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Subject: Comments on Regulation 9028, Microgrid Development

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Re: Comments to the *Regulation on Microgrid Development*, Regulation 9028

I. Introduction

We are Barrio Eléctrico (BE), a non-profit working in Puerto Rico towards a vision of energy justice, security, and independence for all through access to "community-powered" distributed energy resources. We applaud the Puerto Rico Energy Bureau (PREB) for its commitment to creating a robust electric sector for the island, as demonstrated by the serious effort behind creation of the Regulation on Microgrid Development (Regulation). By issuing this Regulation, PREB joins a short list of ambitious public utility regulators who are early to embracing the potential benefits – and the challenges – of establishing microgrids to modernize electricity service.

Barrio Eléctrico is pleased and privileged to submit the following comments and join the conversation about how to integrate microgrids into Puerto Rico's electric infrastructure.

II. A Comprehensive Regulatory Framework for New Technology and Service Models

Barrio Eléctrico proposes that this proceeding consider a comprehensive regulatory framework that will create an environment of business model innovation. We offer our comments below to address three general themes.

- Section IIA briefly reviews the language in the Regulation that Barrio Eléctrico believes is unclear or should not be applicable to microgrids.

- Section IIB provides a high-level description of what we propose a complete microgrid regulatory regime must consider, and that we hope may be addressed in this proceeding or related proceedings.

- Section IIC provides our recommendations of actions that PREB might consider taking in this docket to open the public discussion and make the determinations necessary to create a complete microgrid regulatory regime.

A. Brief Comments Regarding Language in the Regulation

First, language in the Regulation creates uncertainty as to scope of the "third party microgrid" definition. Specifically, whether the Regulation intends to include behind-the-meter (BTM) distributed energy resources that are at times dispatched as a virtual power plant (VPP) or for grid services. The definition in 1.08(29), taken alone and also together with the definitions of "microgrid" and "microgrid operator" (1.08(20 and 21)), proposes language broad enough to include an owner and operator of a VPP. Indeed, both "personal microgrids" and third party microgrids may be operated at times to provide grid services.

Barrio Eléctrico is aware of separate proceedings under PREB's authority to advance a pilot for batteries installed in Puerto Rico to offer grid services to the electric utility. We propose that PREB make clear that the Regulation excludes VPPs and other BTM distributed energy resources selling energy or services to the electric utility. That equipment and those services require a less complex regulatory regime than microgrids, and PREB is already addressing those services separately. Their availability should not have to wait for public consideration of how to regulate microgrids.

Second, Barrio Eléctrico notes with some concern that aspects of the Regulation apply oversight concepts that are appropriately applied only to a monopoly electric utility with an exclusive service territory. The Regulation offers no language that microgrids will be given exclusive territories for service, which is consistent with the common perception – shared by Barrio Eléctrico – that microgrids are meant to be one of many competing service models. Cost of service ratemaking, some aspects of nondiscriminatory rates, and the requirement that a service provider must serve all entities that request service are counterbalances to the monopoly power of a utility that has an exclusive franchise. While Barrio Eléctrico is in favor of consumer protections and some oversight of energy pricing for microgrid owners and operators, those owners and operators will not have the monopoly power that requires the above-mentioned checks to prevent abuse. We propose that this proceeding seriously rethink Sections 5.04, 5.10, and 5.13.

Third, Section 3.06 separates and excludes from the Regulation and this Proceeding the relevant considerations and rules for and by the electric utility. Enabling more administratively and technologically complex multi-property microgrids requires regulators to address technical and market issues that necessarily involve the utility and its equipment, including but not limited to safety, cyber security, equitable cost allocation, ownership, interconnection, operation and maintenance, and compensation for microgrids. This proceeding should also consider removing disincentives that the electric utility may have to cooperation and integration of microgrids. Barrio Eléctrico believes that the Regulation cannot provide the predictability that microgrid developers will need to advance projects unless it addresses these topics or PREB seeks to address them in a parallel and simultaneous proceedings.

B. The Broad Regulatory Scope Required for Microgrid Development

The Regulation presents a strong starting point for commencing discourse about microgrids as an electricity technology and business model option for Puerto Rico. Barrio Eléctrico's analysis and comments herein on how to advance the dialogue borrow heavily from the 2021 National Renewable Energy Laboratory (NREL) white paper, *Enabling Regulatory and Business Models for Broad Microgrid Deployment*.[1]

We urge PREB to broaden this proceeding to consider the following questions, issues, and elements of a holistic regulatory regime for microgrids. Many of the issues identified below will be critical questions for microgrids that serve multiple properties, regardless of ownership. All issues are critical for certainty for developers, who must plan projects and secure financing, and safety and security of the electric sector and those served by the microgrid.

