Our requests are aimed at modifying the SGIP bio-fuels program so that it will attract qualified applicants and projects and facilitate the implementation of cost effective, renewable self-generation projects that minimize greenhouse gas and other pollutant production.

There are other similar existing programs around the nation, where examples can be used as considerations for adaptability. These include Connecticut Clean Energy Fund[3], the New York State Energy Research and Development Authority (NYSERDA)[4], and Massachusetts Renewable Energy Trust[5], and the New Jersey Clean Energy Program™ (NJCEP)[6] all provide a loan and/or incentive program to provide renewable energy and greenhouse gas emission reduction services, promote business and improve technologies.

As stated in both the Itron and 2007 study,[7] the existing process to determine whether technologies meet the GHG emissions reduction requirement in SB 412, and should include more integrated components as discussed above. In the Itron report (pages 1-11 to 1-14), CHP could do better if it[8] received incentives to promote a more efficient system. As stated

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[3] http://www.ctcleanenergy.com
[4] http://www.nyserda.org/Programs/IABR/IndustryRD.asp#chp
[5] http://www.masstech.org/
[6] http://www.njcleanenergy.com/
[7] Summit Blue Consulting. Self- Generation Incentive Program (SGIP) 2007 Evaluation Summary:
http://www.pge.om/includes/docs/pdfs/shared/newgenerator/selfgeneration/sgip_summit_blue_studies_summary_talkingpoints_12-09-08.pdf
[8] http://www.cpuc.ca.gov/NR/rdonlyres/11A75E09-31F8-4184-B3A4-2DCCB5FB0D2D/0/SGIP_Impact_Report_2008_Revised.pdf

earlier, with the increase in MW from 5-10MW a better run and managed system will be more efficient. As such, lower than expected peak hour CFs for these CHP technologies will require additional installed capacity throughout the state to achieve the proposed goal of offsetting 25 percent of the CAISO peak demand load by 2020 with CHP. This will require a higher capital investment and therefore have a greater financial impact on ratepayers, but the costs in the long run will not be overbearing especially if the program is set to expire in 2016.However with the Itron report also stated, "All SGIP cogeneration technologies achieved and exceeded PUC 216.6(a) requirement."[9]

The facilities BE systems will implement could be influenced by peak hour electrical demands because of the added capacity of the integrated system. By combining biogas fuel cells and CHP units offset peak demand and reduce GHG emissions during peak periods. Waste heat recovery of CHP facilities provides a net reduction in GHG emissions by displacement of natural gas that would have otherwise been consumed onsite. Waste heat recovery is important to consider in establishing CHP programs that reduce GHG emissions, and biomass and biofuels provide the opportunity to both eliminate pollution producing waste products and provide clean, renewable electric power.

Also highlighted was the December 2007 Retention Study. In the executive summary it states, "the sample sizes for ICE and micro-turbines is large enough for some generalization but the technology for this application is evolving so expansion of results beyond the time frame and specific sample may produce misleading results."[10] So there is still much room to study and provide incentives to CHP programs to fill in the missing gaps.

In the U.S. Department of Energy table below, a variety of fuel cell technologies, which could be part of the SGIP are described in more depth.

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[9] Ibid…Itron report.

[10]

