

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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Order Instituting Rulemaking Regarding
Policies, Procedures and Rules for the
California Solar Initiative, the Self-Generation
Incentive Program and Other Distributed
Generation Issues.

Rulemaking 12-11-005
(Filed November 8, 2012)

**NATIONAL FUEL CELL RESEARCH CENTER COMMENTS ON PROPOSED
DECISION REVISING THE SELF-GENERATION INCENTIVE PROGRAM PURSUANT
TO SENATE BILL 861, ASSEMBLY BILL 1478, AND IMPLEMENTING OTHER
CHANGES**

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**NATIONAL FUEL CELL RESEARCH CENTER COMMENTS ON PROPOSED
DECISION REVISING THE SELF-GENERATION INCENTIVE PROGRAM
PURSUANT TO SENATE BILL 861, ASSEMBLY BILL 1478, AND IMPLEMENTING
OTHER CHANGES**

Pursuant to Section 14.3 of the California Public Utilities Commission (Commission) Rules of Practice and Procedure, the National Fuel Cell Research Center (NFCRC) submits these comments in response to the Proposed Decision (PD) Revising the Self-Generation Incentive Program (SGIP) Pursuant to Senate Bill 861, Assembly Bill 1478, and Implementing Other Changes.

I. Introduction

The NFCRC at the University of California, Irvine facilitates and accelerates the development and deployment of fuel cell systems; promotes strategic alliances to address the market challenges associated with the installation and integration of fuel cell systems and renewable energy systems; and educates and develops resources for fuel cell and self-generation stakeholders around the world. The NFCRC is working with GE-Fuel Cells, LLC; LG Fuel Cell Systems Inc.; Bloom Energy; Doosan Fuel Cell America; and FuelCell Energy.

The NFCRC appreciates the opportunity to comment on the Proposed Decision and further reemphasize technical points from previous NFCRC comments filed in this proceeding. The data cannot be ignored: fuel cells reduce GHG and criteria air pollutant emissions and contribute to the overall SGIP program goals. Without generation, the Commission risks the successful development of a dynamic grid that meets the demands of all ratepayers. These comments on the Proposed Decision detail the proven technical requirements for generation in a future 100% renewable grid. Additionally, the NFCRC states that:

1. 50% of the SGIP funding should be allocated to generation, and 50% to advanced

- energy storage (AES) to more appropriately and justifiably reflect the program's goals.
2. Some of the fuel cell companies with whom NFCRC works find that the program should have intermissions (i.e., periodic starts and stops) in the disbursement of funding that will allow new and improved technologies and market entrants in order to achieve program goals.
 3. The proposed SGIP program goals and eligibility requirements are aligned with legislative and program requirements.
 4. Air pollutant emission mitigation should be weighted commensurate with the reduction in GHGs.
 5. The additional market transformation goal should be based on more than just "soft" criteria and the market transformation report that was scheduled for release at the end of 2015 should be considered in a final decision.
 6. Incorporation of the California Energy Commission's directed biogas Renewable Portfolio Standard (RPS) eligibility requirements into the SGIP will appropriately align the two standards.
 7. SGIP Measurement & Evaluation and Public Reporting must be transparent and impartial, and should appropriately use expert third parties.

The Commission needs to recognize the importance of generation in managing the dynamics of a 100% renewable grid in the future, and the NFCRC would like to reiterate and expand upon facts presented in previous submissions.

100% Renewable Grid: Deployment of renewable resources is needed to meet California's energy demands in parallel with achieving California's environmental quality goals. For a 100% renewable electric grid, the power generation must (1) source all of the energy from the sun using solar PV, solar thermal, wind, hydropower, and 24/7 load-following renewable power, and (2) convert the solar-derived energy into power with net zero emission of both greenhouse gases (GHG) and criteria pollutants, a zero demand of water, and zero waste.

