GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE: REVIEW OF T&D OPERATOR'S SYSTEM OPERATION PRINCIPLES	**CASE NO.:** NEPR-MI-2021-0001 **SUBJECT:** Determination on LUMA's System Operation Principles.

FINAL RESOLUTION AND ORDER

I. INTRODUCTION

Puerto Rico suffers from an inherently deficient electric system, which has been exacerbated after the impact of hurricanes Irma and María. In particular, the planning, design, and operation of an isolated island-based electricity system imposes on the Puerto Rico Electric Power Authority ("PREPA"), and Puerto Rico as a whole, significant challenges with respect to power system stability and reliability. Act 120-2018[1] establishes the legal framework for the transformation of the electric power system in Puerto Rico.[2] It empowers PREPA to sell its assets related to electric power generation and transfer or delegate any of its operations, functions, or services.[3]

Any agreement arising from Act 120-2018 shall be entered into pursuant to the legal and administrative framework established in Act 29-2009[4], which regulates Public-Private Partnerships. Thus, for such purposes, Act 120-2018 establishes the process that shall apply to any transaction that establishes a Public-Private Partnership for any PREPA function, services, or facility. In addition, Act 120-2018 empowers PREPA and the Puerto Rico Public-Private Partnerships Authority ("P3A") to carry out the processes through which such transactions shall be executed.[5]

After conducting a competitive process in accordance with Act 120-2018 and Act 29-2009, the P3A selected a third-party operator for the T&D System. Under the proposed transaction, the operation of PREPA's Transmission and Distribution System ("T&D System") would be assumed by a private manager for a certain period of time, with

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[1] Known as the *Puerto Rico Electric Power System Transformation Act*, as amended ("Act 120-2018").

[2] *See* generally, Statements of Motives, Act-120-2018, pp. 3-5.

[3] *Id*.

[4] Known as *Public-Private Partnership Act*, as amended ("Act 29-2009").

[5] *Id*.

ownership of the assets remaining at PREPA. Thereafter, on June 17, 2020, the Energy Bureau of the Puerto Rico Public Service Regulatory Board ("Energy Bureau") issued a Certificate of Energy Compliance for the then proposed T&D System operation and management agreement.[6] The Energy Bureau clarifies, as clarified through the Certificate of Energy Compliance and subsequent orders, that any language depriving or restricting the Energy Bureau's jurisdiction is not binding to the Energy Bureau.

Act 17-2019[7] declares the reliability of Puerto Rico's electric delivery system a public policy priority, stating "(t)he electric power system should be reliable and accessible, promote industrial, commercial, and community development, improve the quality of life at just and reasonable cost, and promote the economic development of the Island."[8] Reliable electricity service is fundamental to the development of industry, commerce and Puerto Rico's communities and economic growth. To achieve this public policy goal, the Energy Bureau authority was broadened over the electric power infrastructure to ensure the reliability, resilience, and safety of electric power service.[9]

On June 22, 2020, the Puerto Rico Electric Power of Puerto Rico ("PREPA"), the Puerto Rico Public-Private Partnerships Authority ("P3A"), LUMA Energy, LLC[10] as ManagementCo, and LUMA Energy ServCo, LLC[11] as ServCo (collectively, "LUMA") entered into an Operation and Maintenance Agreement ("OMA") under which PREPA transferred operational control of its transmission and distribution system ("T&D System") to LUMA. PREPA continues as owner of the T&D System, P3A serves as Administrator, and LUMA serves as the T&D operator.[12] Effectively, LUMA assumes, as PREPA's agent, both the operational and regulatory responsibilities once performed by PREPA. As a certified electric service company, the operator of T&D, and agent for PREPA, LUMA is subject to the jurisdiction of the Energy Bureau and all applicable statutory and regulatory requirements.

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[6] *See* Resolution and Order, In re Certificate of Energy Compliance, Case No.: NEPR-AP-2020-0002, June 17, 2020 ("Certificate of Energy Compliance").

[7] Known as the *Puerto Rico Energy Public Policy Act.*

[8] *Id.,* Statement of Motives.

[9] *Id.,* at 4.

[10] *See* In re: Request for Certification LUMA Energy, LLC, Case No. NEPR-CT-2020-0008.

[11] *See* In re: Request for Certification LUMA Energy ServCo, LLC, Case No. NEPR-CT-2020-0007.

[12] Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement ("OMA") (June 22, 2020). Retrieved from https://www.p3.pr.gov/wp-content/uploads/2020/06/executed-consolidated-om-agreement-td.pdf. (Accessed May 28, 2021).

Section 4.1(h) of the OMA requires LUMA, with PREPA's participation, to establish System Operation Principles ("SOPs") based on utility industry norms and rules that will govern the dispatch of power and electricity through PREPA's electric grid, subject to the Energy Bureau's approval. Specifically, Section 4.1(h) provides:

> "(h) System Operation Principles. Promptly (and in any event within sixty (60) days) following the Effective Date, the Parties shall establish a planning team composed of representatives of each of the Parties, and ManagementCo, with input from such team, shall (i) prepare principles related to the dispatch of Power and Electricity (such principles, the "System Operation Principles"), which principles shall be generally consistent with those set forth in Schedule 1 (System Operation Principles) to Annex I (Scope of Services), and (ii) submit such proposed System Operation Principles to Administrator for its review and approval. Within thirty (30) days following its receipt of such proposed System Operation Principles, Administrator, acting reasonably, shall provide ManagementCo comments on the appropriateness of the proposed System Operation Principles and recommend any changes or modifications it believes are necessary or appropriate. If Administrator does not respond within such thirty (30) day period, Administrator shall be deemed to have no objection to such proposed System Operation Principles being submitted by ManagementCo to PREB. The Parties agree that, within thirty (30) days following receipt of Administrator's comments, if any, or the end of Administrator's review period described in the immediately preceding sentence, if Administrator has no comments, Operator shall submit for PREB's review the proposed System Operation Principles, incorporating or rejecting any of the modifications or changes suggested by Administrator, together with an explanation of any of Administrator's comments, as ManagementCo shall reasonably deem appropriate in its sole discretion. PREB shall review and approve, deny, or propose modifications to the proposed System Operation Principles. ManagementCo shall be required to respond promptly to any changes or modifications from PREB to the proposed System Operation Principles and submit any updates to the proposed System Operation Principles to PREB for its approval. If PREB does not respond within ninety (90) days after receipt of the proposed System Operation Principles or any update thereto, ManagementCo may proceed for purposes of this Agreement as if PREB had approved such proposed System Operation Principles. The System Operation Principles shall be subject to further review and update pursuant to Section 5.13(c) (Generation Related Services – Review of System Operation Principles)." [13]

[13] *See* Section 4.1(h) of the OMA.

In anticipation of LUMA's filing an SOP Plan, on January 15, 2021, the Energy Bureau issued a Resolution and Order ("January 15 Resolution")[14] through which it commenced this proceeding and directed that any filing by LUMA and PREPA under Section 4.1(h) of the OMA must be aligned with (i) the public policy established in Act 57-2014[15] and Act 17-2019; and (ii) prudent utility practices, in order for the SOP Plan to be executed before the Energy Bureau.

On February 25, 2021, LUMA filed a document titled *LUMA's Submittal and Request for Approval of System Operation Principles* ("February 25 Request"), which included its SOP Plan as Exhibit 1, for the Energy Bureau's review and approval.[16]

II. PROCEDURAL BACKGROUND

On February 25, 2021, LUMA Energy, LLC as ManagementCo, and LUMA Energy ServCo, LLC as ServCo (collectively, "LUMA") filed before the Energy Bureau a document titled *LUMA's Submittal and Request for Approval of System Operation Principles* ("February 25 Request") in compliance with Section 6.22 of Act 57-2014. The February 25 Request included a document titled *System Operation Principles* ("SOPs"), identified as Exhibit 1. In the February 25 Request, LUMA requested the Energy Bureau to accept the SOPs and approve them in their entirety.

On April 6, 2021, it issued a Resolution and Order on the Completeness of LUMA's System Operating Principles Plan Filing ("April 6 Resolution"), finding that LUMA's February 25 Request lacked an in-depth discussion of key matters, supporting data, analysis, and assessments necessary for the Energy Bureau to conduct an evaluation consistent with the January 15 Resolution. The Energy Bureau ordered LUMA to provide the information identified in Attachment A to its April 6 Resolution; and to modify the February 25 Request accordingly.

On April 15, 2021, LUMA filed a document titled *Motion in Compliance with Resolution and Order of April 6, 2021 and Submitting Responses to Requests for Information* ("April 15 Compliance Motion") through which LUMA responded to the Requests for Information issued by the Energy Bureau, and several documents which LUMA identified as attachments to its responses. On the same day, LUMA submitted a document titled *Request to Submit Portions of LUMA's Reponses to Request for Information Confidentially, and Memorandum of Law in Support Thereof* ("Request of Confidential Treatment"), requesting confidential

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[14] *See* Resolution and Order, In Re: Review Of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, January 15, 2021.

