



**COMMONWEALTH OF PUERTO RICO
PUERTO RICO ENERGY COMMISSION**

IN RE: ENERGY COMMISSION
INVESTIGATION REGARDING THE STATE
OF PUERTO RICO'S ELECTRIC SYSTEM
AFTER HURRICANE MARÍA

CASE NO.: CEPR-IN-2017-0002

Subject: Request for Public Comments.

Issue: Implementation of regulatory actions to facilitate the tasks of restoring electric service and encourage the deployment of new technologies.

RESOLUTION AND ORDER

I. Introduction

Through Resolution issued on October 27, 2017 ("October 27 Resolution"), the Puerto Rico Energy Commission ("Commission") began a comprehensive investigative proceeding into the state of the electric system as a result of Hurricane María's landfall in Puerto Rico. On said Resolution, the Commission identified four main objectives for the investigation: (i) accelerating the restoration of electric service; (ii) correcting vulnerabilities and strengthening the electric system; (iii) elaborating and implementing a new energy model for Puerto Rico; and (iv) updating the Puerto Rico Electric Power Authority's ("PREPA") integrated resource plan in relation with the characteristics of the new energy model.

This investigation has two main phases. The first phase will focus on the restoration of the electric service and the identification and correction of those vulnerabilities in the electric system which contributed to its general collapse. The second phase consists of a medium- and long-term analysis with the aim of identifying Puerto Rico's energy needs and formulating and adopting the energy model best suited to meet those needs, promote economic development and the protection of the environment, and produce quality energy services at just and reasonable prices.

However, these phases are not separate and independent evaluations or procedures. Both phases are interrelated, and therefore the information gathered and the determinations made in one phase will inform and influence the analysis made by the Commission in the other. The restoration efforts and the deployment of microgrids and other distributed generation technologies in the short-term have an impact on the development of the electric system in the medium- and long-term. Therefore, once the short-term strategies for restoring the electric system have been identified, it is necessary to measure the impact of those strategies on the system, as well as the energy demand profile, and the optimum mix of generation resources to meet said demand, among others. Such analysis will be made so as to ensure that the energy model set in place best responds to our needs.

This Resolution and Order comprises one of the first steps in the road towards achieving the objectives of modernizing and transforming our energy system. Beginning with the most pressing needs, the request for public comments made through this Resolution and Order aims at identifying the rules, guidelines and other regulatory actions that must be adopted by the Commission to facilitate the restoration of the electric service, ensuring said service is restored as soon as practically possible. Likewise, it seeks to ensure that the investments made in restoring the electric service have the effect of strengthening the system, make it less susceptible to future natural phenomena and reduce the amount of time required to restore service during future emergencies is significantly decreased.

II. Distributed generation and microgrids as alternate models for restoring and strengthening electric service.

The restoration of electric service is the Commission's main objective in the short-term. Three main factors have limited access to electric service for the majority of the population, making restoration work more difficult: (i) the extent of the damage inflicted on the transmission and distribution infrastructure; (ii) the fact that most generation is located in the southern region requires the use of long-range transmission lines to supply the bulk of the energy demand; and (iii) the lack of generation capacity at the Palo Seco and San Juan generation plants to supply the energy demand generated in the northern region. One of the strategies capable of accelerating the restoration of the electric service is the installation of distributed generation and energy storage systems in those areas areas throughout the Island currently without electric service. Such systems may be deployed to serve individual customers or serve a group of customers through the use of microgrids, solar communities or other measures where the generation and delivery infrastructure is close to the consumption.

Another strategy is to supplement generation from the Palo Seco and San Juan generation plants through the deployment of distributed generation sources throughout the northern region, whether they be individual generation systems designed to supply all or part of one or more specific customers' demand during certain periods of the day, or through small scale generators directly connected to the grid with the intent to serve as additional sources of generation.

These strategies allow (i) the speeding-up of electric service restoration throughout the Island, through the deployment of distributed generation projects financed, developed, and operated by private or non-governmental entities; (ii) the strengthening of the electric system, reducing dependence on centralized sources of generation; (iii) the facilitation of electric service restoration on future occasions through the use of distributed generation systems and microgrids capable of operating independently from the rest of the electric grid; and (iv) the transferring of the responsibility for the restoration and provision of electric service to multiple entities, allowing for greater access to economic, technical and human resources.

