

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

NEPR

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IN RE: REVIEW OF THE PUERTO RICO
ELECTRIC POWER AUTHORITY
INTEGRATED RESOURCE PLAN

CASE NO.: NEPR-AP-2023-0004

SUBJECT: Motion Submitting Testimony
Adoption

MOTION SUBMITTING TESTIMONY ADOPTION

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

COME NOW LUMA Energy, LLC (“ManagementCo”), and **LUMA Energy ServCo, LLC** (“ServCo”), (jointly referred to as “LUMA”), and respectfully state and request the following:

1. On October 17, 2025, LUMA filed a *Motion Submitting 2025 IRP and Request for Confidential Treatment*. Therein, LUMA submitted the 2025 IRP recommending that the Energy Bureau approve Resource Plan Hybrid A as LUMA’s Preferred Resource Plan. In compliance with the May 13th Order, LUMA filed the 2025 IRP as *Exhibit 1* and the workpapers and models relied on in developing the 2025 IRP as *Exhibit 2*. In addition, LUMA submitted the direct testimonies of seven (7) LUMA witnesses in support of portions, chapters, appendices, and workpapers of the 2025 IRP as *Exhibit 3*.

2. Among the pre-filed testimonies submitted by LUMA was the pre-filed testimony of Mr. Daniel Haughton, former Planning and Renewables Integration Director for LUMA. His testimony supported the Transmission and Distribution Plan of the 2025 IRP, as well as the transmission and distribution implications of the preferred resource plan. However, Mr. Haughton is no longer a LUMA employee.

3. LUMA has designated Mr. Pedro Meléndez Meléndez, Chief Capital Programs and Grid Transformation Officer, to adopt the pre-filed testimony of Mr. Haughton. Accordingly, LUMA is submitting the corresponding adoption of the referenced pre-filed testimony. Mr. Meléndez’s testimony, including his personal circumstances and attestation, is attached herein as *Exhibit 1*. To facilitate review, a redline version of the testimony is also attached as *Exhibit 2*. As shown in the markup, the substance of the testimony remains unchanged. Therefore, Mr. Meléndez’s adoption of the testimony does not affect the parties or potential intervenors participating in the captioned case.

WHEREFORE, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned and **determine** that the pre-filed testimony of Mr. Daniel Haughton has been substituted with the testimony of Mr. Pedro Meléndez.

WE HEREBY CERTIFY that this Motion was filed using the electronic filing system of this Energy Bureau and that electronic copies of this Motion will be notified to the Puerto Rico Electric Power Authority: Alexis Rivera, alexis.rivera@prepa.pr.gov, and through its counsel of record, Natalia Zayas Godoy, nzayas@gmlex.net, Richard Cruz Franqui, rcruzfranqui@gmlex.net, and Mirelis Valle Cancel, mvalle@gmlex.net, and Genera PR, LLC, through its attorney of record Luis R. Román Negrón, lrn@roman-negrom.com.

RESPECTFULLY SUBMITTED.

In San Juan, Puerto Rico, on May 5, 2026.



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Exhibit 1

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

IN RE:

REVIEW OF THE PUERTO RICO
ELECTRIC POWER AUTHORITY
INTEGRATED RESOURCE PLAN

CASE NO.: NEPR-AP-2023-0004

Direct Testimony of

Pedro A. Meléndez-Meléndez

Chief Capital Programs & Grid Transformation Officer, LUMA Energy ServCo LLC

April 30 2026

**Summary of Prepared Direct Testimony of
PEDRO A. MELÉNDEZ-MELÉNDEZ
ON BEHALF OF
LUMA ENERGY LLC AND LUMA ENERGY SERVCO, LLC**

Mr. Pedro A. Meléndez-Meléndez (“Mr. Meléndez”) is Chief Capital Programs & Grid Transformation Officer at LUMA Energy ServCo, LLC. In his prepared Direct Testimony, Mr. Meléndez supports the Transmission and Distribution Plan (Appendix 1) portion of the Integrated Resource Plan, along with the Transmission and Distribution Implications of the Preferred Resource Plan.

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1 I. INTRODUCTION

2 A. Witness Identification

3 **Q.1 Please state your name, business address, title, and employer.**

4 A. My name is Pedro A. Meléndez Meléndez. My business address is LUMA Energy, PO
5 Box 363508, San Juan, Puerto Rico 00936-3508. I am the Chief Capital Programs &
6 Grid Transformation Officer for LUMA Energy LLC and LUMA Energy ServCo,
7 LLC (together “LUMA” or “LUMA Energy”).

8 **Q.2 On whose behalf are you testifying before the Puerto Rico Energy Bureau**
9 **(“Energy Bureau” or “PREB”)?**

10 A. My testimony is on behalf of LUMA as part of the Commonwealth of Puerto Rico
11 Energy Bureau’s Case No. NEPR-AP-2023-0004, *In re: Review of the Puerto Rico*
12 *Electric Power Authority [(“PREPA”)] Integrated Resource Plan (“IRP”).*

13 B. Qualifications and Professional Background

14 **Q.3 What is your educational background?**

15 A. I completed my Bachelor of Science degree in electrical engineering, majoring in
16 power systems, at the University of Puerto Rico-Mayagüez. I received my Master of
17 Science degree in electrical engineering, with a major in power systems and control
18 systems, from Wayne State University.

19 **Q.4 What is your professional experience?**

20 A. I have more than 20 years of experience in the electric power industry, working across
21 the United States. Prior to joining LUMA, I served as the vice president of planning,
22 engineering, and construction at Jacksonville Electric Authority, the municipal
23 electric, water, and sewer utility for Jacksonville, Florida, where I had executive

1 

24 responsibility for the planning, engineering, and construction of billions of dollars of
25 capital investments to maintain and improve electric, water, and wastewater services.
26 Prior to that, I was the director of transmission and substation operations at NextEra
27 Energy Resources, LLC, the world's leading generator of solar and wind energy.
28 There, I provided leadership for the field and system operations for transmission and
29 substation assets across North America, including 46 states and Canada. Before that,
30 I served in multiple roles of increasing responsibility at ITC Holding Company, which
31 owns and operates high-voltage transmission facilities across the Midwestern United
32 States, including as a director of asset protection and performance. I have also served
33 as an engineer in the system planning and engineering team at DTE Energy, the
34 investor-owned electric utility that serves Detroit and other communities in Michigan.

35 **Q.5 Have you previously testified in adjudicated proceedings before the Energy**
36 **Bureau?**

37 A. Yes. I have provided testimony under oath in the following adjudicated proceedings:
38 Case No. NEPR-AP-2023-0003, *In re: Puerto Rico Electric Power Authority Rate*
39 *Review*.

40 **II. SUMMARY OF DIRECT TESTIMONY**

41 **Q.6 What is the purpose of your Direct Testimony?**

42 A. The purpose of my testimony is to sponsor: (1) the Transmission and Distribution
43 ("T&D") Plan, Appendix 1 ("Appendix 1"); and (2) a portion of the T&D implications
44 of the 2025 IRP Preferred Resource Plan.

45 **Q.7 Are you sponsoring any statements, schedules, or exhibits in conjunction with**
46 **your testimony?**



47 A. No.

48 **Q.8 Are there any documents you relied on for your testimony that have not already**
49 **been produced in this proceeding?**

50 A. Yes, I have relied on the following documents:

- 51 1. Puerto Rico Grid Resilience and Transitions to 100% Renewable Energy Study
52 (“PR100 Study”), March 2024;
- 53 2. Resolution and Order on the System Stabilization Plan, March 28, 2025, filed in
54 Docket No. NEPR-MI-2024-0005;
- 55 3. LUMA’s System Remediation Plan, May 8, 2021, filed in Docket No. NEPR-MI-
56 2020-0019; and
- 57 4. Expert Report of Synapse Energy Associates, November 23, 2016, filed in Docket No.
58 CEPR-AP-2015-0001.