[15] Known as the *Puerto Rico Energy Transformation and RELIEF Act,* as amended.

[16] *See* February 25 Request, p. 13.

designation and treatment of LUMA's Response to Request for Information ("ROI") number 2 and of several attachments of LUMA's responses to ROI number 10 and 11.

On April 15, 2021, LUMA filed a document titled *Motion in Compliance with Resolution and Order of April 6, 2021, and Submitting Responses to Requests for Information* ("April 15 Responses"). That same day, LUMA filed a document titled *Request to Submit Portions of LUMA's Responses to Requests for Information Confidentially, and Memorandum of Law in Support Thereof* ("April 15 Confidentiality Request").

On April 27, 2021, the Energy Bureau issued a Resolution and Order ("April 27 Resolution") through which it determined that the SOP Petition, as clarified by the April 15 Responses, was complete and established a preliminary procedural calendar for the instant case. The Energy Bureau scheduled a Technical Conference to be held remotely on May 10-11, 2021. In compliance with Resolution and Order of April 27, 2021, on May 1, 2021, LUMA filed a document titled *Motion Submitting Summary of Luma's System Operation Principles in the Spanish Language*.

On May 3, 2021, upon review of LUMA's arguments and the applicable law, the Energy Bureau granted in part and denied in part LUMA's request for confidential designation and treatment.[17]

On May 4, 2021, LUMA filed a document titled *Urgent Request for Extension of Time to File LUMA's Presentation for Technical Conference* ("May 4 Request") in which LUMA requested the Energy Bureau for an extension until May 7, 2021, at 3:00 pm for filing the foregoing presentation. Also on May 4, 2021, the Energy Bureau issued a *Notice Concerning Public Hearings* in Primera Hora newspaper announcing the dates and time the Virtual Public Hearings would be held and providing instructions to the public interested in presenting oral comments during the hearings and/or submitting written comments and suggestions to the Energy Bureau regarding the proposed System Operations Principles.

On May 5, 2021, the Energy Bureau issued a Resolution and Order through which it partially granted LUMA's request as part of the May 4 Motion and ordered LUMA to file its presentation for the Virtual Technical Conference, no later than May 7, 2021, by 12:00 p.m. That same day, the Energy Bureau issued a Resolution and Order establishing the agenda for the Technical Conference scheduled for May 10-11, 2021. Additionally, on May 5, 2021, LUMA filed a *Motion Submitting Public Versions of Response to Request for Information and of Attachment in Compliance with Order*.

On May 7, 2021, LUMA timely filed a document titled *Motion Submitting LUMA 's Presentation for Technical Conference* ("May 7 Presentation"). The Energy Bureau held the Technical Conference, as scheduled. During the Technical Conference, the Energy Bureau

[17] *See* Resolution and Order, In re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, May 3, 2021, p. 4.

Commissioners and consultants raised multiple concerns as to the clarity of the System Operation Principles and degree of detail on the measures and mechanisms to be used by LUMA to implement the System Operation Principles.

On May 10-11, 2021, the Energy Bureau held the Technical Conference, as scheduled. During the Technical Conference, the Energy Bureau Commissioners and consultants raised multiples concerns as to the clarity of the System Operation Principles and degree of detail on the measures and mechanisms to be used by LUMA to implement the System Operation Principles. The Energy Bureau also issued bench orders requiring additional information from LUMA.

On May 11, 2021, the Energy Bureau issued a Resolution and Order ("May 11 Resolution") through which, among other things, determined that, after considering the February 25 Request, the April 15 Compliance Filing and the May 7 Presentation in the instant case, there was a lack of specificity and focus that was not fully clarified by the information provided by LUMA as part of the April 15 Compliance Filing, nor by the responses provided by LUMA representatives to the questions made by the Energy Bureau's Commissioners and consultants during the Technical Conference. Therefore, the Energy Bureau stated that further clarification was necessary to adequately evaluate the System Operation Principles. As a result, the Energy Bureau ordered LUMA to submit certain information on or before May 14, 2021. More specifically, the Energy Bureau ordered LUMA to revise comprehensively the February 25 Request to specifically show the principles that will govern LUMA's operation of the electric system to be followed by a clear and specific discussion on how LUMA intends to implement and/or achieve the actions fostered or pursued by the corresponding principle (*i.e.*, the mechanisms or measures LUMA will use for such implementation), besides providing drafts or final versions of various procedures and standards as identified in the May 11 Resolution and making other specified revisions to the SOP Plans.[18]

On May 13, 2021, LUMA filed a document titled *Informative Motion and Urgent Request for Extension of Time to File Response to Resolution and Order of May 11, 2021* ("May 13 Request"), through which LUMA requested an extension of the May 14, 2021 deadline. LUMA stated that their representatives appeared for the Technical Conference scheduled in this proceeding and provided extensive and detailed testimonies on May 10 and 11, 2021; that the record shows that LUMA representatives offered and requested leave to file additional information or responses regarding several topics and/or to provide written clarifications on specific matters; that the Energy Bureau issued bench orders granting LUMA leave to provide additional information or supplemental written responses to certain questions and/or to submit clarifications by May 14, 2021; and that they were working those responses to be filed by May 14, 2021. Also, LUMA stated that, during the Technical Conference, the Energy Bureau requested, for the first time, the system operation

[18] *See* Resolution and Order, In re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, May 11, 2021, pp. 3-4.

procedures they had been developing, in addition to several other specific requests for information, including the final versions or drafts of the operating procedures and a final version or draft of the emergency response plan, as it relates to the operation of the system.

Upon review of the May 13 Request, on May 14, 2021, the Energy Bureau granted LUMA until May 19, 2021, to file its complete responses to the Energy Bureau's requests for information, including those requested in the May 11 Resolution.

On May 14, 2021, LUMA filed a document titled *Motion in Compliance with Order Submitting Additional Information and Supplemental Responses to Questions Posed in Technical Conference and Submitting Clarifications* ("May 14 Motion"). LUMA submitted a revised Section 3.3 and Figure 3-1 of the System Operation Principles on Plant Retirements. LUMA also filed additional information, including the following: (1) Customer Notification of Planned Outages; (2) Significant System Event; (3) System Redundancy; (4) System Restoration Capabilities; (5) Generation Unit Information; (6) Interoperability; (7) Generator Reactive Testing; and (8) Interconnection. Additionally, LUMA filed a document titled *Motion Submitting LUMA's Emergency Response Plan*.

On May 19, 2021, LUMA filed a document titled *Motion in Compliance with Order Submitting Revised System Operation Principles, Phase 1 Draft Procedures and Additional Information* through which LUMA submitted pending responses to the May 11 Resolution, including a revised version of the System Operation Principles.

To ensure ample public participation with regards to the SOP filed by LUMA, the Energy Bureau held two virtual public hearings. Both hearings were live streamed and recorded. The first hearing was held on May 21, 2021. There was no public participation. The second hearing was held on May 24, 2021. During this hearing, one participant deposed before the Energy Bureau. However, the participant did not present comments or suggestions about the proposed SOP.

On May 24, 2021, LUMA filed a document title *Memorandum of Law in Support of Request to Submit Portions of LUMA's May 14th Submission of Additional Information Related to the System Operation Principles Confidentially* ("May 24 Request for Confidential Treatment").

On May 25, 2021, the Puerto Rico Institute of Competitiveness and Economic Sustainability ("ICSE") filed a document titled *Comments to LUMA's System Operation Principles*, through which it proposed for LUMA to add two principles to LUMA's SOP: i) Empowering Prosumers, and ii) Integrated Distributed Energy Resources. On the same day ICSE filed a document titled *Motion Requesting Extension of Time to File Comments*, in which ICSE states that they acknowledge the integrated nature of the planning, the budgeting, the metrics of immediate remediation and long-term grid re-building and modernization progress inherent to various intertwined proceedings. ICSE sustains that the instant proceeding requires a holistic analysis, more complex and time consuming than totally separated proceedings and that to be able to responsible comment of this matter, they are

consulting with United States based experts, and making a judicious analysis of the legal implications of these issues. ICSE request an additional time of fourteen (14) days to file their position on these issues.

On May 26, 2021, the Independent Consumer Protection Office ("OIPC") filed a document titled *Comentarios de la Oficina Independiente de Protección al Consumidor (OIPC)* in the instant case ("OIPC May 26 Comments"). The OIPC indicates that several documents were granted confidential treatment which limits their capacity to provide comments. Also, OIPC states that confidential treatment impedes their analysis to verify if the fourteen (14) procedures indicated as Phase I and the twelve (12) procedures indicated as Phase II are correctly classified as critical and non-critical. OIPC states that several procedures before the Energy Bureau regarding LUMA are intertwined and therefore the draft procedures should be made public. OIPC also addresses a concern of a possible conflict of interest between the dispatch and control of the electric system based on LUMA's intent to obtain performance metrics related to the reliability of the electric system. Also, OIPC raises concerns on the classification of PREPA Hydro as Independent Power Plants. Finally, the OIPC requests the Energy Bureau to order LUMA to submit to revise its Spanish translation of documents since it appears not to reflect an exact translation from its English version.

