DOCKETED	
Docket Number:	19-ERDD-01
Project Title:	Research Idea Exchange
TN #:	246731
Document Title:	SoCalGas Comments - on the Behind-the-Meter Zero-Emission Backup Power Technologies – Request for Information
Description:	N/A
Filer:	System
Organization:	SoCalGas
Submitter Role:	Public
Submission Date:	10/21/2022 2:35:37 PM
Docketed Date:	10/21/2022

Comment Received From: SoCalGas
Submitted On: 10/21/2022
Docket Number: 19-ERDD-01

Comments on the Behind-the-Meter Zero-Emission Backup Power Technologies â€“ Request for Information

Additional submitted attachment is included below.

Kevin Barker
Senior Manager
Energy and Environmental Policy
555 West 5th Street
Los Angeles, CA 90013
Tel: (916) 492-4252
KBarker@socalgas.com

October 21, 2022

Jonah Steinbuck, Deputy Director
California Energy Commission
Docket Unit, MS-4
Docket No. 19-ERDD-01
715 P Street
Sacramento, CA 95814

Subject: Comments on the Behind-the-Meter Zero-Emission Backup Power Technologies – Request for Information

Dear Deputy Director Steinbuck,

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the Request for Information (RFI) to help define critical research needs around behind-the-meter (BTM) zero-emission backup power and identify high-impact use cases that a future research solicitation may target.

According to the U.S. Energy Information Administration (EIA), "emergency backup generation" is defined as the use of electric generators only during interruptions of normal power supply.[1] This definition considers the need for power during interruptions in power supply but does not consider that backup generator technologies are typically diesel, have limited onsite fuel, and have more environmental concerns than other energy sources. Given such limitations, SoCalGas respectfully suggests that different operation profiles are worth considering for zero-emission backup generators. Further, the ability to run at a lower load factor could then allow zero-emission backup generators to increase output during times of grid instability to provide resiliency. For example, a BTM generator already operating at 70% load factor to partially supply the electricity demand of a facility, could island and increase to 100% load factor during power outages to fully support critical needs; thus zero-emission backup generators could provide more grid support than sitting idle until there is a need to provide emergency power during a grid outage. We appreciate the thoughtful and inclusive approach that has led to the RFI questions for stakeholders and offer the following comments, grouped by four questions answered below:

[1] *See* U.S. Energy Information Administration (EIA) Glossary, available at: https://www.eia.gov/tools/glossary/index.php?id=E.

1) **In this section, we answer the following:** *What are the key barriers to behind-the-meter (BTM) zero-emission renewable backup for critical loads?*

One key barrier to behind-the-meter (BTM) zero-emission renewable backup for critical loads is limited technology options and the ability to offset costs (through rate arbitrage or other incentives). The need for backup power can vary based on the duration and capacity needs of the customers. As such, customers should be able to select cost-effective technologies that serve their specific needs. Most grid outages last only a few hours; however, some can last much longer, so the right technologies, size, and duration are even more important. Additionally, proper sizing can help reduce unnecessary redundancy and increase relative value. A reasonable manner to enable a zero-emission renewable backup system should provide options to reach the appropriate technological configuration to supply the customer's demand during an outage. The proper configuration of renewable generation technologies and energy storage can give customers the necessary duration and capacity, mitigating the risk of overspending. While some customers may be able to satisfy their power needs with energy storage, generally, batteries are limited to 2 – 4 hours of power unless a facility installs a much greater capacity of batteries to extend their hours of operation, which has a high cost. Sizing the right technologies, such as renewable generation and energy storage, can reduce investment costs and provide customers with their needed resiliency.

An example of a critical facility with alternative backup systems is the City of Fremont Fire Stations Microgrid Project [EPC-14-050]. The City of Fremont Fire Stations Microgrid Project received approximately $1.8 million in EPIC funding from the CEC.[2] These microgrids protect critical facilities against electric grid power outages, as the batteries can island for 8-12 hours. The Fremont Fire Stations can island for three hours at any given time.[3] The fire stations also installed diesel generators as a secondary backup to the solar and battery microgrid. According to Rachel DiFranco, Sustainability Manager of the City of Fremont, the secondary diesel generators are used during critical needs and are run monthly to test and make sure they work properly for such needs.[4] This example illustrates the prevalent emissions challenge with using solar and battery microgrids that rely on diesel generators as backup. Utilizing other technology, such as fuel cells running on hydrogen, renewable natural gas, or natural gas, can complement existing systems and reduce harmful emissions emitted by secondary backup diesel generators.[5] It is critical for future solicitations to ensure that any project funded by the CEC for zero-emission backup power limits

---

[2] See City of Freemont & Gridscape Solutions, LLC CEC PON 14-301: Demonstration of Low-Carbon based Microgrid for Critical Facilities, Available at https://www.bayrencodes.org/wp-content/uploads/2018/03/Fremont-Fire-Stations-Microgrid-Demonstration_1-31-18.pdf

[3] *See* Rachel DiFranco Presentation on Resilience Impacts on the Microgrid Market at 2020 IEPR Commissioner Workshop on Assessing the Future Role for Microgrids in California, 09 July 2020. Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=233761&DocumentContentId=66393.