59 **Q.9 Are any of the materials you are sponsoring confidential?**

60 A. Yes. The map of the Puerto Rico Transmission system may contain Critical Energy
61 Infrastructure Information (“CEII”). A public version of this map is provided. In
62 Section 8 of the report, there are also data and results on critical contingencies and
63 critical elements that must be kept confidential to protect the integrity of the fragile
64 Transmission and Distribution networks.

65 **III. TRANSMISSION AND DISTRIBUTION PLANNING**

66 **Q.10 Are there any legal requirements for LUMA to submit its IRP?**

67 A. Yes. LUMA is required to develop its IRP in accordance with the requirements set
68 forth in the *Regulation on Integrated Resource Plan for the Puerto Rico Electric*

69 *Power Authority, Regulation No. 9021 of the Energy Bureau, dated April 20, 2018*
 70 *(“Regulation 9021”).*

71 **Q.11 What is your understanding of what Regulation 9021 mandates, as it pertains to**
 72 **your testimony?**

73 A. As it pertains to T&D System Planning, Regulation 9021 mandates that LUMA
 74 describe the existing and planned electric transmission, distribution systems, and
 75 advanced grid technologies, and analyze the T&D system’s stability, reliability, and
 76 compliance with applicable standards.

77 **Q.12 What analyses must the IRP include regarding the T&D system?**

78 A. Table 1 below sets forth a detailed breakdown of the requirements.

79 **Table 1: Regulation 9021 – Transmission and Distribution Planning**

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(a)	Existing Transmission Facilities Descriptions - The IRP shall include a brief narrative description of the existing electric transmission system and identify any transmission constraints and critical contingencies. The information shall include at a minimum:
Regulation 9021	2.03(J)(1)(a)(i)	A summary of the characteristics of all existing transmission and sub-transmission facilities of thirty-eight kilovolts (38 kV) or higher;
Regulation 9021	2.03(J)(1)(a)(ii)	A discussion of whether the transmission system constrains the transfer of electricity from existing projects, potential new projects, or projects under development or consideration, including a description of its ability to interconnect intermittent renewable generation projects and microgrids, as applicable, and with as much specificity as practical;
Regulation 9021	2.03(J)(1)(a)(iii)	A schematic map of the transmission and sub-transmission network showing transfer limits, which shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time; and
Regulation 9021	2.03(J)(1)(a)(iv)	A map showing the actual, physical routing of the transmission and sub-transmission, geographic landmarks, major metropolitan areas, and the location of substations and generating plants, and interconnections with distribution substations. The IRP shall include two copies of this map on a 1:250,000 scale. Such map shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(b)	Existing Distribution Facilities Description - The IRP shall include a brief narrative description of the distribution system, including description of its ability to accommodate incremental penetration of distributed generation, including intermittent distributed generation, and its ability to receive new loads overtime, such as, for example, increasing penetrations of electric vehicles. In addition, the IRP shall provide PREPA's current distribution system design criteria. Information of PREPA's current distribution system shall include:
Regulation 9021	2.03(J)(1)(b)(i)	Load flow or other system analysis by voltage class of the electric utility's distribution system performance that identifies and considers each of the following:

4 

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(b)(i)(A)	Any thermal overloading of distribution circuits and equipment.
Regulation 9021	2.03(J)(1)(b)(i)(B)	Any voltage variations on distribution circuits that do not comply with the current version of the American National Standard Institute ("ANSI") Standard C 84.1, Electric Power Systems and Equipment Voltage Ratings or Standard as later amended.
Regulation 9021	2.03(J)(1)(b)(i)(C)	[The utility] shall identify any portion of this analysis that it deems Confidential Energy Infrastructure Information. The Commission will handle it in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(b)(ii)	Adequacy of the electric utility distribution system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(c)	Existing Advanced Grid Technologies Description - The IRP shall identify the areas within the service territory where advanced meters and other advanced grid technologies have been installed, along with any plans to expand the integration of any such technologies into its system. The IRP shall include a brief description of the installed advanced grid technologies.
Regulation 9021	2.03(J)(1)(d)	Planned Transmission Facilities Description - The IRP shall provide a detailed narrative description of any planned electric transmission and sub-transmission, and a description of the plans for development of facilities during the next ten years of the Planning Period. The description shall include, at a minimum, all information regarding:
Regulation 9021	2.03(J)(1)(d)(i)	New lines, including any requirements of new rights-of-way;
Regulation 9021	2.03(J)(1)(d)(ii)	Lines in which changes in capacity, either in terms of current, voltage or both, are scheduled to take place; and
Regulation 9021	2.03(J)(1)(d)(iii)	Other changes in transmission lines or rights-of-way, which would be considered as substantial additions.
Regulation 9021	2.03(J)(1)(d)(iv)	A listing of all proposed substations including size and location;
Regulation 9021	2.03(J)(1)(d)(v)	The transmission forecast shall include maps of the planned transmission system as follows: A. A map showing the planned transmission lines, substation, and generating plants as they will tie into the existing system to provide as complete a picture of the system as is possible.
Regulation 9021	2.03(J)(1)(d)(vi)	[The utility] shall submit a justification of its transmission development plans, including: A. Description and transcription diagrams of the base case load flow studies, one for the current year and one as projected five and ten years into the future, and provide base case load flow studies in a standard industry format (such as PSS/E or PSLF) along with transcription diagrams for the base cases. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(d)(vii)	A tabulation of and transcription diagrams for a representative number of contingency cases studied along with brief statements concerning the results.
Regulation 9021	2.03(J)(1)(d)(viii)	Adequacy of [the utility's] transmission system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(d)(ix)	A high-level analysis of [the utility's] transmission system's ability to permit power interchange with microgrids and other independent power producers. [The utility] should provide examples of interconnection studies from recent renewable integration projects.
Regulation 9021	2.03(J)(1)(d)(x)	A diagram showing [the utility's] import and export transfer capabilities and identifying the limiting element(s) during each season of the next ten years. In addition, [the utility] will provide a listing of transmission loading relief (TLR) procedures called during the last two seasons for which actual data are available. For each TLR event, the listing shall include the maximum level, and the duration at the maximum level, and the magnitude (in MW) of the power curtailments.;
Regulation 9021	2.03(J)(1)(d)(xi)	A description of any studies regarding transmission system improvement, including, but not limited to, any studies of the potential for reducing line losses, thermal loading, and low voltage, and for improving access to alternative energy resources.