On May 27, 2021, upon review of LUMA's arguments in the May 24 Request for Confidential Treatment and the applicable law, the Energy Bureau granted LUMA's request for confidential designation and treatment.[19]

III. ANALYSIS AND DISCUSSION

A. Principles versus Procedures

The relationship between principles and procedures establishes an important functional hierarchy that helps to inform the Energy Bureau's review of LUMA's SOP Plan[20]. Principles are statements of commitment to a fundamental goal or policy mandate and that goal that generally determines the design and intended outcome of procedures. Therefore, SOPs are not to be focused on short-term guidance but are to be used to provide aspirational principles that will govern procedures as they should evolve for the operation of Puerto Rico's electric system regardless of time span.

[19] *See* Resolution and Order, In re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, May 27, 2021, p. 4.

[20] February 25 Request, Exhibit 1.

LUMA, describes its SOPs as "guidelines . . . for the dispatch of power"[21] and states that the SOPs together provide a "comprehensive guide for operations."[22]. It is important to note that guidelines are documents which intrinsically comprise flexibility and some subjectivity in their application. LUMA also describes its SOPs as "protocols for the dispatch of power."[23] and later states that the SOP Plan establishes "rules and protocols".[24] LUMA's changing nomenclature relative to the SOPs certainly creates ambiguity and confusion as to as to the clarity, purpose and scope of the SOPs.

LUMA's implicit functional approach to the SOP Plan seems to focus on the need for procedures with only vague principles. More often, the relationship between a procedure required by the SOP to a principle based on public policy goals is merely suggested or must be inferred. In fact, to a certain extent, the SOPs seems to be a mix of operating principles and tasks, making it particularly challenging to discern which are in fact the specific operating principles proposed by LUMA.[25]

B. Alignment with Public Policy

Some of the policy goals and mandates which implementation and achievement the SOPs shall seek, and support directly or indirectly are:

- Non-Discriminatory Universal Access to Electric Power Service[26];
- Modernization of the electric system in order for the same to be responsive to the XXI Century energy needs[27];
- Efficiency in the energy generation, transmission and distribution[28]; and
- Integration of renewable energy in a safe, reliable and cost-effective manner[29];

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[21] *Id.*, p.10.

[22] SOP Plan, Section 2.5, p. 10.

[23] February 25 Request, p. 10.

[24] SOP Plan, Executive Summary, p. 1.

[25] *See* In Re: Review of T&D Operator's System Operation Principles, Case. No. NEPR-MI-2021-0001, Resolution and Order, May 11, 2021, p. 3.

[26] *See* Act 17-2019, Article 1.5 (1) (a).

[27] *Id.*, Article 1.5 (2)(a).

[28] *Id.*, Article 1.5 (2)(b).

[29] *Id.*, Article 1.5 (8)(a).

– Ensure reliable and stable service[30].

Another important policy component is compliance with the Integrated Resource Plan ("IRP").[31] The IRP shall be, in accordance with current public policy, the guidebook for providing least-cost electric service over the planning horizon. As such, the IRP evaluates the merits of using different kinds of energy resources to meet forecasted future demand and determines for the least costly options to serve customer demand in accordance with public policy goals such as resiliency, reliability, and sustainability.[32]

Although, the purpose and scope of operating standards and reliability rules is different than the scope of the IRP, SOPs should reflect the IRP goal to develop a least cost plan that will reliably meet Puerto Rico's energy needs. The least cost plan will include renewable energy facilities that meet the RPS target, increased deployment of cost-effective Energy Efficiency and Distributed Energy Resources ("DER"); and an enhanced security and reliability role for microgrids. From an operating perspective, the IRP goal to integrate more DER versus conventional generation resources means a reevaluation of DER functionalities. Whereas DER was traditionally modeled as a relatively passive load resource, principles addressing resource adequacy, short-term and long-term, should reflect their state-of-the-art capabilities for active power control and reliability services. Principles relating to the function of economic dispatch should provide for a fundamental change in modeling and interconnection procedures that support the IRP's goal of increased integration of DER.

The Energy Bureau has some key policy proceedings are also relevant to the SOPs, including Case No. CEPR-MI-2018-0001[33] and Case No. CEPR-MI-2018-0008[34] on establishing microgrid regulations and microgrid interconnection rules and Case No. NEPR-MI-2019-0011[35] on establishing a regulatory framework and process regarding integrated distribution system planning.

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[30] *Id.*, Article 1.5 (10)(a).

[31] *See In re: Review of the Puerto Rico Electric Power Authority Integrated Resource Plan,* Case No. CEPR-AP-2018-0001, Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan, August 24, 2020.

[32] *Id.*, p. 29-30.

[33] *See* In re: Regulation on Microgrid Development, Case No. CEPR-MI-2018-0001.

[34] *See* In re: Regulation on the Interconnection of Microgrids, Case No. CEPR-MI-2018-0008.

[35] *See* In re: Process for the Adoption of Regulation for Distribution Resource Planning, Case No. NEPR-MI-2019-0011.

C. The Proposed SOPs

During the Technical Conference, LUMA representatives also stated that the SOP were primarily developed to address the short-term needs of the electric system.[36] LUMA representatives stressed that the SOPs were focused on the near-term as LUMA had significant gaps in its understanding and awareness of how Puerto Rico's system operates.[37] For example, LUMA representatives stated they do not have sufficient visibility into the operating decisions of Puerto Rico's generating units, and many of PREPA's existing weather stations are non-operational or only operate intermittently.[38] LUMA stated that it is important to collect and analyze data about the existing distribution and transmission system to better identify opportunities and needs.[39] LUMA has expressed its view that collecting this data, along with stabilizing the existing system in Puerto Rico, should take priority in the short term.[40]

The Energy Bureau found a lack of sufficient details in Section 3 to 10 of the SOPs to determine whether an SOP offered Puerto Rico a forward-looking modern integrated grid, as reflected in the gaps identified in the clause-by-clause review included in **Attachment A** which is made part of this Resolution and Order. The Energy Bureau also identified some principles falling short of aggressively incorporating distributed energy resources into LUMA's system planning and operations. Too often, an SOP merely provided for operating procedures or process to be developed, without defining any engineering or technical operating parameters that should guide their developments. Note, however, that most of the identified gaps that follow can be addressed by developing procedures, protocols, guidelines, and practices considering the included recommendations.

A prima facie review of LUMA's SOPs would indicate a weak alignment with the public policy goals of a more distributed system, where reliance on DER increases. Some of the SOPs fail to look forward to the needs of this integrated grid that promises reliability, resiliency, sustainability, and affordability. The gap analysis performed for each of the SOP clauses

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[36] Technical Conference Recording, May 10, 2021, morning session, 1:50:21 – 1:52:16. The principles do address the short-term needs of the bulk-electric system, a system that currently substantially suffers from a lack of stability and are consistent with the remediation activities sought in LUMA's SRP. LUMA proposes in its System Remediation Plan upgrades to the Control Center Energy Management System and its associated facilities, see *LUMA's Submittal and Request for Approval of System Remediation Plan*, February 24, 2021, NEPR-MI-2010-0019.

[37] Technical Conference Recording, May 10, 2021, morning session, 1:50:21 – 1:52:16.

[38] Technical Conference Recording, May 11, 2021, morning session, 4:22 – 5:07.

[39] Technical Conference Recording, May 10, 2021, morning session, 36:25 – 40:00.

[40] Technical Conference Recording, May 11, 2021, afternoon session, 1:20:30 – 1:25:30.

included in **Attachment A** of this Resolution and Order demonstrates difficult articulation of fundamental principles that would be applied in the design of documented operating procedures and rules to ensure the policy outcome as provided in the legislature. Where an SOP merely points to the responsibility of the system operator to develop procedures for a certain function, the meaningful principle often has been to be inferred by the Energy Bureau.

With respect to facilitating the implementation of the IRP policy, some of the SOPs are unclear as to how the respective function will support the IRP goal. For example, LUMA states in SOP 3.1 it will coordinate planning across three components (load forecasting, IRP, and resource adequacy) and then describes the responsibility associated with each component[41], but it provides no assessment as to the role of DER as part of these planning functions. Even the definition of "economic dispatch" is stated in terms of generation facilities to meet the system load.[42] This seems to infer a traditional passive view of DER, particularly load-management technologies.[43] DER are developing additional capabilities, either directly or through aggregators, that allow them to ride through disturbances, contribute reliability services and follow dispatch signals.[44] This added value, if realized in dispatch prices, would support the IRP goal to increase the integration of DER, particularly, microgrids. However, the dispatch-oriented SOPs make no commitment to adapt procedures and processes to consider these additional capabilities.

The SOPs should lay the foundation for the energy generation resources' ability to operate in an efficient and synchronized manner to provide reliable service and to realize the value of all generation and distributive resources. LUMA's commitment to the DER policy goal is not clear.