Challenge: A major challenge to reach a 100% renewable grid is the management of the dynamics associated with the diurnal and seasonal variation, intermittency, and limited capacity factor that accompany a high penetration of solar and wind power generation. In

addition to accurate forecasting of intermittent solar and wind resources,^{1,2} the following are required:

[1] A systems analysis methodology to identify the technologies required to enable and manage the dynamic and intermittent solar and wind resources associated with a 100% renewable grid,³ and

[2] Widespread introduction of complementary energy storage and 24/7 clean, load-following power generating technologies.⁴

Systems Analysis: The first requirement is particularly demanding due to the complexities associated with the components and operation of a modern electric grid. Under the auspices of the California Energy Commission, a major systems analysis resource, the “Holistic Grid Resource Integration and Deployment (HiGRID)” tool, was developed to guide the planning of a modern electric grid.⁵ Over the past two years, a myriad of scenarios has been evaluated with HiGRID to determine the resources needed to manage and enable the intermittency, diurnal variation, and constrained capacity factor associated with a 100% renewable electric grid. Without exception, two key resources are needed to provide the required ENERGY and POWER capabilities: (1) energy storage comprised of batteries, hydro, and hydrogen; and (2) clean, high-efficiency 24/7 load-following power generating resources.

24/7 Clean Load-Following Power Generation: Stationary fuel cells are emerging as well suited to provide the required clean, high-efficiency 24/7 load-following power generation resource with virtually zero emission of criteria pollutants, and no net water demand. Already meeting initial market demand for base load power generation, more than 30% of power generating fuel cells are operating today on biogas in California.⁶ To meet the demands of the next-generation grid, stationary fuel cells systems are being (1) developed and deployed with the

¹ Rich H. Inman, Hugo T.C. Pedro, Carlos F.M. Coimbra, “Solar forecasting methods for renewable energy integration,” *Progress in Energy and Combustion Science*, vol. 39, Issue 6, pp. 535–576, 2013.

² C. W. Potter, A. Archambault, and K. Westric, “Building a smarter smart grid through better renewable energy information,” *IEEE Power Systems Conference and Exposition, IEEE PSCE'09*, pp.1 -5, 2009.

³ Elaine K. Hart, Mark Z. Jacobson, “A Monte Carlo approach to generator portfolio planning and carbon emissions assessments of systems with large penetrations of variable renewables,” *Renewable Energy*, Volume 36, Issue 8, Pages 2278–2286, 2011.

⁴ *Id.*

⁵ J. D. Eichman, F. Mueller, B. Tarroja, L. S. Schell, and S. Samuelsen, “Exploration of the integration of renewable resources into California’s electric system using the Holistic Grid Resource Integration and Deployment (HiGRID) tool,” *Energy*, vol. 50, pp. 353–363, 2013.

⁶ California Stationary Fuel Cell Collaborative Web Site: <http://www.casfcc.org/>.

requisite load-following attributes, (2) developed to operate on hydrogen as well as natural gas and biogas, and (3) developed to integrate with a gas turbine engine to create a “hybrid” power generator with remarkably high efficiency. Simply stated, stationary fuel cells are (1) a key resource, along with storage, required to manage and enable a 100% renewable grid, and (2) a perfect match to hydrogen energy storage in providing the ideal means for converting massive amounts of renewable fuel into electricity.

II. Comments on the Proposed Decision

With the understanding that development of robust, clean, load following generation together with energy storage is required for a 100% renewable grid, the NFCRC offers the following comments on the Proposed Decision.

A. Program Goals

1. The proposed Environmental Goals reflect the intent of the SGIP, including the reduction of GHGs, the reduction of criteria air pollutants and the limitation of other environmental impacts (such as water usage) and the NFCRC supports these goals. The NFCRC does not find that achievement of the goals is facilitated by primary or exclusive reliance on AES for reasons explained above, and stresses that generation is equally important, in fact required, to facilitate the integration of renewables.
2. The NFCRC supports the listed Grid Support Goals of 1) reducing or shifting peak demand; 2) improving efficiency (e.g., reduced line losses) and reliability of the distribution and transmission system; 3) lowering grid infrastructure costs; 4) providing ancillary services; and 5) ensuring customer reliability of DER.
3. Market Transformation can be a goal but must incorporate findings of the Market Transformation Study, which will inform how to measure and quantify market transformation in this Proposed Decision. The Staff Proposal released November 23, 2015 states that the “*Energy Division expects the report will be available later this year to inform the Commission’s decision making.*”⁷ “Later this year” would have been by the end of 2015. In the Proposed Decision released May 16, 2016, the Commission states that “*Itron is currently drafting the third study, a market*

⁷ SGIP Staff Proposal, pages 6-7.