Accordingly, the Commission is interested in receiving input from the general public and, in particular, from persons and entities with direct interest over the electric sector,

regarding the rules that the Commission should adopt in order to regulate the development and operation of microgrids and other distributed generation systems in Puerto Rico and implement the strategies identified above. **Exhibit A** of this Resolution and Order includes a set of questions and topics for which the Commission is particularly interested in receiving public comments. The Commission encourages any person or entity interested in assisting the Commission efforts to file their comments. The current proceeding is not an adjudicative proceeding. Therefore, request for intervention are not a prerequisite for filing comments.

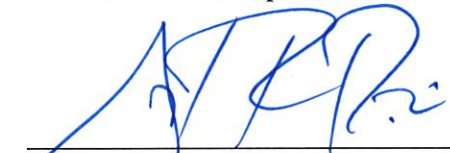
Due to the pressing nature of the emergency Puerto Rico currently faces, the Commission requests all public comments to be filed with the Commission **on or before November 20, 2017**. Comments may be filed through any of the following means:

- a. By email to the following address: comentarios@energia.pr.gov.
- b. By postal mail addressed to the Puerto Rico Energy Commission's Clerk's Office, at 268 Muñoz Rivera Ave., Suite 202, San Juan, PR 00918.
- c. In person at the Commission's Clerk's Office, located at the address set forth above.

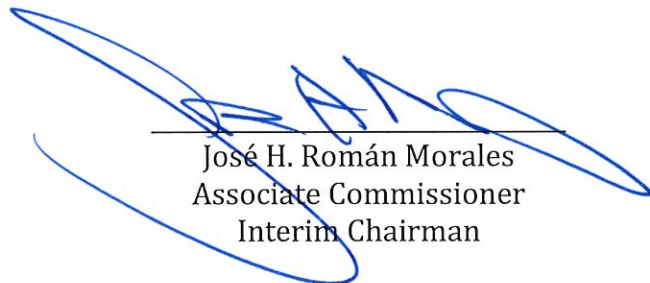
Finally, the Commission **ORDERS** PREPA to provide its comments and answers to the questions and topics identified by the Commission in **Exhibit A** of this Resolution and Order.

For the benefit of all parties involved, the Commission publishes this Resolution and Order in both the Spanish and English languages. Should any discrepancy arise between these two versions, the provisions of the Spanish version shall prevail.

Be it notified and published.



Ángel R. Rivera de la Cruz
Associate Commissioner



José H. Román Morales
Associate Commissioner
Interim Chairman

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Commission has so agreed on November 10, 2017 and on this date a copy of this Resolution and Order was notified by electronic mail to the following: j-morales@aepr.com, n-vazquez@aepr.com, c-aquino@aepr.com and n-ayala@aepr.com. I also certify that today, November 10, 2017, I have proceeded with the filing of the Resolution and Order issued by the Puerto Rico Energy Commission and I have sent a true and exact copy to the following:



**Autoridad de Energía Eléctrica de
Puerto Rico**

Attn.: Lcdo. Javier Morales Tañón
Lcda. Lcda. Nitza D. Vázquez Rodríguez
Lcdo. Carlos M. Aquino Ramos
P.O. Box 363928
Correo General
San Juan, PR 00936-3928

For the record, I sign this in San Juan, Puerto Rico, today, November 10, 2017.

María del Mar Cintrón Alvarado
Clerk



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Exhibit A

Request for Public Comments

This request for public comments is issued pursuant to Chapter V of Regulation No. 8543 and pursuant to the Puerto Rico Energy Commission's March 27, 2017 Resolution initiating the ongoing investigation. All public comments must be filed with the **Commission on or before November 20, 2017.**

I. General Instructions

1. Any party filing public comments shall use the case heading identified above.
2. Any party filing public comments shall provide their names, the name of their representative (if any), and their contact information, consisting of postal address, email and telephone number.
3. If filing supporting documents along with any comments, the party shall identify the document provided, shall describe the nature of the document, by whom the document was prepared and for what purposes, and, the question or topic identified herein to which such document relates to.
4. When responding to the questions and topics identified herein, parties should identify the specific question or topic being addressed using the number of the question as listed herein. General comments not specifically related to the questions and topics identified by the Commission are permissible but shall be identified under a separate section titled "General" or "Miscellaneous".
5. For immediate assistance regarding the filing of comments or any of the instructions provided herein, please contact the Commission's Clerk at 787-523-6262.