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[41] SOP 3.01.

[42] LUMA SOP, Appendix B, Glossary of Technical Terms, p. 33.

[43] SOP 5.2 also reflects this passive view of DER, stating that "*generator units* will be committed and dispatched in economic merit order taking into account the security constraints of the system." **.** (Emphasis Added). Section 1234 of the US Energy Policy Act of 2005 defines security constrained economic dispatch ("SCED") as the "operation of generating facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities." SCED, as defined in this Act, does not explicitly account for the firm capacity/energy/ancillary capabilities found in DER. Puerto Rico's Energy Public Policy Act of 2019 calls for a decentralized system that promotes resilience. Procedures/Guidelines that fully incorporate DER functionality into system operations/planning is consistent with this public policy.

[44] *See* North American Electric Reliability Corporation ("NERC"), *Distributed Energy Resources: Connection Modeling and Reliability Considerations* (Feb. 2017), Retrieved from https://bit.ly/3fYPB4H. (Accessed May 28, 2021).

While the Energy Bureau evaluated the SOPs in the context of the modern grid envisioned by Puerto Rico's public policy energy goals, the Energy Bureau recognizes that the current ability of LUMA to operate consistent with the principles reflected in the SOPs will be contingent on existing delivery system conditions and grid architecture and on the successful progress of plans and programs commenced pursuant to other proceedings before the Energy Bureau, including but not limited to the IRP. Notwithstanding the foregoing, current operating situation should not be an excuse to providing an operating framework that will facilitate the efficient and economic evolution of an energy delivery system for the people of Puerto Rico.

The SOPs seem to be solely intended to pave the way for the safe and reliable operations of the Puerto Rico bulk power system for purposes of fulfilling the requirements of Section 4.1(h) of the OMA. Nevertheless, while focus of the SOPs is to ensure planning and operations of the bulk power system, it would be short sighted and inadequate to ignore the important role distribution connected resources such as distributed solar generating and storage facilities, microgrids, backup generators and demand side resources will play in the resource adequacy, reliability, and stability of the Puerto Rico's electricity system.

We recognize that LUMA focused on certain operational aspects geared towards increasing system stability as quickly as possible. Nevertheless, SOPs are meant to provide long-term direction about how the electric system will be operated with the resources identified in the IRP.

IV. CONCLUSION

For the reasons discussed above, the Energy Bureau **CONDITIONALLY APPROVES** the SOPs.[45] Accordingly, the Energy Bureau **ORDERS** LUMA to comply with the following conditions, which the Energy Bureau has determined that are necessary to ensure compliance with the energy public policy:

1. On or before thirty (30) days from the notification of this Resolution and Order LUMA, shall file with the Energy Bureau a detailed updated timeline for the completion of any other procedure, protocol, manual or document necessary for the operation of the system in accordance with prudent industry practices, standards and local laws and regulations, including but not limited to the draft procedures filed on May 19, 2021[46]. The timeline shall be provided in a Gant Chart format (legible size) with detail

[45] As supplemented in accordance with the Energy Bureau's previous orders in the instant case.

[46] The draft procedures that were submitted to the Energy Bureau in draft form on May 19, 2021: (i) New Generation Interconnection; (ii) Resource Adequacy Assessments; (iii) Legacy T&G Demarcation; (iii) Generator Capabilities; (iv) Black Start Procedures; (iv) Public Reporting; (v) Policy on Reserves; (vi) Critical Loads; (vii) Contingency & System Operating Limits Response; (viii) Energy Dispatch, Scheduling and Merit Order; (ix) Plant Level Procedures; (x) Balancing Frequency and Voltage; (xi) Forced Outage; and (xii) Emergency Response Execution. *See* RFI-LUMA-MI-21-0001-210511-PREB-009 Attachment 2.

information, including but not limited to, the party responsible for each task (*i.e.*, name and position of LUMA personnel and/or consultants), any precursor tasks or events, and the estimated date for the completion of preparation and finalization of drafts. The total timeline shall not exceed five (5) months.

2. On or before thirty (30) days from the notification of this Resolution and Order LUMA, shall file with the Energy Bureau enhancements to the Energy Dispatch principles included in SOP 5.1 and 5.2 that shall fully incorporate capabilities found in DERs into system planning and operations.

3. On or before ninety (90) days from the notification of this Resolution and Order, LUMA shall file with the Energy Bureau final versions of its Load Forecasting Procedures to include a description of power meter load data, load management, load forecast and DER adoption models and weather normalization and peak allocation.

4. Starting on July 5, 2021, LUMA shall file with the Energy Bureau a monthly progress report on the status of the implementation of the timeline required on condition number 1 above.

5. The Energy Bureau will hold periodic compliance hearings to monitor the progress towards compliance with the conditions hereby established, LUMA and the relevant personnel and consultants shall appear before the Energy Bureau fully prepared to answer the questions that the Energy Bureau Commissioner and staff may have. The Energy Bureau will issue the corresponding compliance hearing calendar shortly.

The Energy Bureau **WARNS** LUMA that, noncompliance with any provision of this Resolution and Order, may result in the imposition of fines pursuant to Act 57-2014 and applicable Energy Bureau's regulations and any other appropriate administrative sanctions, as deemed appropriate by the Energy Bureau.

Be it notified and published.

Edison Avilés Deliz
Chairman

Lillian Mateo Santos
Associate Commissioner

Ferdinand A. Ramos Soegaard
Associate Commissioner

Sylvia B. Ugarte Araujo
Associate Commissioner

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Bureau has so agreed on May 31, 2021. Associate Commissioner Ángel R. Rivera de la Cruz dissented with a written opinion. I also certify that on May 31, 2021 a copy of this Resolution and Order was notified by electronic mail to the following: kbolanos@diazvaz.law, jmarrero@diazvaz.law, hrivera@jrsp.pr.gov, contratistas@jrsp.pr.gov and margarita.mercado@us.dlapiper.com I also certify that today, May31, 2021, I have proceeded with the filing of the Resolution and Order issued by the Puerto Rico Energy Bureau.

For the record, I sign this in San Juan, Puerto Rico, today May 31, 2021.

_____

Sonia Seda Gaztambide
Clerk

ATTACHMENT A

The following table discusses the detailed gaps and or deficiencies found by the Energy Bureau during its evaluation of the SOPs proposed by LUMA, based on the information included in the administrative record.[47]

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
	System and Resource Planning	
SOP 3.1 defines the three functional components of System and Resources Planning.	Planning principles need to be enhanced to demonstrate how the planning functions will be performed consistent with Puerto Rico's energy public policy goal of a modernized integrated grid.	SOP 3.1 generally describes system planning components; however, it does not account for capabilities arising from incorporation of distributed energy resources into the planning and operations of the bulk electric system.
Load Forecasting		
SOP 3.5 provides for a single load forecast across all of Puerto Rico that will be updated annually, as well as conducting weekly and monthly load forecasts. LUMA proposes to conduct scenario analyses to understand variability in the load forecast.	Planning procedures that employ accurate end-use assessment and forecast considering historical consumption, efficiency gains, weather impacts, and socio-economic activities is essential. Long-term load forecast is a key activity for planning and investments in an integrated electric delivery system. This requires the need to develop an end-use consumption model for Puerto Rico with specific sensitivities for each customer class per the tariff categories. The load forecast shall also include the impact of all forms of DER, including, but not	The proposed load forecasting principles detail neither end-use consumption in the model development nor the impact of DER in-load forecasting. Further, they do not specify what type and size of resources will be considered in developing a load forecast, and how distribution system-connected resources, *e.g.,* solar, microgrids, storage, will be incorporated in the load and energy forecast. As part of the April 15 Compliance Motion, LUMA did not submit a detailed load forecasting

[47] This includes the initial proposal and the subsequent information and documentation filings made by LUMA upon request by the Energy Bureau.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
	limited to, energy efficiency, demand response, distributed generation, storage, EVs, and electrification. Energy and peak forecasts should also consider seasonality impact load profiles, power meter load data, load management, load forecast model, weather normalization, and peak allocation. The long-term forecasting methodology used by the New York Independent Systems Operator (NYISO) can provide suggested guidance.	methodology but has indicated that it will develop a detailed procedure in phase 2 of the SOP implementation.[48] The OMA did not require LUMA to submit load forecasting practices to the Energy Bureau before service commencement date, however, because load forecasting is a core planning tool its development should had been prioritized and finalized during the front-end-transition.
Integrated Resource Planning		
The IRP will serve as the reference base for long-term resource and grid planning pursuant to SOP 3.0. The operational data and assumptions derived from operations of the system will be used for forecasting and other analyses relating to the IRP, as well as for developing the long-term vision of a supply- and demand-side integrated grid.	Planning procedures that provide for an IRP process in which multiple scenarios are developed that weigh least-cost options with long-term policy goals, such as 100% carbon-free electricity and demand-side flexibility. Further, they should also provide for a detailed stakeholder planning process, including the IRP process, that meets the public policy goals of transparency and participant involvement and that recognizes a distributed, multi-technology, multi-	The SOP Plan did not explain the core principles of resource planning. For example, it did not specify how generation planning shall account for distributed generation and microgrids in the load profile. No specificity was included as to whether such resources were to be modeled as behind-the-meter or as embedded in the distribution system. Further, the SOP does not indicate how storage, demand-side management, and