*transformation study evaluating the potential for different SGIP technologies to be self-sustaining, as well as the extent to which they have already done so. That study is expected to be released to the public by the end of this year.”*⁸ There is neither an explanation for the one year delay on a study that appeared to be nearly complete, nor justification for withholding this study. As stated in Section G (Public Reporting) of these comments, the Market Transformation Study should also be released for public comment to ensure that it is complete and accurate, prior to final publication.

B. Technology Eligibility Requirements

1. Eligibility Criteria

The NFCRC appreciates the Commission’s proposal to base eligibility on meeting technical program requirements and supports the four eligibility criteria:

- a. Lower GHG emissions
- b. Lower or shift peak load to off-peak
- c. Be safe and commercially available
- d. Reduce criteria air pollutants.

2. Determination of Eligible Technologies

The NFCRC agrees with the Commission that technologies should be eligible *“As long as a technology is certified to emit less than the first-year emission rate for the program year for which incentives are sought, the technology passes the GHG eligibility screen.”*⁹

C. Biogas Requirements

The NFCRC supports incorporation of the California Energy Commission’s directed biogas Renewable Portfolio Standard (RPS) eligibility requirements into the SGIP.

D. Incentive Budget

Ongoing development of renewable generation technologies is critical to California’s future energy grid, and a cornerstone of the SGIP. The NFCRC finds the Commission’s reasons

⁸ SGIP Proposed Decision, page 6.

⁹ SGIP Proposed Decision, page 17.

for weighting 75% of the budget for AES to be arbitrary and unjustified. The Proposed Decision states that *“In the end, the Staff Proposal’s 75%/25% split strikes the right balance of the programs goals of reducing GHGs, providing grid support and enabling market transformation. Energy AES is the fastest growing source of projects for SGIP and represents the most scalable set of technologies to achieve the program goals.”* This statement is unjustified without the Market Transformation study, and the Commission presents no technical data to support this reasoning.

There are insufficient data to support that AES makes greater contributions to emissions reduction and ratepayer value. After having reviewed program data and project performance, Program Administrators have presented actual program data to the contrary:

PG&E: To date, the majority of SGIP funds (84% in PG&E territory) have been used to support always-on baseload and load-following generation technologies. The only impact evaluation conducted for storage thus far is from the 2013 SGIP Impact Evaluation Report, and is inconclusive because of an extremely small sample size. Without review of the GHG emissions of all the current SGIP technologies, drastic reallocation of the program budget from 16% storage (in PG&E’s service territory) to 75% storage presents the risk that program GHG goals may not be accomplished.¹⁰

SoCalGas/SDG&E: The “trend” cited in the Staff Proposal was based more on incorrect incentive levels than an indication of market potential. Additionally, the Staff offers no supporting data to substantiate the information in Appendix B. The charts in the Staff’s Proposal Appendix B appear to be erroneous and should be disregarded. The correct information does not support Staff’s findings. Specifically, the chart claims that AES has provided over 20 percent of the program capacity for years in which AES was not part of SGIP.¹¹

SoCalGas/SDG&E also note the attrition rate, from a CPUC report, that offsets the AES “demand” upon which the Commission is basing the Proposed Decision’s budget allocation: *“It appears that this conclusion is based in part to the fact that 73% of PG&E’s attrition comes from advanced energy storage (“AES”) projects.”*¹²

As the NFCRC and others have submitted in previous comments, there are data to show that fuel cells make these contributions to achieving the SGIP goals. Per NFCRC comments on Potential Program Changes and SGIP Funding, SGIP is a critical component to achieve the long-

¹⁰ PG&E Reply Comments on the SGIP Staff Proposal, page 2.

¹¹ SCG/SDG&E Opening Comments on the Staff Proposal, page 8.

¹² SCG/SDG&E Reply Comments on the Staff Proposals, page 3.

term goals set forth by California, and is producing near-term achievement in the reduction of both GHG and criteria pollutants. This achievement is clearly measured and demonstrated in the 2013 Impact Evaluation of fuel cells and generation technologies.