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(d)(xii)	A one-line diagram of the transmission network. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(e)	Planned Distribution Facilities Description - The IRP shall provide a detailed narrative description of any planned changes in approach, standard practice, or broadly applicable substation, circuit, or feeder design for [the utility's] distribution system for the next ten years. This description shall address any changes in distribution facilities that impact the ability to accommodate incremental penetration of distributed generation, including intermittent distributed generation, and the ability to receive new loads over time. [The utility] shall submit a substantiation of distribution development plans, including, if available:
Regulation 9021	2.03(J)(1)(e)(i)	Load flow or other system analysis by voltage class of the electric utility's distribution system performance that identifies and considers each of the following: A. Any thermal overloading of distribution circuits and equipment. B. Any voltage variations on distribution circuits that do not comply with the current version of the American National Standard Institute ("ANSI") Standard C 84.1, Electric Power Systems and Equipment Voltage Ratings or Standard as later amended.
Regulation 9021	2.03(J)(1)(e)(ii)	Adequacy of the electric utility distribution system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(e)(iii)	Analysis and consideration of any studies regarding distribution system improvement, including, but not limited to, any studies of the potential for reducing line losses, thermal loading and low voltage or any other problems, and for improving access to alternative resources.
Regulation 9021	2.03(J)(2)(a)	Transmission and Distribution System Analysis - The IRP shall identify [the utility's] transmission standards and shall confirm that the [the utility's] transmission standards are in compliance with the standards of the North American Electric Reliability Corporation. If any of [the utility's] transmission standards are inconsistent with standards from the North American Electric Reliability Corporation, then [the utility] shall identify each such inconsistent standard and provide the explanation and rationale for the inconsistency.
Regulation 9021	2.03(J)(2)(b)	The IRP shall include a System Stability Analysis, which shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI- 2016-0009 as currently amended and may be amended from time to time. The analysis shall provide operational criteria, define Ancillary Services requirements, and demonstrate least-cost mitigation solutions to maintain system stability;
Regulation 9021	2.03(J)(2)(c)	The IRP shall identify thermal and voltage reliability issues in [the utility's] transmission system and distribution systems. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time;
Regulation 9021	2.03(J)(2)(d)	The IRP shall identify transmission, distribution, and substation potential improvements to increase reliability and meet minimum transmission standards;
Regulation 9021	2.03(J)(2)(e)	The IRP shall document the transmission and distribution implications of the Preferred Resource Plan, including assessing if the plan requires incremental transmission or distribution mitigation or changes.

80 **Q.13 Please briefly explain the difference between LUMA's transmission and**
81 **distribution systems.**

82 A. The transmission system is the critical backbone of higher voltage towers, lines, and
83 substations that connect major generation resources to denser urban load centers. The
84 distribution system, by contrast, is an expansive network of over 340 distribution
85 substation transformers and over 1,100 distribution circuits that directly serve

86 customer loads, feed new load requests, and integrate distributed generation that
87 connects to customer rooftops.

88 **Q.14 Please summarize LUMA's methodology for planning the transmission and**
89 **distribution systems.**

90 A. The strategic objectives driving LUMA include: system stabilization, updating end-
91 of-life assets, reliability improvement, generation and renewable integration, and
92 resilience hardening. Investment priorities are defined after completing thorough
93 assessments that include asset and field condition verification; operational
94 experiences; transmission planning analysis and studies; studies in support of
95 customer load requests; and studies supporting generation and renewable projects.
96 LUMA's methodology for planning the transmission system includes first stabilizing
97 the system by restoring critical out-of-service facilities, then addressing critical
98 performance deficiencies through reconfiguration and redesign, and finally optimizing
99 the grid's performance by rebuilding and hardening critical assets. These factors must
100 all be accounted for when integrating new customer loads, and new generation
101 projects, which are growing rapidly across the system. The system must be planned to
102 achieve essential reliability performance based on NERC Transmission Planning
103 criteria (TPL-001-5) and related reliability standards; for example, loss of a single
104 transmission line, substation breaker, transformer or busbar (known as N minus 1 or
105 "N-1") should not result in consequential load loss.
106 The distribution system planning methodology, in order of emphasis for distribution
107 circuits, includes: (i) focus on restoration of critical out-of-configuration circuits,
108 circuit breakers at substations, and substation transformers; (ii) focus on worst-

109 performing reliability circuits and distribution automation device deployments to
110 improve customer experience and reliability; and (iii) rebuilding and hardening of
111 circuit backbones and selected branches to address reliability deficiencies.

112 Substations that supply distribution circuits are also a major focus including rebuilding
113 of existing substations that are in poor physical condition and those with a history of
114 operational deficiencies, and mitigating flood risk with barriers, elevation or relocation
115 of substation assets as practicable. Also, at individual substations, LUMA focuses on
116 reinforcing and upgrading existing system infrastructure to improve reliability,
117 including replacing aging transformers, oil circuit breakers, distribution circuit
118 breakers, other high-voltage equipment, and other systems as necessary to improve
119 asset performance, system reliability, and safety.

120 **IV. THE EXISTING TRANSMISSION AND DISTRIBUTION SYSTEM**

121 **Q.15 Please describe the state of the T&D system when LUMA assumed operational**
122 **responsibility.**

123 A. The T&D System was operated and maintained exclusively by PREPA prior to
124 LUMA's commencement of operations on June 1, 2021. By all accounts, LUMA
125 inherited a T&D System that was significantly deteriorated, in bankruptcy, and being
126 operated in a manner inconsistent with Prudent Utility Practices, i.e., operational
127 indicators, such as reliability metrics, price, wait times, and billing accuracy, indicated
128 that PREPA was not performing at the same level as its comparable utilities. The T&D
129 System was fragile, having suffered decades of neglect.

130 The Puerto Rico Legislature included findings on the dire state of the T&D System
131 when it enacted both Act 120-2018, which allowed the process to select a private



132 operator for the T&D System and laid the groundwork for the transformation of Puerto
133 Rico's electric power system, and Act 17-2019. For example, in enacting Act 120-
134 2018, the legislature stated that “[p]ractically no infrastructure maintenance was
135 performed during the past decade.” The Puerto Rico legislature also stated that Puerto
136 Rico's electric power generation and distribution systems were deficient and obsolete.
137 The 2017 Rate Order¹ and the 2020 Fiscal Plan also acknowledged PREPA's chronic
138 underinvestment in the system. Specifically, the 2017 Rate Order notes that PREPA's
139 infrastructure spending was not based on actual system needs.² The 2020 Fiscal Plan
140 stated that, “in recent years, capital investments in the T&D System were limited to
141 the most urgent projects to avoid imminent system failure rather than to proactively
142 improve the grid for the future.”³
143 Though these conditions were known, and therefore, not entirely unanticipated, the
144 severity of the deterioration and consequent challenges that LUMA still faces cannot
145 be overstated. A 2016 Study commissioned by the Energy Bureau in PREPA's last
146 rate case, which was conducted by Synapse Energy Economics, Inc. (“Synapse T&D
147 Study”) found that the T&D System was “falling apart quite literally”⁴ due, in part, to
148 capital constraints and an inability to replace and construct lines. Lack of funds forced

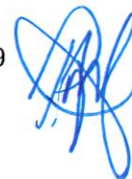
¹ Resolution and Order dated January 10, 2017, as amended in reconsideration in Case No. CEPR-AP-2015-0001 (“2017 Rate Order”).

² See 2017 Rate Order, at p. 3.

³ See 2020 Fiscal Plan for the Puerto Rico Electric Power Authority as Certified by the FOMB on June 29, 2020 (“2020 Fiscal Plan”), at p. 14, available at

https://docs.pr.gov/files/AAFAF/Financial_Documents/Fiscal%20Plans/CERTIFIED%20FISCAL%20PLANS/2020-PREPA-Fiscal-Plan-as-Certified-by-FOMB-on-June-29-2020.pdf.

⁴ Synapse Report at 18, *see also* at 12, 26, *available at* <https://energia.pr.gov/wp-content/uploads/sites/7/2016/11/Expert-Report-Revenue-Requirements-Fisher-and-Horowitz-Revised-20161123.pdf>.