[48] *See* In Re: Review of T&D's Operators System Operation Principles, Case No. NEPR-MI-2021-0001, Motion in Compliance with Resolution and Order of April 6, 2021, and Submitting Responses to Requests for Information, April 15, 2021, RFI-LUMA-MI-21-0001-210406-PREB-001.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
	stakeholder environment to ensure the continued evolution of the modern energy system.	efficiency resources will be developed and incentivized through the IRP process.
Resource Adequacy		
LUMA defines resource adequacy in terms of adequate "generating capacity" to serve all system load. It provides for an annual review of resource adequacy that include existing PREPA legacy generation. The review will consider the current situation and near-term (3-5 years) planning horizon.	Planning procedures that identify a Resource Adequacy analysis methodology such as adopted in NERC standard BAL-502-RF-03[49] "Planning Resource Adequacy Analysis, Assessment and Documentation." Specifically, the SOP should specify the planning reserve margin to be used in a resource adequacy analysis.	The limited concept of resource adequacy in terms of generating capacity does not align with Puerto Rico's public interest in a broader array of resource, such as controllable demand response resources and energy storage. In addition, it does not provide criteria for determining adequate reserve margins or for assessing loss of load probabilities to ascertain resources needs. For example, there is no information on what percentage of planning reserve margin would be considered adequate for peak load demand. Further, there is no explanation on how will load forecasting nuances, resource characteristics, transmission limitations, outage, and maintenance schedules, and capacity resource

[49]NERC, United States Mandatory Standards Subject to Enforcement. Retrieved from https://www.nerc.com/pa/Stand/RegionalReliabilityStandardsUnder%20Development/BAL-502-RF-03_Clean.pdf. (Accessed May 28, 2021). The Energy Bureau recognizes the common prevalence of NERC standards as minimum requirements in the energy industry. As such, the Energy Bureau deems it convenient and prudent to use them as minimum standards, to the extent applicable.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
		accounting be accounted for in a resource adequacy analysis, or how should customer-owned generating capacity be allowed to participate to meet resource adequacy needs. Finally, it specifies no process to ascertain adequacy of ancillary services needed for grid stability.
Requirements for Interconnected Generation Resources		
The SOP 3.2 provides that generators shall enter into a plant-level agreement (PLA) with the System Operator. The PLA will specify the system need for the resource to maintain frequency and voltage in the bulk power system. SOP 3.2 sets basic technical requirements for all interconnected generators to provide primary frequency and voltage support band based on the type of generation resource.	Planning procedures that specify the operating parameters for balancing voltage and frequency within the energy delivery system. They should align with NERC standards[50] that relate to (i) Resource and Demand Balancing specifically BAL-001-2: (ii) Real Power Balancing Control Performance, BAL-003-2: (iii) Frequency Response and Frequency Bias Setting and VAR-001-5: (iv) Voltage and Reactive Control, and (v) more significantly, PFR, BAL-003-1 that was approved by FERC in 2014 and updated in 2015 as NERC BAL-003-1.12. This specific standard requires that each Balancing Authority ("BA") annually satisfies a minimum Frequency	The basic technical requirements, however, do not drill down to specify voltage and frequency limits, as well as provide key technical parameters, such as droop characteristics desired from different generator types. The proposed SOP also does not specify the basis on which Primary Frequency Response (PFR) will be obtained from Generating Units. Will it be mandatory or voluntary? If voluntary, how will generators be incentivized? What will be the testing requirement Annual/ After an incident on the system? SOP 3.2 is vague when it states, "generators will need to agree on rules governing interconnected

[50]NERC, United States Mandatory Standards Subject to Enforcement. Retrieved from https://www.nerc.com/pa/stand/Pages/ReliabilityStandardsUnitedStates.aspx?jurisdiction=United%20States (Accessed May 28, 2021).

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
	Response Measure ("FRM") to ensure it can avoid Under Frequency Load Shedding for a specified loss of generation.	generators frequency and voltage maintenance specifically [Automated Voltage Regulators] and [Automated Generating Control]," providing no parameters for agreement. For example, which generators need to provide AGC? How will solar and wind generators perform the AGC function? Given that PREPA's legacy generators do not provide AGC, the SOP should address how the System Operator intends to manage load if loss of existing generation occurs. How will the system's need for Primary Frequency Response be met? Will this and other ancillary services be available through ancillary markets?
Generation Retirement Requests		
SOP 3.3 establishes the System Operator's authority over a generator's request to retire its generation unit from the delivery system. It states that the retirement procedure should be uniform, while providing that the System Operator will define the rules for the application process, including	Planning procedures that specify the details of the review and approval process, which should include review and concurrence by the Energy Bureau to ensure that criteria for plant retirement have been followed.	An impact study is required but the criteria and scope of the impact study are not specified.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
whether and how the unit should be designated as Must Run.		
Coordinating requests for new generation and transmission interconnections		
SOP 3.4 sets a goal for uniform procedures for processing generators' request to interconnect, which procedures will be consistent for operating an integrated system. The procedure for interconnecting new transmission to the bulk power system will be the same. Such interconnection procedures applicable to both generation and transmission are to be developed and implemented by the System Operator. The SOP defines the topics to be addressed in the request which includes completeness of documentation; system impact studies' results; payment responsibility and timing; project milestones; and needed electrical controls, AGC, telemetry, performance, and metering requirements. The procedures will be consistent with the IRP, and with Puerto Rico's energy policy, specifically regarding the transition	Planning procedures that address separation of system operating functions between transmission and distribution generally and particularly where there is potential conflict such as regarding transmission interconnection. Functional separation has been a standard policy implemented by FERC as part of the electric industry restructuring.	The SOP does not provide parameters for interconnection procedures, particularly regarding the scope of impact studies to be performed or the criteria by which interconnection requests will be reviewed and approved for different size generations. The Energy Bureau notes that LUMA is on both sides of the interconnection: LUMA, the Transmission Operator, and LUMA, the System Operator.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
from fossil generation to renewables and storage and a safe, reliable, and cost-effective operation of an integrated system.		
Transmission Planning Standards		
SOP 3.1 contemplates additional activities to support the provision of O&M services or address needs of the Bulk Electric System. LUMA states that these activities may include transmission planning and the consideration of storage and non-wire alternatives.	Transmission Planning Standards based on NERC Transmission Planning requirements to apply to all Transmission Operators.	LUMA, as the System Operator, needs to specify transmission planning standards. Transmission planning standards are a core planning component on any electric utility.
Transmission Planning Criteria		
SOP 3.1 contemplates additional activities to support the provision of O&M services or address needs of the Bulk Electric System. LUMA states that these activities may include transmission planning and the consideration of storage and non-wire alternatives.	Transmission Planning Criteria conforming to LUMA's Transmission Planning Standards.	LUMA, as a Transmission Operator, needs to specify its transmission planning criteria. It is expected that this planning criteria takes into account the power flow characteristics found in energy storage systems.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
Transmission Line Design Criteria		
SOP 3.1 contemplates additional activities to support the provision of O&M services or address needs of the Bulk Electric System. LUMA states that these activities may include transmission planning and the consideration of storage and non-wire alternatives.	Transmission Line Design Criteria conforming to LUMA's Transmission Planning Criteria.	LUMA as a Transmission Operator, needs to specify its transmission line design criteria. This criteria has interconnection implications that need to be specified.
Data Management		
The SOP 4.1 recognizes that data management is a critical component of stable and efficient operations, and so provides for system procedures that will define roles and responsibilities, governance, and reporting requirement. The procedures will provide for prioritization of accurate, complete, and credible data, and comprehensive data validation. They will address data management	Standard procedures that explain data accuracy, data collection frequency, and type of data to be collected, and that establish protocols for data collection and exchange. Sharing data with energy participants that include stakeholders, end-use customers, and third parties providing various energy services to customers is fundamental to developing an open electric delivery service, which is a public policy goal. Limited access to data is identified as a key barrier to customer-side innovation and designing	Notwithstanding the importance of data management processes in the SOP Plan, SOP 4.1 does not identify data transfer protocols to be followed for data transfer from field devices (RTU/Meters) to the control center, between the control center and enterprise system, and with external sources. It also does not specify the criteria for determining eligibility for data sharing or mode by which data will be shared. While accuracy of data is prioritized in the SOP, it does not define

