

COMMONWEALTH OF PUERTO RICO
PUERTO RICO ENERGY COMMISSION

IN RE: REGULATION ON MICROGRID
DEVELOPMENT

CASE NUM.: CEPR-MI-2018-0001
SUBJECT: ElectrIQ Power Comments on
Proposed Rules

COMMENTS OF ELECTRIQ POWER, INC.

ElectrIQ Power, Inc. (“ElectrIQ”) respectfully submits these comments in response to the Puerto Rico Energy Commission (“Commission” or “CEPR”) on the subject of the Notice of Proposed Rulemaking and Public Comments regarding the Regulation on Microgrid Development.¹

1. DESCRIPTION OF ELECTRIQ POWER, INC.

ElectrIQ Power is a California-based company that manufactures fully-integrated distributed energy storage systems and develops intelligent energy management software that maximizes the value of batteries, renewable energy and smart devices.

ElectrIQ deployed its first system in Puerto Rico to support an orphanage and nursery school in Trujillo Alto, Caguas in January 2018. That system integrates a 10 kWh lithium ion battery, 4 kW solar PV, 3 kW gasoline generator, and our proprietary energy management system. ElectrIQ’s “IQ System” orchestrates and controls each of these resources as a microgrid to

¹ Case No. CEPR-MI-2018-0001; In Re: Regulation on Microgrid Development

maximize the use of solar energy and minimize gas generator run-time and associated fuel and maintenance costs.

ElectrIQ looks forward to deploying more microgrid projects across Puerto Rico to support the country's transition to a clean, distributed, resilient grid. Our customers are homeowners and light commercial facilities, so the following comments are primarily directed towards small, individual systems as defined by the Proposed Rules. We appreciate the opportunity to support CEPR's development of appropriate rules for such systems, and applaud the Commission's leadership in being the first to develop a comprehensive framework for microgrid development.

2. MICROGRID CLASSIFICATION

ElectrIQ strongly support the Commission's decision to exclude small, individual- and partnership-owned systems from regulatory requirements within the Proposed Rules. The economics of most small, self-supply microgrid systems offer thin margins to developers and lengthy payback periods for customers, and any additional regulatory requirements could significantly disincentive customers and/or private capital from investing in and deploying such systems.

Furthermore, a key barrier to developing such systems is the significant upfront cost. Depending on the size and included technologies, our experience has shown that a renewable energy and battery based self-supply microgrid for a single facility could cost anywhere from \$10,000 to \$100,000 after installation. Many customers don't have that much available capital to

invest, but, just as it did for solar PV, third-party financing options would unlock the ability of many Puerto Rico residents and businesses to invest in microgrids.²

Third-party financing can take many forms, but a common construct is for the electrical equipment to be owned by a third-party who have a reasonable cost of capital and can leverage Federal renewable energy tax incentives, and then be leased to the facility or home owner for a monthly payment (which is typically less than their monthly electric bill) over the lifetime of the system. The importance of enabling third-party financing for individuals cannot be overstated, but the Proposed Rules as written, appear to preclude that crucial third-party financing from being able to support individual- and partnership-owned small systems.

ElectrIQ proposes the following changes to expressly enable and clarify classification of third-party-financed individual and partnership self-supply microgrids:

Chapter II – Microgrid Provisions

Article 2. – Microgrid Categories

Section 2.01. – Microgrid Classification

C. Microgrids shall be classified based on size according to the following:

1. Individual *and Partnership* systems are those with one or two customers-~~owners~~ and are owned by said customer(s) or a third-party;

E. Microgrids shall be subject to various requirements based on their classification, as follows:

1. There are no requirements for individual *and partnership* self-supply systems under the Regulation.

4. The requirements for small municipal systems, large municipal systems and third-party systems, except those classified as individual or partnership systems, are described in Article 6 of this Regulation.