149 PREPA to play “a catch-up game on maintenance – following outages, instead of
150 improving the fundamental system.”⁵

151 During the Front-End Transition Period (“FET”),⁶ LUMA conducted a system-wide
152 gap assessment and identified over 1,000 gaps.⁷ To address these conditions, LUMA
153 developed the System Remediation Plan (SRP) that provides and appropriately
154 transitions toward Prudent Utility Practice and compliance with T&D OMA
155 provisions. The gap assessment spanned the entire T&D System, including physical
156 infrastructure, operational procedures and protocols, supporting infrastructure and
157 information systems, and administrative practices (including employee training and
158 certifications).

159 These legislative findings, the findings of the Energy Bureau, LUMA’s FET
160 evaluation and independent studies, reflect a consistent theme: the decades-long
161 degradation of Puerto Rico's energy system is predominantly driven by a well-
162 documented historical lack of investment in the grid, resulting from both poor
163 planning and insufficient funding.

164 **Q.16 What has LUMA done since assuming operational responsibility to improve the**
165 **T&D system?**

⁵ *Id.* at 33.

⁶ The FET was the period of time from and including the Effective Date (that is, June 22, 2020) and until Commencement Date (this period, the “Front-End Transition Period”) as defined by the Puerto Rico Transmission and Distribution System Operations and Maintenance Agreement and the Supplemental Agreement (“T&D OMA”) executed among PREPA, the Puerto Rico Public Private Partnership Authority, and LUMA dated June 22, 2020. During the FET, LUMA was required to provide “Front-End Transition Services” to ensure an orderly transition of the responsibility for the management, operation, maintenance, repairs, restoration and replacement of the T&D System, without disrupting customer service and business continuity. The Front-End Transition Services were included in the T&D OMA to complete the transition and handover to LUMA of the operation, management and other rights and responsibilities with respect to the T&D System.

⁷ See System Remediation Plan at p. 1, *available at* <https://energia.pr.gov/wp-content/uploads/sites/7/2021/05/Motion-in-Compliance-with-Order-Submitting-Revised-Redacted-Version-of-SRP-and-Redacted-Attachments-to-Responses-to-RIs-NEPR-MI-2020-0019.pdf>.



166 A. In compliance with Section 4.1(d)(ii) of the T&D OMA, LUMA developed a System
167 Remediation Plan (“SRP”). At the highest level, the SRP provides a roadmap for the
168 transition from a state in which utility assets and activities are not in compliance with
169 Contract Standards and Prudent Utility Practices, to one where the minimum
170 conditions are met to achieve the vision of providing safe and reliable electric service
171 to customers. The SRP was approved by the Energy Bureau in Case No. NEPR-MI-
172 2020-2019.⁸

173 Since the approval of the SRP, LUMA has implemented multiple programs to improve
174 the T&D System, resulting in tremendous progress across all facets of Puerto Rico’s
175 electric grid. Examples include:

- 176 • **Strengthened the energy system against storms and hurricanes:** by replacing
177 more than 32,400 utility poles with new stronger poles able to withstand winds of
178 +160 mph.
- 179 • **Reduced the size and the impact of outages:** by installing over 10,500 grid
180 automation devices, which have served to avoid over 460 million service
181 interruption minutes for our customers;
- 182 • **Addressed the largest cause of outages:** by clearing vegetation from over 6,491
183 miles of powerlines and electric infrastructure;
- 184 • **Improved community safety and energy efficiency:** by replacing over 84,000
185 streetlights as part of LUMA’s Community Streetlight Initiative;

⁸ Case No.: NEPR-MI-2020-0019, Determination on LUMA’s Proposed System Remediation Plan, Resolution & Order of June 23, 2021.



- 186 • **Enabled the adoption of Distributed Solar Photovoltaics (“DPV”):** by
187 connecting over 175,000 customers to rooftop solar, representing 1,282 MW of
188 clean, renewable energy for Puerto Rico, along with a recorded 153,000 Battery
189 Energy Storage Systems representing 850 MW and 2,600 MWh of energy storage
190 capacity, and;
- 191 • **Improved reliability during generation shortfalls:** by launching the Customer
192 Battery Energy Sharing (“CBES”) initiative to aggregate customer home batteries
193 to provide system support during known generation shortfall events. By October
194 2025, CBES had over 80,000 participants reliably providing up to 65 MW of
195 response over 4-hour events during the summer of 2025.

196 **V. Existing Transmission System**

197 **Q.17 Please describe the existing transmission system.**

198 A. Puerto Rico’s electric transmission system includes approximately 424 miles of
199 230kV, 711 miles of 115kV and 1,563 miles of 38kV transmission lines and 299
200 substation sites spread across eight transmission planning zones spanning the Island.

201 **Q.18 Please summarize the transmission constraints and critical contingencies on the**
202 **existing system.**

203 A. The detailed technical analysis used to evaluate the performance of the transmission
204 network identified 26 critical contingencies that lead to significant thermal overloads
205 for loss of a single element, and another 17 critical contingencies that lead to
206 significant voltage violations across areas of the Puerto Rico grid. These thermal and
207 voltage issues are so significant that they can lead to area-wide disturbances or have
208 historically caused cascading failures that can impact large regions of the island.



209 Examples include a single 115/38kV transformer tripping, multiple elements
210 overloaded by up to 190% of rated capacity, potentially triggering cascading failures
211 in other lines and transformers.

212 **Q.19 Has LUMA conducted a system analysis to assess the adequacy of the existing**
213 **transmission system to withstand natural disasters and overload conditions?**

214 A. LUMA has conducted physical assessments of field assets to identify those at risk of
215 not withstanding high winds during natural disasters. Note that a detailed
216 engineering ‘Pole Loading Analysis’ would be required to calculate a structure’s
217 probability to withstand specified wind speeds; however, visual inspections only
218 identified the at-risk assets that would be highly likely to fail in high winds. LUMA
219 has also conducted an assessment that included extensive load-flow simulations,
220 including 982 N-1 and 77,006 N-1-1 contingencies. These simulations evaluated the
221 transmission system’s performance under various operational scenarios and
222 identified potential vulnerabilities. The contingencies consider a broad listing of
223 equipment types, including transmission line segments, substation transformers,
224 generators, buses, breakers, and other equipment. The guidance in LUMA’s
225 Transmission Planning Criteria document is derived directly from the North
226 American Reliability Corporation (“NERC”) Transmission Planning (TPL 001-05)
227 active standard for transmission planning entities.

228 **VI. Existing Distribution System**

229 **Q.20 Please describe the existing distribution facilities.**

230 A. Puerto Rico’s electric distribution system includes 342 distribution substations that
231 supply loads to 1,127 distribution circuits (also referred to as feeders). The source of



232 the substation is fed from either 115 or 38 kV transmission, and the load side of
233 substations and feeders are energized at one of five primary voltage levels: 13.2 kV,
234 8.32 kV, 7.2 kV, 4.8 kV or 4.16 kV. LUMA manages six operational regions across
235 Puerto Rico: Arecibo, Bayamón, Caguas, Mayaguez, Ponce and San Juan. Section 5.1
236 of Appendix 1 describes of the existing distribution system.