Comparison of Fuel Cell Technologies

DOE Hydrogen Program

Fuel Cell Type	Common Electrolyte	Operating Temperature	System Output	Electrical Efficiency	Combined Heat and Power (CHP) Efficiency	Applications	Advantages
Polymer Electrolyte Membrane (PEM)*	Solid organic polymer poly-perfluorosulfonic acid	50 - 100°C 122 - 212°F	<1kW – 250kW	53-58% (transportation) 25-35% (stationary)	70-90% (low-grade waste heat)	▪ Backup power ▪ Portable power ▪ Small distributed generation ▪ Transportation ▪ Specialty vehicles	▪ Solid electrolyte reduces corrosion & electrolyte management problems ▪ Low temperature ▪ Quick start-up
Alkaline (AFC)	Aqueous solution of potassium hydroxide soaked in a matrix	90 - 100°C 194 - 212°F	10kW – 100kW	60%	>80% (low-grade waste heat)	▪ Military ▪ Space	▪ Cathode reaction faster in alkaline electrolyte, leads to higher performance ▪ Can use a variety of catalysts
Phosphoric Acid (PAFC)	Liquid phosphoric acid soaked in a matrix	150 - 200°C 302 - 392°F	50kW – 1MW (250kW module typical)	>40%	>85%	▪ Distributed generation	▪ Higher overall efficiency with CHP ▪ Increased tolerance to impurities in hydrogen
Molten Carbonate (MCFC)	Liquid solution of lithium, sodium, and/or potassium carbonates, soaked in a matrix	600 - 700°C 1112 - 1292°F	<1kW – 1MW (250kW module typical)	45-47%	>80%	▪ Electric utility ▪ Large distributed generation	▪ High efficiency ▪ Fuel flexibility ▪ Can use a variety of catalysts ▪ Suitable for CHP
Solid Oxide (SOFC)	Yttria stabilized zirconia	600 - 1000°C 1202 - 1832°F	<1kW – 3MW	35-43%	<90%	▪ Auxiliary power ▪ Electric utility ▪ Large distributed generation	▪ High efficiency ▪ Fuel flexibility ▪ Can use a variety of catalysts ▪ Solid electrolyte reduces electrolyte management problems ▪ Suitable for CHP ▪ Hybrid/GT cycle

**Direct Methanol Fuel Cells (DMFC) are a subset of PEM typically used for small portable power applications with a size range of about a subwatt to 100W and operating at 60 - 90°C.*

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U.S. DEPARTMENT OF ENERGY

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Addressing the last component of question three, asking whether the Commission should provide incentives based on actual production versus up-front capacity, BE energy systems considers a combination of the two aspects. There is a need for up-front costs to be reimbursed, so the company can continue to reinvest and promote the technology. But this should be for a span of five years, so the technology can reach the tipping point of effective and efficient capacity while at the same time maximizing the benefits to ratepayers. It takes a few years to work out the glitches, but these initial years must be met with support to ensure the product reaches its full potential.

4. In light of the January 2016 sunset date for SGIP in SB 412, how should SGIP prepare to wind down? Should SGIP consider implementing a declining incentive structure to facilitate the transformation of DG markets so that DG technologies do not continue to rely on incentives

beyond 2016? How might this declining incentive structure be designed?

Similar to the structure mentioned before with promoting an integrated system including CHP units, the SGIP could be phased out and transitioned into a program funded by RECs. The additional financial support requested above, both for biomass gasification and bio-fuel cells, is only required for sufficient time to deploy these technologies in the market place to demonstrate their viability and increase production. BE believes that the current 2016 program period should be adequate, as long as the financial parameters are adequate to stimulate the marketplace. For example, one of the major, U.S. based bio-fuel cell manufacturers is currently at 50% of their capacity, with most of that shipped overseas. They can significantly reduce costs if they can reach their production capacity.

The state has set a goal of achieving 25 percent of its supply of peak electricity from CHP facilities by 2020 along with an overall goal of 33% renewables by 2020. Achieving and maintaining this goal will require well designed, properly operated, and appropriately maintained CHP facilities. In addition, if designed and operated appropriately, these CHP facilities can also provide an important means of reducing GHG emissions. Based on Itron's past investigation into issues encountered with design and implementation of CHP facilities and on the performance results observed to date with SGIP CHP facilities, we recommend the following be considered in establishing a statewide CHP program:

a) Establish tariffs that encourage CHP facilities to maximize electricity generation at times that will help provide relief to congested or highly loaded distribution feeders or help offset critical peak demand.

b) Establish policies and tariffs that encourage CHP facilities to adopt the use of absorption chillers operated from waste heat recovered by the CHP facility and sized to offset onsite cooling needs.

c) Establish design policies and approaches that require CHP system developers to identify and match thermal and electrical hourly load profiles for the host site for a minimum of the daily peak electricity demand hours of the host site.

d) Establish policies and incentives that encourage CHP system owners and operators to maintain their systems such that no more than two percent (2%) performance degradation occurs annually.

Such policies should consider the use of service agreements to help maintain CHP system operation; annual inspections of CHP systems and major components; and efficacy insurance.

CHP is a capable and proven distributed generation tool, which warrants additional incentives to ensure it provides existing and new benefits. BE systems will demonstrate with its advanced CHP technology new components not yet introduced into the market, which will require additional incentive assistance to successfully penetrate the market. Other companies may have similar advancements and will also need this incentive for a few years to jump the hurdles prohibiting deployment.