² See Hobbs et al. (July 2013). *Improving Solar Policy: Lessons from the Solar Leasing Boom in California*. Climate Policy Initiative. <https://climatepolicyinitiative.org/wp-content/uploads/2013/07/Improving-Solar-Policy-Lessons-from-the-solar-leasing-boom-in-California.pdf>

These changes will ensure that innovative private financing options will be made available to individuals and partnership microgrids which will lead to more widespread and faster deployment of these types of systems.

3. MICROGRID TECHNICAL REQUIREMENTS

ElectrIQ Power strongly supports the Commission's insistence to ensure that microgrids covered under these Rules are primarily driven by renewable energy. We encourage the Commission to consider three points:

1. Electrical energy storage (e.g., batteries) sited with and charged by renewables should count towards the renewable generating capacity calculation mandated in Chapter II, Article 3, Section 3.02.
2. Exemptions to technical requirements in Chapter II, Article 3, Section 3.02. for non-renewable energy inputs must be allowed when grid outage events occur.
3. Electrical code adoption varies considerably by jurisdiction across the U.S. and code compliance mandates in Chapter II, Article 3, Section 3.05. as written may lead to unintended confusion between microgrid developers and permitting officials.

1. Battery storage can act as both a load, charging when excess renewable energy is generated, and a generator, when discharging and delivering electricity to meet a load when other generation capacity is insufficient. So, for example, if a 20 kW solar system is sited with a 10 kW battery, the total available capacity of that system to meet peak load would be 30 kW. Since the resources would be sited together in the microgrid and have the ability to operate islanded from the electric power grid, the renewable+storage system would most likely be designed and sized to ensure that

most of the electricity used to charge the battery is from connected renewables. Thus, energy discharged from the battery can also be considered renewable.

Therefore, ElectrIQ recommends the following changes:

Chapter II – Microgrid Provisions

Article 3. – Microgrid Technical Requirements

Section 3.02. – Renewable Microgrids

A. “Renewable” microgrids have the following qualifications:

2. “Primary energy source” means that:

b. The *cumulative* installed renewable energy generating capacity *and electrical energy storage capacity* (in MW) of the system exceeds the expected peak load of the microgrid.

2. There is always a worst-case scenario that electrical system designers must plan for, whether it’s for the entire grid or a single microgrid, and many customers are experiencing the worst-case scenario at this very moment. Regardless of how well designed a renewable-based microgrid may be, a disaster that brings down the electric grid may also cause damage to that microgrid as well (e.g., solar panels damaged from windborne projectiles).

Should another disaster occur that results in widespread outages and damage to microgrids adopted under these Rules, families and communities will and should be primarily concerned with regaining power as quickly as possible. In that situation, they should be allowed any means necessary to regain the safety and security provided by electricity, even if that means using fossil-fuel generation sources, rather than be concerned with ensuring they continue to comply with the Regulations herein - specifically, Chapter II, Article 3, Section 3.02., Subsection A.4. Furthermore, if renewable generation equipment is damaged during a significant disaster, it may take a long

time to get the necessary replacement equipment, such as solar panels or inverters, to the site and contract with electricians to re-install it.

For these reasons, ElectrIQ recommends that the Commission update Chapter II, Article 3, Section 3.02., Subsection A.4. to either a) expressly exempt microgrids from total energy input regulations during significant grid outages and for a limited period thereafter if microgrid electrical equipment is damaged, or b) allow microgrid owners and/or operators to apply to the Commission for a limited-time Total Energy Input exemption in case of significant grid outages, natural disasters, or other situations that cause damage to a microgrid's renewable generation sources.

3. ElectrIQ's energy storage and inverter systems comply with the latest safety standards including UL 9540 and UL 1741SA. We have designed our system specifically to adhere to the 2017 National Electrical Code ("NEC") which includes grid-tied lithium-ion battery energy storage systems.

We request the Commission clarify the intention of Chapter II, Article 3, Section 3.05., Codes and Standards. Is the Commission mandating that all microgrid equipment and systems comply with the latest version of the NEC, or must they comply with the version of the NEC that Puerto Rico and the local authority having jurisdiction ("AHJ"), if applicable, have officially adopted?