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
coordination to ensure data validation. The SOP also provides for development of (i) data retention policies to allow critical incident analysis; (ii) data redundancy procedures including system and software level redundancy; and (iii) data and communication protocol and requirements for secured and unsecured data transfer applicable to all parties.	innovative markets. Further, since LUMA will perform system operation and T&D operation function, the Energy Bureau will need to ensure full transparency and oversight over the operations. The Energy Bureau may opt to gain access to data from the actual system in near real-time and develop regulatory information management tools to analyze raw operation data. This section should be construed to cover both system-level data and customer energy usage data; the standard procedures should provide greater details regarding the sharing and availability of system-level data and the ability of a customer to obtain and the means by which a customer can obtain and authorize a third party to access their information via a commonly accepted standard format and protocol.	the acceptable level of accuracy for commercial and operational data or what interval data is to be stored. Likewise, while the SOP identifies the importance of incident analysis, it does not specify which frequency event data should be logged to allow incident analysis.
Cybersecurity		
SOP 4.2 provides for the development of a cybersecurity strategy and a cybersecurity plan that will conform with LUMA's overall cybersecurity policy, as well as comply with federal government cybersecurity standards adopted by DHS, DOE, FBI, and DOD, and standards under Puerto Rico law.	At a minimum, LUMA's cybersecurity practices and procedures that incorporate NERC Critical Infrastructure Protection (CIP) as applicable for the aspects of its operations, specifically, those operations relating to bulk power systems, system recovery processes,	SOP 4.2 proposes the development of both a strategy and a plan for cybersecurity but provides no technical parameters or specifics guidelines for standards to be included in either the strategy or the plan. While it references the standards of several government agencies with which the strategy and plan must comply, the

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
Both the strategy and the plan are to be managed by LUMA's IT department. Finally, SOP 4.02 establishes a cybersecurity management team to identify and manage threats and to establish a system recovery process if a cyber breach occurs.	incident response, vulnerability assessments, and training.[51]	SOP does not reference the standards in NERC CIP for the protection of physical and cybersecurity. There are 12 enforceable NERC CIPs[52] which address physical and cybersecurity. Further, SOP 4.0 addresses Data Management generally but does not specify data privacy policy or provide how LUMA will address data privacy concerns. LUMA offers few details about how it is leveraging resources from Cybersecurity Infrastructure Security Agency ("CISA"), to which Puerto Rico belongs as part of Region II[53], or how it is making efficient use of available federal resources for the protection of critical infrastructure. There was also no mention of the NIST Cybersecurity Framework;[54] the implementation of this framework

[51] Note that the SOPs related to cybersecurity are subject to modifications depending on the determinations of the Energy Bureau under Case No. NEPR-MI-2020-0017.

[52] NERC, United States Mandatory Standards Subject to Enforcement. Retrieved from https://www.nerc.com/pa/stand/Pages/ReliabilityStandardsUnitedStates.aspx?jurisdiction=United%20States (Accessed May 28, 2021).

[53] Cybersecurity and Infrastructure Security Agency (CISA), Region II (2019/04/25). Retrieved from https://www.cisa.gov/sites/default/files/publications/Region%20II%20Fact%20Sheet.pdf (Accessed May 28, 2021)

[54] National Institute of Standards and Technology, U.S. Department of Commerce, Cybersecurity Framework. Retrieved from https://www.nist.gov/cyberframework. (Accessed May 28, 2021)

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
		manages and reduces cybersecurity risk throughout the electric system.
Energy Dispatch		
SOP 5.1 provides that the system operator will operate under security-constrained economic dispatch principles to dispatch sufficient resources for reliability, which shall include dispatch of available non-wire storage operating besides generation. The system operator will define communication protocols appropriate for each situational need, governing communications between the system operator, generation, and T&D personnel. Automation and control procedures for AGC, AVR, and transmission line loading will be used to increase each plant's reliability and resiliency, and the reliability and resiliency of the transmission system. It also provides for dispatch to be reprioritized in the event of a transmission constraint, which could include regulation, voltage, or increased generation production.	Transparent economic dispatch procedures that (i) are based on non-discrimination for all the existing and anticipated generation and other distributed energy resources; and (ii) provide a clear market signal to existing and future generation as to load and system reliability needs. SOP 5.1 and dispatch procedures should align with Puerto Rico's goal of a diverse resource portfolio at lowest cost.	SOP 5.1 lacks specifics as to how economic dispatch will be determined. There are no specific principles, as to how non-wires DER alternatives and batteries will be dispatched versus conventional generation. It also does not specify as to what other considerations will go in making dispatch decisions apart from cost and how will distributed resources be treated in the dispatch decisions? While the SOP requires AGC and AVR, it is not clearly defined which resource type will need AGC and AVR or how inverters in solar energy systems will be treated in real and reactive power management?

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
SOP 5.2 provides that the System Operator will define criteria to guide how dispatch is sequenced, in addition to providing multiple dispatch scenarios in which generation would be dispatched in a sequence that considers both economics and reliability in order to provide for the lowest feasible cost, taking into consideration system security. The criteria will necessarily require the System Operator to have accurate and timely data on marginal costs and to forecast marginal costs per generating unit.	While SOP 5.2 provides that both reliability and economics are to be considered in determining the dispatch sequence, it is as similarly vague as SOP 5.1 regarding dispatch specifics. Dispatch procedures should be specifics and transparent. For example, the SOP does not address how load management programs and other DER can participate in the dispatch market. Finally, the SOP does not demonstrate how the decision-making process during a period of resource inadequacy would prevent windfalls for generators. LUMA provided the Generation Fleet Dispatch Stack on May 10 in response to a request by the Energy Bureau, however depicted heat rates may be questionable given that heat rate characterization for some generators is outdated[55].	A dispatch principle and procedures that fully incorporate DER in the Energy Resource Dispatch Stack and accounts for the reliability DER can provide, as well as costs. The term "GENERATION FLEET DISPATCH STACK" is descriptive of the traditional centralized bulk power system that relies on large generation facilities. LUMA should modernize its economic dispatch principle and procedures so the system can leverage DER capabilities to balance supply/demand across the Island in the future. While the Energy Bureau recognizes that Puerto Rico's current system has low DER penetration and firmness, principles 5.1 and 5.2 should pave the way to the distributed system envisioned by energy public policy.
SOP 5.1 Dispatch decision-making parameters should contribute to a more reliable system and lower costs energy subject to security constraints on the system. SOP 5.3 advocates for greater information sharing and	Detailed operating and pricing dispatch procedures and rules that include public access to dispatch criteria and operating records. The transparency from providing public access will allow stakeholders and the Energy Bureau to assess the compliance	While the SOP reflects the public interest in non-discriminatory operations in its title, the limited dispatching conditions provided in the SOP does not necessarily

[55] Technical Conference Recording, May 11, 2021, morning session, 2:21:50.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
transparency of system requirements to promote industry best practices and to help developers of energy projects to evaluate system needs, current and future demand and market value to encourage greater deployment of renewables, non-wire alternatives and emerging technology solutions. While dispatch sequences are to be defined to optimize overall production, the generators will also be dispatched consistent with their PPOA, including the validation of production data and commercial terms.	actions of the system operator. Guidelines as to how the contractual terms for dispatching under power purchase agreements will be integrated into dispatching procedures based on reliability and economics.	detail how they will foster non-discrimination in dispatching operations.
SOP 5.4 requires the system operator to analyze and evaluate the overall resource inventory of the system and to determine a course of action to maintain system integrity. That responsibility includes defined response plans for constrained areas, with load relief warnings to be issued to all resources; limitation on thermal overloads to ensure network operating frequency and voltage levels; defined rules for Load-Shed Events that will minimize threats to	Well defined standards for system operations under resource inadequacy and emergency conditions based on NERC Resource and Demand Balancing ("BAL") and Emergency Preparedness and Operations ("EOP"). Standards should also provide for normal automated operations, ensuring that resource inadequacy cannot be used as excuse arbitrary and manual operations. Finally, LUMA should define principles to identify critical loads.	The SOP does not identify what technology or programs are included in demand side resources, nor provide criteria by which to identify critical loads.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
employee and public safety, equipment damage and customer impact; identification of which critical loads to remain online in coordination with the LUMA's critical loads policy and LUMA's Emergency Response Plan ("ERP"); and manual dispatch of resources to mitigate resource shortfalls during emergency conditions. Further, LUMA may use strategies to reduce voltage according to procedures and current operating conditions.		
Operating Parameters		
SOP 6.1 provides for the System Operator to manage all contingencies on the system to mitigate or reduce system interruptions, including G-1 or T-1 events. The System Operator will define detailed rules and procedures on reserves that address existing generators, storage, and other non-wire alternatives, setting (i) appropriate contingency reserve requirements to address smaller load and generation imbalances through regulation connected devices such as reactors and capacitors; and (ii)	Rules and procedures that are both based on the best practices from ISO market operations from the US mainland and consistent with principles established by reliability coordinators in other US jurisdictions. Further, rules and procedures addressing base interconnection and integration of solar inverters should follow	LUMA relies on a legacy approach to operating, regulation, spinning, and non-spinning reserves for managing the system during contingencies that have a transient and sustained nature to balance the system. However, procedures associated with SOP 6.1 should define the actual percentage value of these reserves which the system operator expects. Further, consistent with the Renewable Portfolio Standard ("RPS"), solar and wind resources are expected to be the dominant sources. Utilizing these resources and integrating them into the grid requires