[4] *Ibid*.

[5] SoCalGas also filed a Petition for Modification of CPUC Decision (D.)15-10-049 in CPUC Application (A.)14-08-007, relating to its Distributed Energy Resources Services Tariff. The petition seeks to expand eligibility of the tariff to meet the reliability and resiliency needs of critical customers and decrease greenhouse gas emissions and reducing reliance on diesel backup generation.

the use of new diesel backup generators and includes a preference for technologies using alternative fuels that can replace diesel backup generators.

If a project does allow for the zero-emission backup generators' regular operational use, future solicitations that result from this RFI should assure that these types of systems can operate and provide energy continuously during grid outages, in other words, isolated from the grid without additional need for diesel backup generators. Some solar plus storage microgrids still rely on diesel generation as an alternative backup system. The example that we proposed could include backup generation utilizing the existing resilient gas pipeline infrastructure for renewable fuel delivery to provide fuel for backup generation, regardless of other resource availability.

2) **In this section, we answer the following:** *What are the current opportunities for standardizing the design of how BTM backup systems interconnect with the distribution grid while enhancing safety and managing operational constraints?*

The existing Electric Rule 21 standards already provide for BTM backup systems interconnection with the distribution grid. More specifically, BTM backup systems that are interconnected to the grid through Rule 21 can interconnect with isolation systems that allow them to safely continue to provide onsite power during a power outage. Therefore, additional standardization may only be limited to those devices that meet Electric Rule 21.[6]

3) **In this section, we answer the following:** *What are the most significant barriers (technical, cost, design, permitting, etc.) to integrating BTM backup power in the various sectors (e.g., residential, rural) and use cases mentioned above?*

Costs present significant barriers to integrating BTM backup power systems in various sectors. In the Role of Firming Generation in Microgrids, a California Case Study,[7] researchers from E3 – Energy and Environmental Economics, Inc. ("E3") performed an analysis for supermarket customers in Napa, California. E3 examined the economics for various technology configurations from a customer perspective, using a 20-year net present value as the economic metric, and configurations were modeled by using the existing utility tariffs (including net energy metering).

Critical findings from the whitepaper include:

1. *The economic results of this whitepaper clearly demonstrate the economic infeasibility of providing reliable microgrid power for a multi-day (72-hr) period using only solar + battery storage. Instead, some type of firm generation is needed that can dispatch for prolonged periods of time without running out of charge.*

2. *A backup generator, fuel cell, or the Mainspring linear generator are all capable of providing this firm generation. Some type of firm generation*

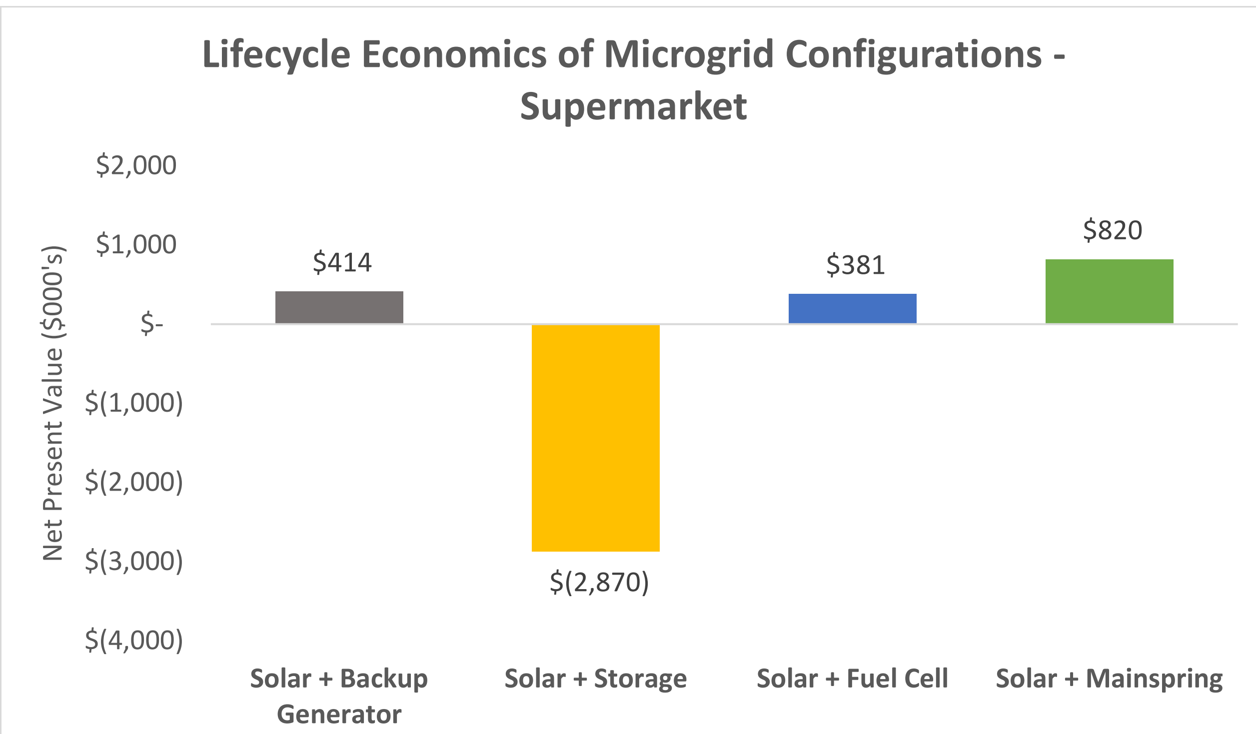
[6] *See* CPUC Rule 21 Interconnection.
[7] The Role of Firming Generation in Microgrids, A California Case Study, E3 Energy and Environmental Economics, Inc., Prepared by Ming et. al, March 2021.