If it is the latest version of the NEC, local AHJs and electrical engineers may not be familiar with the significant changes therein since Puerto Rico has not yet adopted the 2017 NEC. Nor would local AHJs necessarily be familiar with these Microgrid Rules, and may compel developers to comply with past code versions that may be unnecessarily burdensome, or even contradictory to the current code. Our local experience is limited, so we defer to the expertise of those with

deeper regional code experience. However, open language such as that found in 3.05 can lead to confusion among all stakeholders and delay successful program implementation.

While we strongly support the adoption of the 2017 NEC (it is the only version that addresses energy storage systems such as ElectrIQ's), it seems inappropriate for a single CEPR program to adopt codes that are not officially adopted through the standard national code adoption process nor understood by AHJs who will be responsible for permitting these systems. Therefore, we would recommend an initial step of updating the language as follows:

Chapter II – Microgrid Provisions

Article 3. – Microgrid Technical Requirements

Section 3.05. – Codes and Standards

Microgrids shall be compliant with existing safety standards; namely, IEEE Standard 1547 for design; UL Standard 1703, UL Standard 1741, or IEEE Standard 1547 for equipment; and *applicable local and state electrical and building codes* ~~the National Electric Code, or any successor code or standard, as such code or standard may be revised, amended or updated from time to time.~~

After these Microgrid Regulations are established, then we would recommend and support initiating the formal adoption of the latest National Electric Code for all of Puerto Rico. Once that has been adopted, every electrical system participating in any energy program (including this one) will fall under the same rules, and AHJs and developers will be working from the same rulebook.

4. INTERCONNECTION

Interconnection of renewable energy and energy storage poses challenges to customers and developers of all system sizes. The U.S. Environmental Protection Agency (2017) notes, “The absence of standard interconnection rules, or uniform procedures and technical requirements for

connecting renewable energy systems to the electric utility's grid, can make it difficult, if not impossible, for renewable systems to connect to the electric utility's grid.”³

Since interconnection is likely to be one of the biggest challenges with successful implementation of these Rules, ElectrIQ strongly recommends that the Commission add further specificity into the Rules for interconnection procedures in Chapter II, Article 4, Section 4.05., Chapter II, Article 5, Section 5.07, and in Chapter II, Article 6, Section 6.15. We again defer to those with more local experience on the best course of action, especially in light of progress made towards enacting Act No. 57-2014, but one initial recommendation is to expressly mandate that interconnection for small microgrids, regardless of ownership structure, be expedited by PREPA under the Small Generator Interconnection Procedures and Small Generation Interconnection Agreement, provided under Order No. 2006 of the Federal Energy Regulatory Commission (FERC). Furthermore, CEPR could also direct that large microgrids are, for the purposes of interconnection, treated as community solar systems by PREPA.

5. ADDITIONAL COMMENTS

The Regulations as proposed provide an excellent framework for most microgrid developers and adopters. There are thousands of potential individual and partnership microgrid systems, which we agree should not be covered under these rules, that could also be successfully deployed with additional consideration from the Commission. While this docket may not be the correct forum to address those considerations, we look forward to working with CEPR on a host of potential regulatory changes that would enable safe, rapid, and mass adoption of customer-sited

³ See <https://www.epa.gov/statelocalenergy/state-renewable-energy-resources>

renewable energy and energy storage. Some potential areas for further regulatory exploration include:

- Time-of-use, and time-of-use Net Energy Metering tariffs
- Further interconnection standardization and streamlining
- Code adoption and permitting standardization
- Distributed energy resources participation rules for distribution and transmission system services and energy and ancillary service markets
- State-level adoption of energy storage targets
- State-driven pilot projects or economic incentives for adoption of energy storage, microgrids, renewable energy, demand-side management technologies, electric vehicles, or other distributed energy resources

6. CONCLUSION

ElectriQ Power, Inc. respectfully submits these comments to the Commission for consideration and sincerely looks forward to furthering the successful adoption of resilient microgrids across Puerto Rico.

Respectfully Submitted:

/s/ Randy Fish

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