Duplication of projects getting credit will be avoided due because the integrated system will have already accounted for it, and won't allow it to be double-counted. The phase-out of SGIP by 2016 is achievable if bio-gasification, bio-fuels and CHP units are included and have the expansion outlined earlier to 10MW.

IV. Conclusion

Enhancing support for bio-fuel cells, adding biomass gasification, providing incentives for CHP and energy efficiency will stimulate a robust program for these technologies that are so important from a technology/fuel diversity, greenhouse gas and other pollutant reduction and host site load matching standpoints. They will aid in reducing fuel price volatility, reducing congestion including electric constraints, assisting with reducing peak demand, decreasing the carbon footprint, and improving economic development in California.

Bio-fuel cells and biomass gasification, particularly when operated in the CHP mode, promote benefits to consumers by decreasing the demand and therefore the price of natural gas. California gains more reliable and clean energy service from these biogas units. BE is a qualified CA company with 2500 employees in the San Diego office not to mention additional staff throughout the state. Our bio-fuel cell and biomass gasification business strategy is expected to provide many more jobs, developing, manufacturing, building and operating these projects. California residents will assemble the systems from components from all over the western hemisphere.

To recap, Balance Energy is looking for eight elements for the SGIP to incorporate:

1. Include biomass gasification/power generation technologies as eligible for SGIP apart from of the technology utilized for converting the resultant bio-gas into electricity
2. Allow biogas to be produced at the location where the biomass is produced and transported to the project site, via the utility gas pipeline, regardless of the biomass type, source and location
3. Increase the base SGIP amount for biogas fueled fuel cells and biomass gasification power technologies to $6.5 million per Megawatt
4. Raise the allowable project size for these two technologies to ten (10) MW, with SGIP incentives available for the first six (6) MW
5. Eliminate the financial disincentives for larger systems by allowing 100% of the SGIP payment for the first 3MW and 80% of the payment ($5.2 million per Megawatt) for the next three Megawatts,
6. Provide enhanced benefits for CHP applications of the above technologies in the amount of an additional $1.25Million/MW for the first 3 MW of capacity and $1.0 million for the next three Megawatts.
7. Provide enhanced benefits where energy efficiency measures (EEM) are incorporated in the self generation project that reduces the overall plant size

equal to the amount of reduction in the SGIP level that occurred because of the project size reduction resulting from the EEMs.

8. Incorporate other new technologies that show similar levels of efficiency and pollutant reduction, but do not reintroduce the micro-turbine, internal combustion engine and gas turbine technologies, which were once allowed, but are not currently eligible for SGIP financial support.

BE's integrated system approach will meet multiple California markets segments. BE looks forward to working with the Commission to ensure peak demand, power/fossil fuel consumption and greenhouse gas and other pollutant emission problems facing California are addressed.

We appreciate the opportunity to offer these comments and participate in these proceedings.

Respectfully Submitted,

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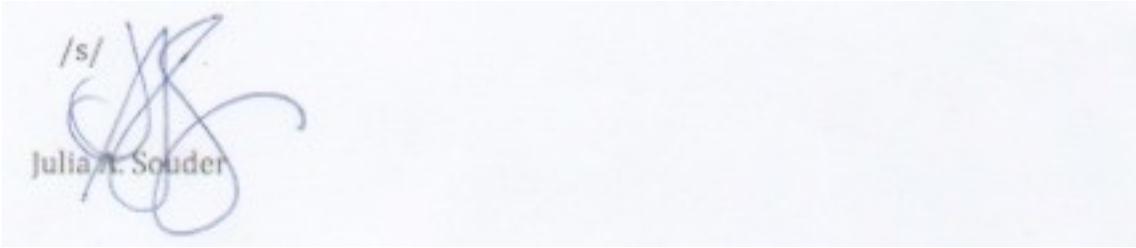
V. Certificate of Service

Certificate of Service

I hereby certify that JAS energies, on behalf of Balance Energy, a BAE Systems Initiative have this day served a copy of "Comments on the Implementation of Senate Bill 412 and Noticing Workshop" on all known parties to Rulemaking 08-03-008 by transmitting an e-mail message with the document attached to each party named in the official service list. Parties without e-mail addresses were mailed a properly addressed copy by first-class mail with postage prepaid.

Executed on January 19, 2010 in San Francisco, California.



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