237 **Q.21 Please summarize the existing distribution system’s ability to accommodate**
238 **incremental penetration of distributed generation and its ability to receive new**
239 **loads over time.**

240 A. LUMA has worked to incorporate and mitigate the impact of distributed energy
241 resources (“DERs”) on Puerto Rico’s system through both corrective action and
242 forward-looking strategies. On one hand, LUMA continues to identify required
243 upgrades, such as service transformers, voltage regulators and thermal capacity
244 improvements. On the other hand, a proactive approach is being implemented through
245 the adoption of Smart Inverter Settings, aligned with Institute of Electrical and
246 Electronics Engineers (IEEE) -1547 standard. These settings were developed through
247 robust stakeholder engagement, informed by operational data and system simulations
248 and are designed to improve grid stability and reliability.

249 However, LUMA is quickly approaching the physical and technical limits of the
250 distribution system to accommodate incremental distributed generation. Without
251 significant intervention, the distribution grid will collapse under the current pace of
252 interconnections. This means that LUMA will be unable to manage system voltage,



253 control thermal loads, and ensure the safety and reliability of the distribution circuit
254 infrastructure.

255 The safety aspect of this condition is significant. The presence of customer-owned
256 generation throughout the distribution system means de-energized conditions can no
257 longer be assumed during outages or maintenance activities, as DERs could potentially
258 continue to provide power to isolated portions of the system. This situation places
259 service personnel—and even customers at an increased level of risk due to unexpected
260 energization and limits LUMA’s ability to verify that these areas are free from all
261 energy sources prior to performing repairs. As penetration rises, so does the
262 operational complexity of managing these conditions safely.

263 **Q.22 Has LUMA conducted a system analysis to assess the adequacy of the existing**
264 **distribution system to withstand natural disasters and overload conditions?**

265 A. Yes. The analysis reveals that portions of the network are well equipped to withstand
266 natural disasters (e.g., those with underground or covered conductors and rebuilt
267 infrastructure). However, it also reveals that a large portion of the network is very
268 exposed to natural disasters. The analysis also reveals that a significant number of
269 circuits and circuit sections are experiencing thermal overloads and require rebuilding
270 to accommodate existing and planned future growth.

271 **VII. Advanced Grid Technologies**

272 **Q.23 Please describe the current state of advanced grid technologies employed on the**
273 **existing T&D system.**

274 A. LUMA is in the process of advancing its grid modernization efforts by deploying
275 automated switchgear, fault sensors, and advanced monitoring technologies across its



276 distribution and transmission systems to enhance reliability and resilience. The
277 program includes the installation of three-phase and single-phase smart reclosers with
278 microprocessor-based controllers, enabling remote monitoring and control via
279 Supervisory Control and Data Acquisition (“SCADA”), as well as the deployment of
280 communicating Fault Circuit Indicators (“FCIs”) to improve fault location accuracy
281 and expedite service restoration. The initiative also involves upgrading outdated
282 protection devices and implementing feeder automation schemes that allow for
283 automatic isolation and restoration of feeder segments, thereby minimizing outages.
284 Additionally, LUMA is integrating advanced sensor technologies such as Phasor
285 Measurement Units (“PMUs”) to provide high-speed, synchronized data for real-time
286 system monitoring, event analysis, and support for renewable energy integration.
287 These technologies are being deployed in substations, on feeders, and as part of
288 microgrid projects in Vieques and Culebra, where they will enhance situational
289 awareness, power quality monitoring, and operational flexibility. Collectively, these
290 efforts are designed to create a more reliable, efficient, and future-ready electric grid
291 for Puerto Rico.

292 **Q.24 Does LUMA have plans to expand the integration of advanced grid**
293 **technologies?**

294 A. Yes. As of September 2025, LUMA has installed a total of 308 three-phase reclosers
295 and 674 single-phase reclosers under its distribution automation initiative, impacting
296 156 distribution feeders. LUMA has plans to deploy over 13,000 single-phase
297 reclosers and over 3,000 three-phase reclosers by FY2035. Additionally, LUMA has



298 already installed thousands of FCIs and plans to continue expanding this deployment
299 through 2029, with optimal device placement determined by reliability studies.

300 **Q.25 Are there any other conclusions you would like to draw from the existing T&D**
301 **System?**

302 A. Yes. Puerto Rico is at a critical juncture where the policies, laws and regulations that
303 impact the integration of distributed renewable energy systems must be updated to
304 reflect the pace and volume of existing conditions, and to allow for the hardening of
305 the grid to accommodate these installations before future installations are deployed.
306 LUMA stands ready to support accelerated deployment of customer owned resources,
307 but the balanced approach must include: (a.) enabling customer technologies and
308 leveraging their capabilities like smart inverter settings, (b.) protecting the grid from
309 physical damage so safety and reliability are available to all customers, and (c.)
310 ensuring costs are equitably assigned to protect the affordability of both technology
311 adopters and non-participants alike.

312 **VIII. PLANNED TRANSMISSION AND DISTRIBUTION FACILITIES**

313 **Q.26 Please describe the electric transmission and sub-transmission facilities planned**
314 **to be installed during the 2025 IRP planning period.**

315 The electric transmission and sub-transmission facilities in LUMA infrastructure
316 plans during the 2025 IRP planning period can be divided into two categories: (1)
317 those that were developed prior to commencement of the 2025 IRP; and (2) those
318 that arise from the selection of the Preferred Resource Plan. With respect to the first
319 category, Appendix 1 outlines LUMA's comprehensive five-year strategy to enhance
320 Puerto Rico's transmission and sub-transmission infrastructure, driven by: (a.)



321 System Stabilization efforts to restore out-of-service transmission and substation
322 infrastructure, and (b.) findings from the 2025 Transmission Planning Assessment.
323 The assessment identified a range of projects to address reliability, resilience, and
324 the integration of renewable energy, including the construction of new transmission
325 lines, reconductoring to increase the capacity of existing lines, restoring additional
326 facilities to service, rebuilding and reconfiguring substations, and adding and
327 restoring out-of-service transformers.

328 Extensive load flow simulations and contingency analyses (N-1 and N-1-1) were conducted
329 to identify system vulnerabilities and thermal or voltage violations across various operational
330 scenarios, including natural disasters and peak loading conditions. Key planned transmission
331 line rebuild projects are listed in Section 4.3.4. which are anticipated to utilize FEMA funding.
332 Additionally, \$89.6-\$129M have been requested in an ongoing Rate Case Filing for the next
333 three fiscal years to address the thermal overloads and voltage violations needing immediate
334 mitigation. No new substations were proposed as a result of the 2025 Transmission Planning
335 assessment.

336 With respect to the second category of planned transmission projects to support the Preferred
337 Resource Plan, these will be identified concurrent with LUMA's PSS[®]E analysis, which was
338 filed with the Energy Bureau on November 21, 2025.

339 **Q.27 Please describe the planned changes in approach, practice, and design of the**
340 **distribution system over the 2025 IRP planning period.**

341 A. As with LUMA's proposed changes to the transmission system, the changes to the
342 distribution system fall into two categories: (1) those planned before release of the
343 2025 IRP; and (2) those needed as a result of the Preferred Resource Plan selected in
344 the 2025 IRP. With respect to the first category, the planned changes span substation



345 and feeder rebuilds, automation, reliability upgrades, and targeted infrastructure
346 improvements, as detailed below:

- 347 • Substation Rebuilds and Upgrades: The Substation Rebuild program focuses on
348 the rebuilding of existing substations that are in poor physical condition, the
349 rebuilding of substations with a history of operational deficiencies, the
350 mitigation of flood risk where applicable, and the relocation of substations with
351 a high risk of flooding when flood mitigation alone is not an option.
- 352 • Substation Reliability: This program will reinforce and upgrade existing system
353 infrastructure to improve reliability, including replacing aging transformers, oil
354 circuit breakers, distribution circuit breakers, other high-voltage equipment,
355 alternating current/direct current (AC/DC) systems, standby generators, relays,
356 remote terminal units, and auxiliary systems. It will also include protection and
357 control upgrades and procurement of emergency spares.
- 358 • Distribution Line Rebuilds: The Distribution Line Rebuild program focuses on
359 rebuilding distribution feeders with poor reliability performance and those that
360 serve critical power facilities, targeting the worst-performing feeders first. This
361 program will result in significant short-term improvements and incremental
362 improvements over the remainder of the program.
- 363 • Distribution Pole and Conductor Repair: This program focuses on minimizing
364 safety hazards caused by distribution poles, equipment, and conductors that
365 require repair or replacement. Major repairs and replacements will be based on
366 the results of assessments of the distribution system and on an analysis by
367 engineers to schedule repair or replacements based on the structure's criticality.