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
appropriate operating reserves requirements to address larger load and generation imbalances. The reserve policies will also consider the timeliness of receiving reserves and appropriate reserve requirements to restore the spinning reserves after the disturbance and once the system has been restored to pre-contingency levels.	IEEE 1547 standards[56] and their latest revisions.	specified standards for inverters to provide real and reactive power support.
SOP 6.2 provides for the system operator to develop a procedure to maintain steady-state power system stability, which entails system variables being bounded within certain bandwidths such that the system remains intact during a disturbance.	Procedures that define system variables, their limits, and disturbance before resources are granted permission to operate. These are basic system parameters, that shall be agreed upon by all parties.	The SOP does not define system variables and their band within which stability would be managed during disturbance. Further, while types of disturbances are mentioned in the SOP, it does not describe what size of the disturbance the system will be designed to withstand.
SOP 6.3 is not an operating procedure and consequently it does not provide any specific operating parameters for determining the baseline or for	Procedures that define (i) current generation and transmission capabilities; (ii) system operating limits before the start of the	SOP 6.3 is not an operating procedure and consequently it does not provide any specific operating parameters for determining the baseline or for

[56] IEEE Standards Association, IEEE 1547-2018- IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces (published 2018-04-06). Retrieved from https://standards.ieee.org/standard/1547-2018.html (Accessed May 28, 2021)

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
developing load relief procedures. For example, what will be current system operating limits? It also does not indicate what form the guidance will take for when a unit deviates from dispatch instruction or what defines contingencies.	operations; and (iii) what constitute contingencies.	developing load relief procedures. For example, what will be current system operating limits? It also does not indicate what form the guidance will take for when a unit deviates from dispatch instruction or what defines contingencies.
SOP 6.4 again provides for the system operator to develop another set of operating requirements, this time regarding transmission operating limits for facility ratings, voltage stability, and transient stability.	Operation procedures that define transmission operating limits, detail facility rating and define voltage and transient stability limits for the current system before the start of the operation.	Given that this is not an operation procedure, no technical or engineering parameters for how the operating requirements are established. LUMA also did not provide the Transmission Limit of the current T&D system.
Energy Management System ("EMS")		
SOP 7.0 provides for implementation of a new EMS system to provide visibility to generation, transmission, and distribution systems, as defined in LUMA's System Remediation Plan ("SRP") filed on February 24, 2021.[57]	Operation procedures that detail operational parameters for an energy management system designed for a fully integrated grid as envisioned under Puerto Rico energy reforms. It should include specifications regarding the level of visibility required for an EMS, especially in the distribution system. Because LUMA will not be able to implement an EMS with visibility of the entire	Although the new EMS system is defined in the SRP LUMA filed with the Energy Bureau, SOP 7.0 provides no details as to the level of visibility EMS system will or should achieve, or what functionalities EMS will have or should provide and the level of optimization it will or should contribute. Further, given the time required for implementation of a new EMS

[57] *See*, In re: Review of the Puerto Rico Electric Authority System Remediation Plan, Case No. NEPR-MI-2020-0019, LUMA's Submittal and Request for Approval of System Remediation Plan, February 24, 2021.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
	Generation, Transmission, and Distribution system in a short time, the procedures should provide for the progression of system management functionalities, including system visibility, to be deployed to achieve the goals of a diverse resource portfolio and reliability. The discussion should include how the system operator intends to use EMS data in forecasting and system operation planning, especially when the EMS may not have visibility of generators of a certain size. Further, basic technical parameters such as intervals of data collection, how events will be logged and time resolution for the events should be addressed in the procedures.	system, the SOP does not explain how the necessary visibility of DER and other functionalities associated with an energy management system will or should be provided.
Outage Scheduling and Reporting		
SOP 8.1 provides for the system operator to define a procedure for planned generation and transmission outages to be scheduled, coordinated, and approved. The outage schedule will be based on a rolling two-year period.	Outage Management procedures that specify the scheduling parameters for determining the schedule of requested planned outages and how planned outages will be addressed in operational planning.	Because this SOP is not a procedure, no scheduling parameters were provided.
SOP 8.2 provides for the system operator to develop a scheduled outage procedure that will include:	Outage Management procedures that specify a schedule outage practice.	Lack of procedural schedules.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
▪ Request forms ▪ Requirements regarding timing for submittal ▪ System impact study ▪ Outage duration ▪ Restoration plans ▪ Communication and coordination plan between generation and transmission Outage scheduling is to be done with a minimum two-year notice. All requests will be reviewed to determine the system impact on other generators, transmission lines, and/or equipment. Generation and equipment outages will be managed to maintain proper system configuration while maximizing system resilience.		
SOP 8.3 provides for the system operator to have command-and-control authority over forced outage responses, subject to existing power purchase agreements, where applicable. To be prepared to minimize the impact of forced and unplanned outages, the System Operator is to design procedures that	Operating procedures relevant to the system operator's response in the event of a forced outage that specify communication protocols and reporting mechanisms to ensure that the conditions of the system are transparent to market participants and that they have real-time access to real-time system conditions. Procedures should allow for the capabilities found in microgrids or other generation	The SOP does not direct the system operator, as part of developing procedures, to define areas that will be capable of operating as islands to restore supply to as much of the network and customers as possible.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
will define the appropriate course of action in each area of operation, consistent with existing power purchase agreements, where applicable. In addition, the System Operator is to define rules for reporting and updating dispatch sequence during forced outages, for determining estimated outage duration and for implementing restoration plans.	systems that are capable of islanding themselves from grid operations in the event of a forced outage and providing energy service to their islanded area, thus mitigating the outage's impact on end-use customers. Formation of islands and restoring supply to them will be a key strategy to manage climate and other forced outage events.	
SOP 8.4 provides that the system operator will develop a process for conducting a Root-Cause Analysis ("RCA") of significant system events to identify, both individually and collectively, causal and contributing factors and to learn reliability lessons. Generators will be required to share data and analysis, as requested by the System Operator.	Outage management procedures that provide clear criteria as to the type of incidents for which LUMA will conduct incident analysis reportable to the Energy Bureau.	The process parameters that the system operator is directed to develop are not defined. The SOP also does not define what constitutes a significant event for which RCA will be conducted; how data will be collected; how information and data about the incident and its root cause will be transparent and available to the public.

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
Emergency Response[58]		
SOP 9.1: Pursuant to Section 4.2(g) of the OMA, LUMA is to develop an Emergency Response Plan ("ERP") that identifies system operation activities during emergency events. The ERP is to include: ▪ Classification of events and emergencies; ▪ Appropriate response based on classification; ▪ Emergency command center (ECC) to be manned during an event; ▪ Incident commander and roles and responsibilities for an emergency response organization consistent with FEMA guidelines; and ▪ Procedures that define proper responses to events and emergencies and after-action	Parameters that use the NERC standard on Emergency Preparedness and Operations (EOP) as a model, specifically NERC standard EOP 011-1 Emergency Operations.[59] Regardless of what operating standards and reliability rules that will ultimately be used in developing the ERP under the OMA, those standards, or at least their operating parameters should be included as part of the SOP.	While the SOP references that the ERP is being developed under the OMA, it does not specify standards or even parameters to be used in designing the ERP. Given severe climate events across mainland US and Puerto Rico, the ERP could be the most critical document and its guiding parameters and principles should also be clearly stated in this SOP.

[58] Note that the SOPs related to emergency responses are subject to modifications depending on the determinations of the Energy Bureau under In Re: Puerto Rico Electric Power Authority Emergency Response Plan, Case No. NEPR-MI-2019-0006 and compliance with applicable federal and local laws and regulations.

[59] NERC Standard EOP-011-1 Emergency Operations. Retrieved from https://bit.ly/3c6ecDz. (Accessed May 28, 2021).

LUMA'S PROPOSAL	WHAT IS SOUGHT	GAP
reviews. In addition to the ERP, LUMA will also establish a drill program to train on emergency procedures that will involve coordination with government agencies, other utilities, and key stakeholders. A performance metrics is to be developed that will measure LUMA's performance during major outage events and system emergencies. It will provide key data and allow for continuous improvement of emergency procedures and activities.		
SOP 9.2 provides that the System Operator will prepare a risk mitigation plan (RMP) that lists preventive and corrective actions that are to be followed during significant system events and disturbances and that will help to mitigate outages and/or restore the system. The events could be weather and natural events, equipment malfunctions, operating error or major system disturbances that could result in cascading events, such as electrical islanding, load shedding, generator trip, or a partial or full blackout. It	Risk mitigation guidelines, procedures, and protocols.	The SOP provides for yet another document to be prepared, in this case the RMP, incorporating no specific operating procedure or parameters to govern or at least guide, the RMP. At a minimum, the RMP should define the performance capability of interconnected energy resources to respond in a system emergency situation.