Appendix I

Microgrids in Unserved Areas

1. Microgrid Organization:

- 1.1. What legal authority does the Commission have to regulate actors and actions involved in microgrids? Consider the following actions, among others: Creation of a microgrid business, interconnection with other microgrids, interconnection with PREPA's transmission or distribution system, sales of microgrid output to PREPA (for resale), sales of microgrid output to retail customers (with or without participation by PREPA).
- 1.2. What are the advantages and disadvantages of alternative microgrid ownership structures (e.g., third-party, customer co-op, anchor load)? Consider such factors as reliability, economics, accountability.¹
 - 1.2.1. For each possible ownership structure, what actions by the owners, users and customers should be guided, constrained or rewarded through regulatory actions? What regulatory actions are necessary? What regulatory actions might be unnecessary or problematic?
- 1.3. Are there legal or practical obstacles to any desirable ownership structures? If so, what are the solutions, within and outside the Commission's authority?
- 1.4. What financing sources are available to support various ownership forms? Consider private investment (both independent investors and commercial entities like large stores), government investment, and foundation and other non-profit sources.
- 1.5. What types of expertise (e.g., planning, engineering, customer education, other) are necessary to make the planning, development and operation of microgrids a success? What are current examples of success and failure?

¹ An anchor load is a large customer, such as a hospital, water-treatment facility, or big-box store that owns its own power supply (possibly including a storage system). It uses this system to serve itself but could extend to neighboring facilities through a microgrid.

2. Microgrid placement and availability: Given the Commonwealth's need and desire to getting service restored to all customers as soon as possible, consider these questions:

- 2.1. What are the advantages and disadvantages of focusing microgrid development on specific types of customer loads (e.g., large industrial loads, urban loads, rural loads, residential neighborhood loads)? Are some types of load profiles, or some geographic areas, better suited than others? What data exist to support your answer?
- 2.2. Regardless of the possible priorities to place on different types of loads, what are the most cost-effective paths to getting microgrid service universally available to all customers regardless of their locations?
- 2.3. What level of financial assurance will microgrid developers reasonably require before investing their own funds in Puerto Rico microgrids?
- 2.4. What can the Commission do to facilitate universal service in the restoration?

3. Microgrid Regulation

- 3.1. What form of registration and/or approval by the Commission should be required for microgrids?
 - 3.1.1. What regulatory changes would be needed to permit various microgrid arrangements?
 - 3.1.2. What aspects of microgrid operations should be regulated?
 - 3.1.3. What are the advantages and disadvantages of the Commission establishing technical and financial qualifications for the microgrid developers?
 - 3.1.4. What are the risks of incompetent or unscrupulous developers and what are reasonable ways to prevent such problems?
- 3.2. What technical standards should apply to islanded microgrids?
 - 3.2.1. What safety standards should apply?
 - 3.2.1.1. Are the existing standards—IEEE Standard 1547 for design; UL Standard 1703, UL Standard 1741, or IEEE Standard 1547 for equipment; and the 2011 National Electric Code—sufficient? Why or why not?
 - 3.2.2. What are the advantages and disadvantages of requiring inspections? If the Commission requires inspections, what types of professionals and entities

should be responsible for conducting them and certifying compliance? Consider registered engineers (working for the developer, for the Commission or for some other independent entity, municipal construction permit inspectors, others). What technical specifications should apply to the process of interconnecting a microgrid to PREPA's transmission or distribution system?

3.2.3. Based on what factors should the Commission determine whether microgrids be interconnected only to PREPA's distribution system vs. to PREPA's transmission or sub-transmission system?

3.3. How should the location of microgrids be determined?

3.3.1. Should the Commission establish limits on the size of a microgrid? On what factors should that limit be based (geographic extent, capacity, number of customers, other)?

3.3.2. Should the Commission issue franchise rights for microgrids? What conditions should be applied for a franchisee to maintain franchise rights?

3.4. What consumer protections are required, and how should those vary with the ownership of the microgrid?

3.4.1. Prices and costs.

3.4.1.1. Assuming (for purposes of this question) that microgrid owners can sell their output directly to retail customers, what are the advantages and disadvantages of different pricing methods (including traditional cost-based pricing, price caps based on reasonable projected cost, and allowing market forces to set prices)? Is it reasonable for there to be an administrative charge to cover the Commission's oversight costs?

3.4.2. Contract terms.

3.4.2.1. What are the advantages and disadvantages of the Commission establishing standard contract terms for retail and wholesale (to PREPA) sales?