Designing a valuation and compensation scheme for microgrids that provide grid services is admittedly an extremely challenging task. PREB would be one of the first regulatory bodies to tackle it. Barrio Eléctrico has confidence in PREB and that it can lead the way on demonstrating all aspects of a complete regulatory construct for microgrids. This demonstration is invaluable for innovating Puerto Rico's electric sector to embrace the value microgrids offer for an island electric grid, but is also invaluable to show the United States how to accomplish this innovation.

1. Define microgrids by owner, operator, and use case.

The Regulation defines microgrids according to three ownership types. Ownership and operational responsibility are not always the same, but both are significant factors in the nature and structure of oversight and access to customers and the public electric grid. Those factors, and use cases, all invoke different considerations that should be built into the regulations. Moreover, the Regulation should consider public ownership of microgrids, and issues related to utility-owned and -operated microgrids in this proceeding, as well.

Ownership and operation combinations encompass the following permutations:

- Single customer – self-financed, owned, and operated;
- Single customer – self-financed and owned, utility-operated;
- Single customer – privately owned and offered as "microgrid as a service" under power purchase arrangement;
- Multi-property, multi-customer – privately financed, owned, and operated;
- Multi-property, multi-customer – utility financed, owned, and operated; and

[1] Zinaman, Owen, Joseph Eto, Brooke Marshall-Garcia, Jhi-Young Joo, Robert Jeffers, Kevin Schneider. 2021. White Paper: Enabling Regulatory and Business Models for Broad Microgrid Deployment. Golden, CO: National Renewable Energy Laboratory (NREL White Paper).

- Multi-property, multi-customer – publicly financed, owned, and operated (may involve purchase of utility distribution assets by division of the government).

In addition, we propose consideration of the following microgrid use cases and how each warrants some customization of the regulatory regime the PREB will put in place:

Table 1: Microgrid Types Defined by Use Case[2]

Facility-level microgrid	A microgrid designed for an individual customer (e.g., a data center) connected to a central utility system for enhanced service quality and resiliency. Microgrid assets would be located "behind" the utility meter. Such microgrids can be owned and operated by the customer, utility (i.e., under a fee-for-service arrangement), or a third party microgrid developer, or some combination thereof.
Campus-level microgrid	A microgrid serving a single- or multi-owner contiguous set of facilities (i.e., a campus) typically behind-the-meter of a utility grid. These systems may serve customer load on a full-time basis and/or be designed to provide back-up islanding services. Department of Defense bases, universities and airports are common sites for campus-level microgrids. Utilities may or may not be involved in campus-level microgrid operation beyond the point of common coupling.
Public purpose microgrid	A microgrid that serves one or more customers designed specifically to provide uninterrupted service to critical infrastructure and vitally important community assets. Government- or ratepayer-funded investments in these microgrids are common due to the social values associated with maintaining critical services during power outages.
Remote microgrid	A fully operational microgrid, sometimes referred to as a mini-grid, serving an electrically isolated community without connection to a larger electricity grid . Remote microgrids are a "one-stop shop" for all services, from provision of energy to maintaining stability and power quality. These are already common for service to islands and geographically remote/rural settings.
Community microgrid	A microgrid serving energy to two or more different properties nested within the service territory of a utility. Community microgrids can operate independently from the grid but are otherwise connected to the utility network through a point of common coupling (PCC). They are a means to increase local energy independence and resilience.
Non-wires alternative (NWA) "anchor" microgrids	A type of community microgrid operating a feeder segment or substation balancing area to provide non-wires alternative services as a primary use, while simultaneously offering partial or full resiliency services to customers during utility grid outages.
Temporary microgrids	Feeder segments or substations configured to be islandable microgrid hubs with all hardware installed except generation. Portable generators are staged at islanding point by truck, rail, boat or helicopter, and configured to plug into feeder segment or substation microgrid hubs when needed. Temporary microgrids are a resilience-only application (i.e., no value stacking opportunities) but do provide flexibility for where microgrids can be quickly deployed and is thus a form of "flexible resilience."
Networked microgrids	A prospective future microgrid application in which sub-service-territory balancing areas, substations, feeder segments, or transformers act as clustered and nested microgrids, maximizing reliability and resilience among them. Most likely, this use case would consist of a series of community microgrids that also provide NWA characteristics in order to justify their investment.