The NFCRC supports the new, simplified categories of AES and generation, and the recent comments of SCE and SoCalGas to separate AES and generation funding:

“To equitably disburse funds based on their need for incentives to improve market adoption, SCE recommends that the Commission allow the PAs to divide the SGIP funding into two distinct energy storage and energy generation budget buckets.”¹³

“SoCalGas strongly recommends creating two separate budget and rate schedules, one for Advanced Energy Storage (“AES”) and another for generating Distributed Generation (“DG”) resources. SoCalGas continues to recommend that the budget be divided 50/50 and allocated as follows: (1) energy generation; and (2) energy storage technologies.”¹⁴

“SoCalGas submits that AES technologies should have a budget schedule that will allow AES to become an incentive independent technology at its own pace”¹⁵ “considering that “DG and AES are not just different technologies; their project development is also significantly different.”¹⁶

E. Incentive Design

1. Incentive Levels in Proposed Decision Tables. For consistency and technical accuracy, the NFCRC requests the following changes to incentive level tables:

Table 1: In Step 1, 2 and 3 columns should read “Incentive per Watt Capacity” not “Incentive per kW Capacity.”

Table 5: The table title reads “Current and Revised Initial Incentive Levels (\$/Wh).” The title should read “Current and Revised Initial Incentive Levels (\$/W or \$/Wh).”

2. Program Starts/Stops. With all of the SGIP funding available for disbursement up front, and the current level of demand across the SGIP, it is possible that all of the funding would be allocated within one year of program opening. In order to preserve the SGIP for new market entrants, and for new and improved technologies, some of the fuel cell companies with whom the NFCRC works request that the program maintain periodic program starts and stops.

¹³ SCE Response to Maas Energy Petition for Modification, April 7, 2016, page 3.

¹⁴ SoCalGas Response to Maas Energy Petition for Modification, April 7, 2016, page 4.

¹⁵ Ibid.

¹⁶ Ibid.

F. Establish Lottery to Award Reservations

1. A lottery process and the proposed distribution of funds will cause market uncertainty. Project development often takes one to two years to complete. If a project is being developed, and the customer intends to apply for SGIP funds, the uncertainty in the program, and the uncertainty of awards based on a lottery process, could preclude customers from proceeding with their cleaner, greener energy projects.
2. The NFCRC agrees with the PD proposal for a workshop to determine the most effective way to implement a lottery.

G. Measurement & Evaluation and Public Reporting

1. Measurement & Evaluation. The Proposed Decision does not give an explanation as to why the Measurement & Evaluation plan should now be created by the Commission's Energy Division, rather than Program Administrators, other than it replicates the California Solar Incentive (CSI) program: "this mimics the CSI program where M&E was directed by Energy Division, not Administrative Law Judge (ALJ) ruling."¹⁷ The entities that create the M&E plan should be technically qualified to do so and there is no justification as to why the CSI program process might be better than the current process. Without ALJ approval, there may be no oversight concerning the Energy Division processes and decisions. To best serve the ratepayers, a third party evaluator who is technically qualified should lead Measurement & Evaluation of the program, in consultation with the Program Administrators who understand program technicalities, and performance of SGIP technologies in the field.
2. Public Reporting. Any future reports, including Impact Evaluations, Cost-Effectiveness Reports, Renewable Fuel Use Reports and Market Transformation Studies, should be released publicly for review and input prior to publishing final reports. Any reports that are referred to in proposed decisions should be publically released prior to releasing the proposed decision that references such.

¹⁷ SGIP Proposed Decision, page 41.

III. Conclusion

The NFCRC appreciates the opportunity to offer comments on the Proposed Decision. We encourage the Commission to release the Market Transformation report and to review the results of the 2013 SGIP Impact Evaluation Report, which unequivocally demonstrates the GHG emissions reductions of natural gas fuel cell systems. Generation is required for a 100% renewable grid and the CPUC's emphasis on transitioning the SGIP to an AES-only program is short-sighted and technically unsound. We maintain that fair consideration and an inclusive program based on meeting technical requirements will further California's environmental and generation objectives into the future.

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Respectfully submitted,

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