368 Following this process, safety hazards and priority poles will be replaced, along
369 with damaged equipment, conductors, and hardware.

370 • Distribution Automation: This program involves deploying automated
371 switchgear and fault sensors on distribution feeders to improve grid reliability.
372 It will take place as part of LUMA's efforts to enhance system performance
373 through remote operations, fault detection, and faster service restoration,
374 utilizing advanced communication tools and system analysis.

375 • Distribution Grid Reliability: This program focuses on reducing outages,
376 improving response times, and ensuring the delivery of safe and reliable
377 electricity to customers. Assessing the worst performing feeders, targeting
378 localized reliability concerns, and performing reliability system upgrades, such
379 as integrating FCIs and fuse coordination are the three main drivers of this
380 program.

381 LUMA did not conduct a distribution-system analysis for the PRP because DPV and
382 EV charging installations are driven entirely by customer choice and therefore cannot
383 be forecast with the location- specific detail required for a meaningful assessment. The
384 distribution system is already nearing technical limits due to increasing distributed
385 generation. Given the absence of necessary data and the impracticality of performing
386 a detailed analysis without knowing resource locations, LUMA has requested a waiver
387 of the requirement to complete the distribution analysis.

388 **IX. TRANSMISSION AND DISTRIBUTION SYSTEM ANALYSIS**

389 **Q.28 Please describe the transmission system standards LUMA adheres to.**



390 A. LUMA's transmission system standards are covered in two documents – (i.)
391 Transmission Planning Criteria and (ii.) LUMA Transmission Design Criteria and
392 Manual. The Transmission Planning Criteria document is derived from the NERC
393 reliability standards and incorporates best practices from other Regional Reliability
394 Organizations. The Transmission Design Criteria document provides the physical and
395 structural requirements for designs to meet or exceed current American Society of
396 Civil Engineers (“ASCE”) and Institute of Electrical and Electronics Engineers
397 (“IEEE”) codes and standards, including wind loading and other parameters such as
398 ground and structural clearances. These two together ensure that transmission network
399 performance meets essential reliability and applicable codes and standards.

400 **Q.29 Is the transmission system that LUMA inherited in compliance with those**
401 **standards?**

402 A. No. As discussed previously, transmission planning criteria is not met, as 26 critical
403 contingencies produce thermal violations and 17 critical contingencies produce
404 widespread voltage violations. Also, present transmission design criteria were not the
405 standard in place when most transmission facilities were constructed, so poles,
406 structures, and associated infrastructure do not meet current codes and standards. For
407 example, Act 17 - 2019 requires wind loading of 155 mph, but very few transmission
408 structures are designed or built to this existing requirement.

409 **Q.30 Did LUMA conduct a system stability analysis of the T&D system?**

410 A. Yes. The discussion and results of the System Stability Analysis are located in Section
411 7.0 of Appendix 1.

412 **Q.31 What thermal and voltage reliability issues were identified in the T&D systems?**



413 A. For the “as operated” transmission system, 26 critical contingencies cause major
414 overloads on neighboring transmission facilities, with overloads greater than 190% of
415 a line rating in some cases. These cause cascading overloads on other facilities
416 resulting in regional or island-wide instability and outages. Additionally, another 17
417 critical contingencies cause major voltage disturbances that can impact regions or lead
418 to island-wide instability and outages. Due to the sensitive nature of these facilities,
419 LUMA requests that these critical contingencies be treated as CEII. Transmission
420 analysis concludes that the Puerto Rico grid is not in compliance with NERC
421 Transmission Planning standards for system performance.

422 Distribution substation analysis discussed in Section 5.3.1 identified 25
423 distribution substations at a loading of 90% of the transformer’s maximum thermal
424 loading or higher. When including already requested new business customers, an
425 additional 22 transformers would exceed 90% or more of the transformer’s maximum
426 thermal loading or higher. This means that significant increases in transformer
427 capacity or new distribution substations will be required over the 3-year and 10-year
428 investment planning horizons.

429 Distribution circuit analysis discussed in Section 5.3.1 identified approximately
430 304 of 1,127 circuits with notable voltage violations, especially due to night-time and
431 evening peaks in hot summer months, and 164 circuits with thermal overloads.

432 **Q.32 Are there specific issues on the distribution system with respect to DER**
433 **integration? .**

434 A. Yes, it was also found that DER and the bi-directional flows during daytime, and
435 during lightly loaded shoulder months contribute to violations in 660 feeders, split



436 into 285 voltage issues, and 638 thermal issues including service transformer
437 overloads and primary circuit conductors in neighborhoods across the island. Note,
438 the timeframe of study for DER and PV injection impacts (light load, often in
439 February – April) and mid-day load and generation levels means that these violations
440 are mostly unique from the evening peak thermal and voltage violations that occur
441 when PV is not producing, and demand is high, especially in the summer months
442 (June – October). Beyond their impact on system performance metrics, sustained
443 thermal overload and persistent voltage excursions of this nature carry direct safety
444 consequences that go beyond ordinary grid reliability concerns. Most critical is the
445 risk of unintentional islanding. This is a condition where portions of the distribution
446 system remain energized by customer-owned DERs even after being electrically
447 isolated from the main system. Although current interconnection regulations include
448 anti-islanding requirements, the sheer volume and geographic density of DERs
449 across the system has significantly increased the complexity of verifying de-
450 energized conditions in the field. The decentralized and uncontrolled nature of
451 interconnection severely limits LUMA’s ability to have full visibility for control or
452 isolation of all potential sources of energy in a given work area, placing crews,
453 emergency responders and even customers at risk of encountering feeders (or lines)
454 that appear to be deenergized, but remain live due to DER injection. At the same
455 time, the proliferation of inverter-based resources, such as DERs, is reducing
456 conventional short-circuit levels, distorting conventional protection schemes and
457 increasing the potential for missed fault detection. These conditions reinforce the
458 urgency of prudent regulatory revisions that explicitly address these challenges and



459 impact safety and reliability.

460

461 **Q. 33 What potential transmission, distribution, and substation improvements are**
462 **planned to increase reliability and meet minimum standards?**

463 A. As discussed above, LUMA's investment strategy is driven by strategic pillars of
464 system stabilization and asset replacements to improve public and worker safety and
465 equipment and community support, reliability and resilience improvements to address
466 the worst reliability impacts first and harden the grid against resilience threats, while
467 supporting regulatory and community objectives of driving deep decarbonization and
468 supporting distributed energy integration. The activities in the System Stabilization
469 plan include, but are not limited to, restoring out of service transmission lines, and
470 substation transformers, deploying grid automation devices and enabling technologies
471 such as information technology and telecommunications investments, including
472 substation relays and remote terminal units. These will have the near-term impact of
473 improving reliability, but facilities such as transmission lines will not be upgraded to
474 withstand higher wind speeds (as only necessary structural installations necessary to
475 return the lines to service are being implemented).