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should define the degree of advance warning or expected severity of the forecasted event. The system operator is to use industry best practices, including the development of a damage prediction model and timely post-event damage assessment to support restoration activities.		
SOP 9.3 provides for the system operator to develop and maintain Black Start procedures designed to restore the initial generation unit and then coordinate the restart of other resources in such a way to safely energize portions of the T&D system. During a blackout condition, the System Operator will control operations consistent with the procedures. These procedures will identify generation equipment that is able to start without an outside electrical supply, and the proper steps to energize defined portions of the	Emergency response restoration procedures modeled after the NERC standard on Emergency Preparedness and Operations (EOP), specifically NERC standard EOP 006-3 System Restoration Coordination,[60] and EOP 005-3 System Restoration from Black Start Resources.[61] It should also describe the role of DER, particularly battery storage, in the system restoration process.	The SOP does not specify any set of standards or parameters on which to base the Black Start and system restoration procedures. Given severe climate events across mainland US and Puerto Rico, which often leads to blackouts. Black Start and system restoration procedures are critical documents. The SOP also does not address the role of DER in-system restoration, particularly storage.

[60] NERC standard EOP-006-3- System Restoration Coordination. Retrieved from https://bit.ly/3uDYPsg. (Accessed May 28, 2021).

[61] NERC standard EOP-005-3-System Restoration from Blackstart Resources. Retrieved from https://bit.ly/3p4EtYe. (Accessed May 28, 2021)

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transmission system. The System Operator will create a desktop procedure for on-shift Operators to select which units to restore first in order to restore the system safely. System restoration drills will be conducted annually. As part of its regular planning, the System Operator will give special attention to the fragility of the system during a system restoration. The process should carefully manage frequency control, voltage control and ramping time, along with avoiding over-current conditions and cold load pickup situations.		
SOP 9.04 provides that LUMA will develop a plan to provide a near-term bridge (less than three years) that considers alternative resources such as distributed generation, demand-side-management, storage, other no-wire alternatives, and temporary or mobile generation or substations, to ensure Resource Adequacy during projected generation resource shortage. Pursuant to Section 5.13(d)(iii) of the OMA, LUMA will	Emergency response procedures that harmonize SOP 9.04 and 3.0.	The SOP Plan does not provide for where various SOPs overlap or intersect, such as when SOP 9.4's directive to ensure for Resource Adequacy intersects with SOP 3.0 addressing short-term planning.

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meet with the Energy Bureau annually to review prepared analyses, demand projections and existing generation supply to assess the system's current and projected future Resource Adequacy. LUMA will identify potential solutions, trade-offs, and technical considerations in selecting a Resource Adequacy solution.		
SOP 9.5 primarily discusses what should constitute critical load for purposes of SOP 9.1, including residential facilities having life support equipment.	Emergency response guidelines that clearly define critical loads.	Precise objective criteria are not provided.
Frequency and System Impacts		
SOP 10.1 provides for the development of procedures and schedules for testing to collect secure, accurate and timely data from generators, reactors and capacitors that are connected to the system. These procedures will inform on-shift operators helping to optimize responses to sub-optimal voltage and/or frequency situations. The on-shift operators will have the capability to raise or lower	Operating procedures that clearly define the allowable parameters for resources that could support frequency and voltage control, taking into consideration contemporary and future distributed and clean energy resources. Operating parameters should use the NERC Resource and Demand balancing (BAL) standards as model.	The SOP itself does not reference specific Prudent Utility Practices regarding frequency and voltage.

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generation or load, either automatically or manually, under normal and post-contingency conditions.		
SOP 10.2 illustrates an operator's typical hierarchy of control to maintain frequency and voltage, in which primary control is managed through governor action in each generator and load reaction; secondary control through AGC; and tertiary response where primary and secondary is not sufficient with quick start resources being dispatched. Alternative balancing methods include voltage reduction, transmission switching, and load shed.	Operating procedures that clearly define the allowable parameters for resources that could support frequency and voltage control, taking into consideration contemporary and future distributed and clean energy resources. Operating parameters should use the NERC Resource and Demand balancing (BAL) standards as model.	SOP 10.2 address a typical hierarchy of frequency and voltage control. Evolving technology, such as inverter control for solar DG, conservation voltage reduction software, and battery response, provide alternative voltage/frequency controls not considered in this hierarchy, contrary to the energy policy goal for an integrated grid that should maximize the value of DER to the grid while keeping costs low.

GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE: REVIEW OF T&D OPERATOR'S SYSTEM OPERATION PRINCIPLES	**CASE NO.:** NEPR-MI-2021-0001 **SUBJECT:** Determination on LUMA's System Operation Principles.

Associate Commissioner Ángel R. Rivera de la Cruz, dissenting

Today, the majority of the Puerto Rico Energy Bureau ("Energy Bureau") issued a Resolution and Order through which it conditionally approved LUMA's[1] System Operation Principles ("SOP"). For the reasons expressed herein, I dissent.

* * *

As I stated in my May 14, 2021 concurring opinion in the instant case, System Operation Principles without well-defined actions or implementation procedures are just mere aspirations.[2] The SOP submitted by LUMA in its February 25 Petition[3] represents a high-level view of how the transmission and distribution ("T&D") system should be operated. It is an amalgam of best practices from several jurisdictions. However, the specific way in which such SOP will be implemented is lacking from LUMA's filing.

More than the definition of general SOP, the Energy Bureau must evaluate how LUMA is planning to operate the system and how the SOP will be implemented and enforced. Without the specific procedures, it is impossible for the Energy Bureau to complete such evaluation.

To that effect, the February 25 Petition contains a list of to-do actions that lack the necessary operability to be implemented at this time. Notwithstanding, in its May 19 Compliance Filing,[4] LUMA provided a timeline for the development of certain procedures designed to implement the SOP. Such timeline consists of two phases. Phase I includes fourteen procedures related to the operation of the Monacillos Control Center. Phase II

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[1] LUMA ENERGY, LLC as ManagementCo, and LUMA ENERGY SERVCO, LLC as ServCo (collectively, "LUMA").

[2] Resolution and Order, In Re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, May 14, 2021, Associate Commissioner Ángel R. Rivera de la Cruz, concurring, p. 3.

[3] LUMA's Submittal and Request for Approval of System Operation Principles, In Re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, February 25, 2021 ("February 25 Petition").

[4] Motion in Compliance with Order Submitting Revised System Operation Principles, Phase 1 Draft Procedures and Additional Information, In Re: Review of T&D Operator's System Operation Principles, Case No. NEPR-MI-2021-0001, May 19, 2021 ("May 19 Compliance Filing").

includes the development of certain procedures encompassing several areas of the T&D system operation.

Phase I is scheduled to conclude at the end of May 2021, whereas Phase II, which has not commenced yet, is scheduled to be completed on or about December 2021.[5] In the May 19 Compliance Filing, LUMA included drafts of the fourteen procedures that comprise Phase I.[6] LUMA did not include drafts of the procedures that comprise Phase II.

The submitted draft Phase I procedures are preliminary. Therefore, there is a possibility that the final versions include changes that the Energy Bureau will not be able to review before they get implemented. Moreover, the Energy Bureau does not have visibility as to the Phase II procedures. During the May 10, 2021 Technical Hearing in the instant case, LUMA's representatives acknowledged that it is highly unusual to commence operations without having written procedures in place.[7] To that effect, LUMA witness, Mr. Brian Walshe, stated that he has worked with over 80 utilities around the world, and he has never seen it where there is no written procedures for dispatch.[8]

Without a clear description of the procedures LUMA will use to implement such principles or to operate the T&D system, approving the SOP is premature at this time. During the May 10, 2021 Technical Hearing, LUMA witness, Mr. Mario Hurtado, stated that, based on how the system is currently being operated, it is a significant step to have the SOP reviewed and looked at.[9] Although I agree with Mr. Hurtado's statement, such step is incomplete without a clear implementation path. LUMA should be held to a higher standard. As such, I would have not approved the SOP without evaluating the final version of the Phase I procedures and, at the very least, a working version of the Phase II procedures.

Therefore, I dissent.

Ángel R. Rivera de la Cruz
Associate Commissioner

In San Juan, Puerto Rico, on May 31, 2021.

NEGOCIADO DE ENERGÍA DE PUERTO RICO
JUNTA REGLAMENTADORA DE SERVICIO PÚBLICO

[5] May 19 Compliance Filing, File "8.1 RFI-LUMA-MI-21-0001-210511-PREB-008 Att1.xlsx", Tabs "Phase I" and "Phase II".

[6] *See* May 19 Compliance Filing, RFI-LUMA-MI-21-0001-210511-PREB-009, Attachment 2.

[7] May 10, 2021 Technical Hearing, testimony of Mr. Brian Walshe, at 1:24:56 – 1:25:12.

[8] *Id.*

[9] May 10, 2021 Technical Hearing, testimony of Mr. Mario Hurtado, at 1:21:00 – 1:21:34.