- 3.4.2.2. How does the answer to the preceding question vary by customer group? For example, should standard terms be required only for residential and small-commercial customers?
- 3.4.2.3. Should the standard terms be required only for microgrids owned or operated with the main purpose of selling energy at retail?
- 3.4.2.4. Should contract provisions be subject to Commission review?
- 3.4.2.5. Should the Commission set limits on contract duration?
- 3.4.2.6. How should the Commission address customers who decide they no longer wish to be part of a microgrid?
- 3.4.2.7. Should the development of microgrids require unanimous approval of customers within the area to be served by microgrids?
- 3.4.2.8. What are the advantages or disadvantages of allowing specific customers to opt in or opt-out from being served by a microgrid?
- 3.4.3. What types of pre-payment or deposits are appropriate? How does the answer vary by customer group?
- 3.4.4. Are non-discrimination rules necessary?
- 3.4.5. Are other protections necessary?
- 3.5. Must all microgrids (at least those serving multiple customers) charge for services by metering delivered energy, or are other pricing structures acceptable?
- 3.6. To ensure that a microgrid project is cost-effective, safe and reliable, what information should the Commission receive from a microgrid developer prior its connecting customers? For example, should the Commission require developers to specify:
 - 3.6.1. Maximum set of customers to be served? Type of customers to be served?
 - 3.6.2. Maximum generation and storage capacity anticipated?
 - 3.6.3. Costs?
 - 3.6.4. Pricing?
- 3.7. What timing requirements, in terms of the development process, must the Commission take into account, when determining how long it will take to approve or reject a microgrid proposal?

4. Microgrid Generation Technology: Solar photovoltaics, supplemented with storage, have been employed to power microgrids. The Commission is interested in the range of other options for reenergizing the disconnected portions of the island.

4.1. Information provided to the Commission by Pattern Santa Isabel, LLC suggests that the Santa Isabel wind farm is operable, but lacks load and a source of energizing power. This condition could affect other renewable independent power producers, whose installations are operable but require power from PREPA to get back online.

4.1.1. Is there a technical solution to add a small solar or diesel generator to restart the wind farm, and storage to firm up the supply?

4.1.2. Is there load close to the wind farm that could be served from a microgrid based on the wind farm?

4.1.3. What legal or contractual obstacles would prevent or limit the ability of the Santa Isabel wind farm from (i) procuring a small-scale generation source to power up its turbines and (ii) serve surrounding communities directly through the use of microgrids?

4.2. Are there any existing solar facilities that could be firmed up with storage and connected to load?

4.3. For generation facilities under contract with PREPA, how would use of those facilities to serve a microgrid affect PREPA's contract?

4.3.1. Can a party other than PREPA develop a microgrid from such a facility?

4.4. Can any of PREPA's hydro-electric facilities be firmed up with storage and connected to load?

4.4.1. Can other parties use those facilities to serve local load?

4.4.2. What arrangements would be needed with PREPA to implement this option?

4.5. Is it legal, practical, and necessary for solar-storage or wind-storage microgrids to have some fossil fuel back-up capacity?

4.5.1. How much fossil fuel based back-up capacity can be used in a microgrid without compromising its renewable status and ability to sell to customers?

5. Restoring operation of existing industrial generation using combined heat and power (CHP) systems.

5.1. How much CHP is currently installed on the island? (The Commission would be interested in anecdotal information about specific facilities, as well as more comprehensive data.)

5.1.1. What portion of the installed CHP capacity is operating interconnected with PREPA?

5.1.2. What portion of the installed CHP capacity is operating in islanded mode, without PREPA supply?

5.1.3. What portion of the installed CHP capacity is physically capable of operating, if utility power were restored to the host facility?

5.2. Are those systems capable of operating in islanded mode?

5.2.1. For those that cannot operate islanded, would a small amount of additional on-site generation allow the CHP to restart?

5.3. For CHP installations that could operate now, but are sitting idle, what else would be needed to bring those plants back into service, to serve the host facility, feed power back to PREPA and/or power a microgrid?

5.4. Do any CHP facilities have unused electrical capacity that could be delivered to PREPA or a microgrid?

5.5. What regulatory actions would be required to allow a CHP to sell excess power to PREPA?

5.6. What regulatory actions would be required to allow a CHP to sell excess power to a microgrid?

6. Coordination of Islanded Microgrids with PREPA:

6.1. To PREPA: Please provide the Commission with any information relating to plans for serving rural communities with solar/storage microgrids. Such information should include responses to the following questions:

If so,

6.1.1. What details are available regarding this plan?

6.1.2. When will the first of these systems be installed?

6.1.3. What duties does PREPA propose to assume for these communities?

6.1.4. How would PREPA's rates and role in these areas differ from areas served by central generation?

6.1.5. For all commenters: What are the advantages and disadvantages of the Commission requiring PREPA to develop microgrids in some areas? Would such a requirement avoid duplication of effort and conflict? Would it discourage competitors from entering the Puerto Rico microgrid market?

6.2. Are there areas that should be reserved for PREPA restoration, or should microgrids be encouraged everywhere?

7. Use of Stranded PREPA Equipment: This set of questions addresses the possibility of assisting microgrid development by using existing PREPA equipment that PREPA is temporarily unable to use.