[2] From NREL White Paper at 5.

Utility pilots	Utilities sometimes receive special regulatory approval to build-own-operate microgrids because of their novel and unique nature for the jurisdiction and the need to foster learning in the utility and regulatory environment. Realistically, a utility pilot will attempt to pursue one of the above use cases.

2. Define microgrid ownership and microgrid component ownership rules.

- Who is allowed to own and operate a multi-property microgrid;
- What criteria apply to defining that privilege;
- What allowances and conditions apply to separate ownership and operation of components (for example, network infrastructure, switch gear, storage, non-storage distributed energy resources, etc.).

3. Redefine the conventional interconnection rules, which do not contemplate microgrids.

Multi-property microgrids require changes to the distributed resource interconnection rules because multiple components connect to the grid even though the microgrid will be operated as a single resource. With public consultation, the regulator and electric utility must expand existing interconnection requirements for distributed energy resources to better account for complex interconnections and islanding requirements (e.g., for microgrid formation and black start). The utility operator may require entirely new provisions of interconnection requirements (e.g., requirements related to resource availability and scheduling, protection, relaying, and controls).

In the absence of standard interconnection procedures for microgrids, the electric utility will have sole discretion over each interconnection request and the license to require microgrid developers to pay for expensive equipment upgrades that benefit the grid. These potential costs, and the associated uncertainty around them, can be a significant barrier to microgrid development and deployment.

In addition, well-designed technical interconnection standards and processes help to ensure that privately-owned multi-property microgrids can operate in both grid-connected and islanded modes of operation without adversely affecting the operation of the utility grid. Interconnection standards must also contemplate cybersecurity and ensuring secure communication and coordination between the utility and networked microgrids. These rules underlie safety for utility line workers and secure operations that do not negatively impact consumer-owned equipment through power quality or reliability problems. Defining these standards also plays an important role in allocating liability in the event of damage or loss caused by electric service.

This topic must also consider how the microgrid intelligence will interact with the utility grid operations and intelligence, and what visibility or intelligence the utility operator currently lacks and must create or reinforce to accommodate microgrid operations by a private operator.

4. Define the meaning and value of resilience and other grid services the microgrid may provide.

All stakeholders presumably recognize the resiliency value that a microgrid brings to a distribution grid. Puerto Rico does not have, however, a definition of resilience or a monetary value attached to it. This proceeding is an opportunity to establish this fundamental predicate, from which PREB and the public can evaluate prioritization, expectations, obligations, costs, and pricing of proposed microgrids. Clear definitions of resilience may and should include, for example, (1) defining the event (or set thereof) for which resilience is required; (2) defining the level and duration of service required of the microgrid to adequately address that event; and (3) defining a site- or area-based "scope" over which this resilience value is assumed to accrue. In addition, the definition might consider locationally-differentiated valuation methodologies for the resilience value of microgrids, which can be used for economically justifying and ultimately deploying multi-property microgrids.

A related issue is the need for definition of how microgrids might be compensated for grid services in "Blue Sky" periods, i.e., hours other than emergency conditions. This might include capacity, resource adequacy, demand response, non-wires alternatives to grid maintenance and upgrades, and operational grid services such as frequency response and VAR regulation. Regulations that allow for compensation for these services could reduce operating costs to the electric utility by avoiding upgrades and repairs to the grid, while also providing better economics to the developers that encourage project financing.

5. Acknowledge and address utility economic disincentives to incorporate microgrids.

Privately-owned multi-property microgrids tend to reduce electricity sales revenue and/or utility capital investment opportunities. The utility regulatory frameworks impose incentives to prevent microgrid projects from moving forward, and to avoid investment of institutional resources into creating participation frameworks for private microgrids. It is important to address this issue early, because microgrids cannot move forward without full cooperation of the electric utility as a matter of technology interconnection and business operations.

An important element of this inquiry that warrants special mention is the exclusive franchise granted the public utility. Because of it, no other entity is legally allowed to sell electricity to retail customers across multiple properties within the franchise territory, and non-utility distribution wires are explicitly forbidden. Thus, franchise agreements limit the ability of non-utility multi-property microgrid owners to tie customers together into a network. We urge PREB to consider how microgrid operators may be permitted to rebuild existing distribution lines, build new ones, and cross public rights of way.

6. Define how microgrids co-exist with the public utility within the jurisdiction of the public utility or alongside of it.