476 LUMA also has requested funding in an active Rate Case (NEPR-AP-2023-0003) to
477 begin addressing high priority capacity constrained transmission and distribution
478 circuit thermal and voltage violations, as well as emergent safety and reliability risks
479 due to DERs.

480 **X. TRANSMISSION & DISTRIBUTION IMPLICATIONS OF THE**
481 **PREFERRED RESOURCE PLAN**



482 **Q.34 What is your understanding of the requirements for the portion of the T&D**
483 **System Planning section of the 2025 IRP that you are sponsoring?**

484 A. With respect to the T&D System section of the 2025 IRP Report, LUMA followed the
485 requirements set forth in Section 2.03(J)(2)(e) of Regulation 9021. This section
486 requires the 2025 IRP to document the T&D implications of the PRP, including an
487 assessment of whether the PRP requires incremental T&D mitigation or changes.

488 **Q.35 Did LUMA receive any clarifications regarding the Energy Bureau's**
489 **expectation for LUMA's 2025 IRP fulfilling the T&D requirements in**
490 **Regulation 9021?**

491 A. Yes. On April 15, 2024, the Energy Bureau issued a Resolution and Order in this case,
492 granting a portion of LUMA's request for a waiver of certain specific requirements in
493 Regulation 9021 and denying LUMA's request for waivers to other requirements. In
494 addition, in this R&O, the Energy Bureau clarified that: LUMA cannot provide
495 information it does not have.

496 **Q.36 What portion of the T&D system analysis of the implications of the PRP does**
497 **your testimony address?**

498 A. As noted above, my testimony addresses the existing state of the T&D system, which
499 was used as input into the analysis of the PRP's impacts on the transmission system
500 (addressed by LUMA witness Ajit Kulkarni). My testimony also addresses the
501 analysis of the PRP implications on the distribution system.

502 **Q.37 What analysis did LUMA perform to assess the implications of the PRP on the**
503 **distribution system?**

504 A. LUMA did not complete a comprehensive analysis of the implications of the PRP on



505 the distribution system. The inclusion of distributed photovoltaic (DPV) and electric
506 vehicle (EV) charging installations in the PRP reflects forecasts of customer choices
507 for these installations, which are not under LUMA's control and are driven solely by
508 customer choice. Therefore, the location and quantity of the distributed resources are
509 outside LUMA's planned resource deployment and must be addressed reactively in
510 accordance with current laws and regulations.

511 LUMA has developed recommended smart-inverter settings whose adoption
512 is imperative to improve near-term distribution circuit voltage performance under
513 normal conditions and to support transmission grid stability by enabling inverters to
514 respond to grid frequency and grid voltage disturbances; however, these recommended
515 settings require PREB action to implement. LUMA re-iterates again, that the system
516 is already quickly approaching the physical and technical limit of the distribution
517 system to accommodate incremental distributed generation (evidenced by the
518 prevalence of DG related high voltages, distribution transformer and circuit thermal
519 overloads being identified, and volume of repairs and upgrades that are being newly
520 driven by DPV). These items will need to be considered in any implementation plan
521 to execute the improvements needed for a reliable grid that meets minimum industry
522 requirements.

523 Given the impossibility of performing a detailed distribution system analysis of the
524 PRP without knowing where on the system the resources may be placed, and the
525 waivers and clarifications granted by the Energy Bureau in its R&O of April 15,
526 2024, which recognized and waived LUMA's ability to comply with Regulation
527 9021 when it did not possess the required data, LUMA has requested the Energy



528 Bureau to waive the requirement of completing the distribution analysis of the PRP.

529 **Q.38 Does this conclude your direct testimony?**

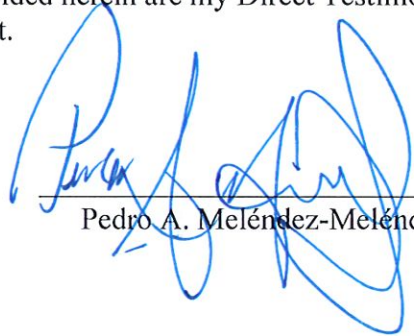
530 A. Yes.

A handwritten signature in blue ink, consisting of several overlapping loops and lines, located in the bottom right corner of the page.

ATTESTATION

Affiant, Pedro A. Meléndez-Meléndez, being first duly sworn, states the following:

The prepared Direct Testimony that I am sponsoring constitutes my Direct Testimony in the above-styled case before the Puerto Rico Energy Bureau. I would provide the answers set forth in the Direct Testimony if asked the questions included in the Direct Testimony. I further state that the facts and statements provided herein are my Direct Testimony and, to the best of my knowledge, are true and correct.



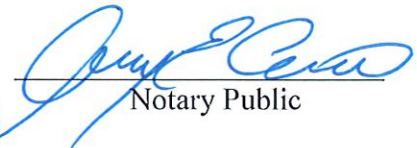
Pedro A. Meléndez-Meléndez

Affidavit No. -34-

Acknowledged and subscribed before me by Pedro A. Meléndez-Meléndez, in his capacity as Chief Capital Programs & Grid Transformation Officer at LUMA Energy ServCo, LLC, of legal age, married, and resident of San Juan, Puerto Rico, who is personally known to me.

In San Juan, Puerto Rico, this 30th day of April 2026.





Notary Public

Exhibit 2

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

IN RE:

REVIEW OF THE PUERTO RICO
ELECTRIC POWER AUTHORITY
INTEGRATED RESOURCE PLAN

CASE NO.: NEPR-AP-2023-0004

Direct Testimony of

~~Daniel Haughton~~

~~Planning and Renewables Integration Director~~ Pedro A. Meléndez-Meléndez

Chief Capital Programs & Grid Transformation Officer, LUMA Energy ServCo LLC

~~October 15, 2025 (Revised on November 20, 2025, to include Transmission and Distribution~~

~~Implications of the Preferred Resource Plan)~~

April, 2026

Summary of Prepared Direct Testimony of
DANIEL HAUGHTON
PEDRO A. MELÉNDEZ-MELÉNDEZ
ON BEHALF OF
LUMA ENERGY LLC AND LUMA ENERGY SERVCO, LLC

~~Dr. Daniel Haughton~~ (“~~Dr. Haughton~~Mr. Pedro A. Meléndez-Meléndez (“Mr. Meléndez”) is ~~Planning and Renewables Integration Director~~Chief Capital Programs & Grid Transformation Officer at LUMA Energy ServCo, LLC. In his prepared Direct Testimony, ~~Dr. Haughton~~Mr. Meléndez supports the Transmission and Distribution Plan (Appendix 1) portion of the Integrated Resource Plan, along with the Transmission and Distribution Implications of the Preferred Resource Plan.

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|

1 **I. INTRODUCTION**

2 **A. Witness Identification**

3 **Q.1 Please state your name, business address, title, and employer.**

4 A. My name is ~~Daniel Haughton~~Pedro A. Meléndez Meléndez. My business address is
5 LUMA Energy, PO Box 363508, San Juan, Puerto Rico 00936-3508. I am the ~~Director~~
6 ~~for Transmission and Distribution Planning~~Chief Capital Programs & Grid
7 Transformation Officer for LUMA Energy LLC and LUMA Energy ServCo, LLC
8 (together “LUMA” or “LUMA Energy”).