7.1. Should microgrids be allowed to deliver power to customers through existing PREPA metering equipment?

7.1.1. If so, how and when should PREPA be compensated for that use?

7.1.1.1. Should the Commission set a fixed rate per meter, based on the average embedded costs of PREPA meters?

7.1.1.2. Should the microgrid pay a monthly fee, or purchase the equipment outright?

7.2. Should microgrids be allowed to purchase distribution equipment (poles, primary lines, secondary lines, service drops, and transformers) that PREPA is not currently able to use due to lack of connection to central generation?

7.2.1. If so, how and when should PREPA be compensated for that use?

8. What tools are available to the Commission or other parties to enable behind-the-meter resources in areas without electric service?

8.1. Are there technical resources (such as pile drivers for ground mount systems) in short supply in Puerto Rico? If so, what can be done to alleviate those shortages?

8.2. Do firms that are new to Puerto Rico need information about local design and approval processes and standards? If so, how can that information be efficiently shared?

Appendix II

Distributed Resources to Augment Northern Supply

Although these questions are primarily addressed to PREPA, the Commission welcomes comments from any other stakeholder .

1. What is the status of power restoration?
 - 1.1. What areas currently have PREPA power supply?
 - 1.1.1. Which PREPA-owned and PREPA-contracted power plants are currently serving customers?
 - 1.2. What is the status of transmission from the southern power plants (EcoEléctrica, AES, Aguirre, Costa Sur) to the San Juan area?
 - 1.2.1. On each of the transmission routes:
 - 1.2.1.1. How many towers were damaged by Hurricane María?
 - 1.2.1.2. How many towers were destroyed?
 - 1.2.1.3. How many towers have been repaired or replaced?
 - 1.2.1.4. How many spans of conductor have been broken or separated from their towers?
 - 1.2.1.5. How many spans have been restored?
 - 1.3. What is the status of the Palo Seco plant?
 - 1.4. How much more load (or customers) could PREPA serve from the restored northern delivery system, if adequate generation supply were available?
2. What factors have been impeding deployment of behind-the-meter resources in the restored northern delivery system?
 - 2.1. Has PREPA actions been helpful in getting deployed since late September?
 - 2.2. Has PREPA created any obstacles to behind-the-meter restoration, through either action or inaction (including lack of administrative capacity)?
 - 2.3. What can and should the Commission do to facilitate behind-the-meter resources to increase power supply in the restored northern delivery system?
3. What PREPA regulations need to be amended, at least temporarily, to address the supply emergency?

- 3.1. Section IV, Article D (3)(f) of PREPA Regulation No. 8915² limits the aggregate capacity of distributed generation connected to a transformer to be less than or equal to the capacity of that transformer.
 - 3.1.1. Should this requirement be modified to reflect the ability of distributed generation, especially with storage, to limit flow back to the distribution system?
- 3.2. Section IV, Article D (3)(g) of Regulation No. 8915 limits distributed generation installed on a feeder to not exceed 15% of the annual peak demand on that feeder.
 - 3.2.1. What is the practical purpose of this requirement?
 - 3.2.2. Should this requirement be waived for the duration of the emergency?
 - 3.2.3. Does PREPA have data on peak load by feeder, or is this provision unworkable?
 - 3.2.4. Should the limit be raised to an approximation of the minimum load on the feeder, such as 50% of peak?
- 3.3. Regulation No. 8915 requires a more complex study for projects ineligible for Expedited Interconnection Process as defined in the Regulation.
 - 3.3.1. Should the size limit for the Expedited Interconnection Process be increased, at least temporarily?
- 3.4. Section V, Article B (10) of Regulation No. 8915 states that the cost of any required upgrades to PREPA's distribution system in order for the distributed generation facility to be interconnected are the client's responsibility.
 - 3.4.1. How should this provision be amended, if at all, to reflect the current process of reconstruction of much of the distribution system?
- 3.5. PREPA Regulation No. 8916³ establishes the interconnection requirements for generators to PREPA's transmission or sub-transmission system. Should any of the

² *Reglamento para Interconectar Generadores con el Sistema de Distribución Eléctrica de la Autoridad de Energía Eléctrica y Participar en los Programas de Medición Neta.*

³ *Reglamento para Interconectar Generadores con el Sistema de Transmisión o Subtransmisión Eléctrica de la Autoridad de Energía Eléctrica y Participar en los Programas de Medición Neta.*



provisions of said regulation be amended in order to incorporate microgrids to PREPA's transmission or sub-transmission system in an expeditious manner?