Subjecting private microgrid developers, owners and operators to the exact same regulatory requirements as public utilities will stifle the development of microgrids and delay the benefits they offer. In addition, to the extent that all or some microgrid services should be offered under a

competitive market regime, many obligations of a regulated monopoly utility do not and should not apply to private microgrid business models. Microgrids should, however, be subject to oversight with respect to the quality for each type of service they offer, pricing and other issues of consumer protection, and technology and operations standards that are compatible with gird operations and those of other microgrid operators.

How the regulatory regime perceives microgrids and which burdens and benefits of public utility regulation apply to them is an issue that we all must understand in the first instance. Only then can we collectively outline what the regulatory regime must include or address. In addition, PREB and the public are unlikely to perceive all microgrids, which will have different ownership and use cases, in the same way. Accordingly, this proceeding and related proceedings must be prepared to address this question across multiple microgrid constructs.

7. Define rights and costs of microgrid owners and operators using existing utility grid assets.

It is conceivable that a private, multi-property microgrid will rely on using some combination of utility distribution network infrastructure and privately-owned network infrastructure. A comprehensive regulatory regime will define how or under what circumstances utility wires might be used within a microgrid, as well as whether private wires, islanding equipment and other infrastructure can be constructed and used in conjunction with utility wires. It will also establish the terms, conditions, and charges for use of utility distribution network lines by private microgrid developers under both normal and islanded conditions.

8. Establish a proceeding to create a framework for inter- and intra-microgrid energy trading.

Microgrids create a subset of networks that are also a subset of the energy marketplace. Depending on the use case and technical design of the privately-owned multi-property microgrid, there may be a need to determine the circumstances in which electricity generated by individual distributed energy resources can be delivered and sold to neighboring customers within the microgrid. The many questions and challenges inherent in creating this framework and market rules deserve a separate proceeding. Microgrid developers will rely on the rights, obligations, and compensation models determined by such a proceeding, and the right to wheeling across the utility wires and other microgrid assets, when designing the use case and seeking financing. Thus, an environment of innovation and rapid deployment for microgrids will rely on PREB opening that proceeding as soon as possible and advancing it simultaneously with this proceeding.

C. A Well-Designed Regulatory Process to Take the Lead on Integrating Microgrids

Established regulatory precedent for microgrids remains almost nonexistent to date. The States of Hawaii and California have both opened public processes to develop tariffs governing both interconnection and compensation for resilience services from privately-owned multi-property microgrids that span multiple properties and/or rights of way. Their recent history shows that the radical nature of privately owned wires and multi-property service models that deviate from the public utility model (and associated regulatory and legal paradigm shifts) require significant public process and a complexity of new rules.

PREB is ripe to initiate this conversation for Puerto Rico's electric sector, and has all the tools and stakeholder interest to accomplish a robust and fair regulatory regime for microgrids.

Barrio Eléctrico recommends that PREB step back from a written regulation and solicit stakeholder input on the topics that a comprehensive regulation must address. The list above in Section IIB is a highly generalized list. Each topic mentioned includes subtopics, not mentioned here, encompassing multiple challenges. Those challenges will incur significant debate. By soliciting a public consensus on the scope of the regulatory framework, PREB will have a basis to define this proceeding in stages or create multiple parallel proceedings to better define and isolate the weighty questions. Clear boundaries on these questions will make the public process more efficient and effective by avoiding unnecessary confusion of issues that should be taken separately.

Once PREB defines the full regulatory scope and all intrinsic questions, it can tackle the different issues in an orderly manner and with appropriate prioritization. In addition, defining regulatory scope will help PREB and the public identify areas where PREB might need more authority, through legislative enactment, to address or act on certain issues or topics relevant to microgrids.

In the meantime, PREB could recognize it has experience with pilots in the VPP arena and apply that experience to microgrids. Small pilots allow PREB to teach itself and the public what certain aspects of microgrid regulation should be. This learning-by-doing can be limited to small and low-risk efforts. Soliciting and encouraging pilots that proceed simultaneously with public processes to determine microgrid rules should have enormous value for getting those rules correct. We recommend that PREB consider scheduling a workshop open to all interested stakeholders to discuss how to shape the solicitation for such pilots.

Conclusion

Barrio Eléctrico respectfully submits the foregoing comments and thanks PREB for the opportunity to have this public conversation. It looks forward to active participation in any and all processes that PREB establishes to meet the challenge of creating a microgrid regulatory regime.

Respectfully,

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