(backup generator, fuel cell, or linear generator) is required to economically meet reliability requirements for 72 hours of backup power.*

3. *Solar + Storage is a highly uneconomic configuration due to significant oversizing of the battery system to meet reliability requirements.*[8]

Further, Figure 1 below illustrates E3's findings that a "Solar + Mainspring" technological configuration provides the **highest net customer benefit over the life of the investment** and is the most economic technological configuration, while reducing greenhouse gas emissions relative to grid power.[9] Study results further point to the conclusion that Mainspring's high-efficiency technology and near-zero criteria pollutant emissions allow it to operate regularly to economically offset customer purchases from the grid while reducing emissions.[10] As further illustrated in Figure 1, the "Solar + Fuel Cell" configuration can also provide customers with a positive net present value. Finally, while the "Solar + Backup Generator" configuration provides the customer with a positive net present value, this configuration's health and environmental concerns should be considered.

Figure 1: **Lifecycle Economics of Microgrid Configurations of a Supermarket Customer Type**[11]



[8] The Role of Firming Generation in Microgrids, p.2
[9] The Role of Firming Generation in Microgrids, p.3
[10] *Ibid*.
[11] The Role of Firming Generation in Microgrids, Figure 2 (p.4), was reconstructed to model only the existing utility tariffs (including net energy metering) and avoided any hypothetical future microgrid tariffs within the lifecycle economics model.

4) **In this section, we answer the following:** *What unknowns can be illuminated through research?*

Examples of emerging technology solutions that have proven successful in the backup power technology space include Enchanted Rock's microgrid fleet, which provided local resiliency services at approximately 200 microgrids during Texas' Winter Storm Uri.[12]

Enchanted Rock is a microgrid developer that provides resiliency-as-a-service to large commercial, industrial, and institutional customers utilizing an ultra-clean, natural-gas-fired reciprocating engine to power a microgrid.[13] Enchanted Rock's microgrid solutions could provide fully decarbonized resiliency solutions for long-duration outage protection in California. Solutions like these enable a diversified electrical resiliency strategy by improving local air quality through the displacement of diesel backup generation solutions and could help the grid accommodate more intermittent renewable resources cost-effectively.

Additional research in backup power technologies can also help to illuminate the unknowns of ***avoided costs*** customers face, which should be properly assessed in resilience frameworks and investment decisions to demonstrate the importance of resilience investments prudently. Avoided costs should be included in benefit-cost tests of any technology application so that the true benefit of implementing mitigation efforts can be illustrated to decision-makers. Ultimately, enhancing avoided cost analyses would improve the valuation of resilience investments across future solicitations.

Conclusion

SoCalGas applauds the California Energy Commission for its foresight in addressing topics related to BTM zero-emission backup power technologies and looks forward to continued participation in this discussion and related ideation. With the proper programs and policies in place, fuel cell and linear generator deployment can help accelerate the public interest in transitioning to a clean and reliable energy system. With the proper mix of DER deployment, California can achieve its core energy objectives. Thank you for your consideration of our comments.

Respectfully,

/s/ Kevin Barker

Kevin Barker
Senior Manager
Energy and Environmental Policy

---

[12] *See* "Did Your Texas Energy Business Change After Winter Storm Uri?", Power Grid International, February 2022, available at: https://www.power-grid.com/distributech/did-your-texas-energy-business-change-after-winter-storm-uri/

[13] *See* Enchanted Rock, Electrical Resiliency-as-a-Service, available at: https://enchantedrock.com/electrical-resiliency-as-a-service/