9 **Q.2 On whose behalf are you testifying before the Puerto Rico Energy Bureau**
10 **(“Energy Bureau” or “PREB”)?**

11 A. My testimony is on behalf of LUMA as part of the Commonwealth of Puerto Rico
12 Energy Bureau’s Case No. NEPR-AP-2023-0004, *In re: Review of the Puerto Rico*
13 *Electric Power Authority [(“PREPA”)] Integrated Resource Plan (“IRP”)*.

14 **B. Qualifications and Professional Background**

15 **Q.3 What is your educational background?**

16 ~~A. I earned a Bachelor's Degree in Electrical Engineering with a concentration in Electric~~
17 ~~Power Systems from the University of South Florida in 2006 and a Master's Degree~~
18 ~~in Electrical Engineering with a concentration in Electric Power Systems from~~
19 ~~Arizona State University in 2009. Additionally, I earned a Doctor of Philosophy in~~
20 ~~Electrical Engineering with a concentration in Electric Power Systems from Arizona~~
21 ~~State University in 2012, with research focused on modeling and simulation, as well~~
22 ~~as state estimation of Transmission and Distribution systems with high penetration of~~
23 ~~distributed renewable energy systems.~~

24 A. I completed my Bachelor of Science degree in electrical engineering, majoring in
25 power systems, at the University of Puerto Rico-Mayagüez. I received my Master of
26 Science degree in electrical engineering, with a major in power systems and control
27 systems, from Wayne State University.

28 **Q.4 What is your professional experience?**

29 ~~A. I have professional, technical, and industry experience in the electric utility industry~~
30 ~~in various technical, engineering, and leadership roles across transmission,~~
31 ~~distribution, and large industrial facilities. I spent 11 years at Arizona Public Service~~
32 ~~("APS"), an investor-owned utility in Phoenix, Arizona. There, I served as Director of~~
33 ~~Technical Engineering Support (2022), Director of Customer to Grid Solutions~~
34 ~~(2021), Manager of Distribution Planning and Engineering (2018), and Manager of~~
35 ~~Distributed Energy Resource Engineering (2016). Prior to these roles, I held various~~
36 ~~technical positions at APS encompassing Transmission Planning and Transmission~~
37 ~~Operations support, including obtaining a Reliability Coordinator ("RC") certification~~
38 ~~from the North American Electric Reliability Corporation ("NERC") for three years.~~

39 ~~Prior to APS, I worked at Intel Corporation in both Rio Rancho, New Mexico~~
40 ~~and Chandler, Arizona, as a facilities engineer. I also worked at California~~
41 ~~Independent System Operator ("CAISO") in Folsom, California, and at Tampa~~
42 ~~Electric in the Electric Distribution Engineering business. In addition, I have been an~~
43 ~~adjunct faculty member at Arizona State University, teaching graduate and~~
44 ~~undergraduate level Electrical Engineering courses since 2014.~~

45 A. I have more than 20 years of experience in the electric power industry, working across
46 the United States. Prior to joining LUMA, I served as the vice president of planning,

47 engineering, and construction at Jacksonville Electric Authority, the municipal
48 electric, water, and sewer utility for Jacksonville, Florida, where I had executive
49 responsibility for the planning, engineering, and construction of billions of dollars of
50 capital investments to maintain and improve electric, water, and wastewater services.
51 Prior to that, I was the director of transmission and substation operations at NextEra
52 Energy Resources, LLC, the world's leading generator of solar and wind energy.
53 There, I provided leadership for the field and system operations for transmission and
54 substation assets across North America, including 46 states and Canada. Before that,
55 I served in multiple roles of increasing responsibility at ITC Holding Company, which
56 owns and operates high-voltage transmission facilities across the Midwestern United
57 States, including as a director of asset protection and performance. I have also served
58 as an engineer in the system planning and engineering team at DTE Energy, the
59 investor-owned electric utility that serves Detroit and other communities in Michigan.

60 **Q.5 Have you previously testified in adjudicated proceedings before the Energy**
61 **Bureau?**

62 A. ~~No.~~

63 A. Yes. I have provided testimony under oath in the following adjudicated proceedings:
64 Case No. NEPR-AP-2023-0003, *In re: Puerto Rico Electric Power Authority Rate*
65 *Review.*

66 **II. SUMMARY OF DIRECT TESTIMONY**

67 **Q.6 What is the purpose of your Direct Testimony?**

68 A. The purpose of my testimony is to sponsor: (1) the Transmission and Distribution
69 ("T&D") Plan, Appendix 1 ("Appendix 1"); and (2) a portion of the T&D implications

70 of the 2025 IRP Preferred Resource Plan.

71 **Q.7 Are you sponsoring any statements, schedules, or exhibits in conjunction with**
72 **your testimony?**

73 A. No.

74 **Q.8 Are there any documents you relied on for your testimony that have not already**
75 **been produced in this proceeding?**

76 A. Yes, I have relied on the following documents:

- 77 1. [Puerto Rico Grid Resilience and Transitions to 100% Renewable Energy Study](#)
78 (“PR100 Study”), March 2024;
- 79 2. [Resolution and Order on the System Stabilization Plan](#), March 28, 2025, filed in
80 Docket No. NEPR-MI-2024-0005;
- 81 3. [LUMA’s System Remediation Plan](#), May 8, 2021, filed in Docket No. NEPR-MI-
82 2020-0019; and
- 83 4. [Expert Report of Synapse Energy Associates](#), November 23, 2016, filed in Docket No.
84 CEPR-AP-2015-0001.

85 **Q.9 Are any of the materials you are sponsoring confidential?**

86 ~~A.~~ A. Yes. The map of the Puerto Rico Transmission system may contain Critical
87 Energy Infrastructure Information (“CEII”). A public version of this map is
88 provided.

89 In Section 8 of the report, there are also data and results on critical contingencies and critical
90 elements that must be kept confidential to protect the integrity of the fragile
91 Transmission and Distribution networks.

92

IV-III. TRANSMISSION AND DISTRIBUTION PLANNING

Q.10 Are there any legal requirements for LUMA to submit its IRP?

A. Yes. LUMA is required to develop its IRP in accordance with the requirements set forth in the *Regulation on Integrated Resource Plan for the Puerto Rico Electric Power Authority*, Regulation No. 9021 of the Energy Bureau, dated April 20, 2018 (“Regulation 9021”).

Q.11 What is your understanding of what Regulation 9021 mandates, as it pertains to your testimony???

A. As it pertains to T&D System Planning, Regulation 9021 mandates that LUMA describe the existing and planned electric transmission, distribution systems, and advanced grid technologies, and analyze the T&D system’s stability, reliability, and compliance with applicable standards.

Q.12 What analyses must the IRP include regarding the T&D system?

A. Table 1 below sets forth a detailed breakdown of the requirements.

Table 1: Regulation 9021 – Transmission and Distribution Planning

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(a)	Existing Transmission Facilities Descriptions - The IRP shall include a brief narrative description of the existing electric transmission system and identify any transmission constraints and critical contingencies. The information shall include at a minimum:
Regulation 9021	2.03(J)(1)(a)(i)	A summary of the characteristics of all existing transmission and sub-transmission facilities of thirty-eight kilovolts (38 kV) or higher;
Regulation 9021	2.03(J)(1)(a)(ii)	A discussion of whether the transmission system constrains the transfer of electricity from existing projects, potential new projects, or projects under development or consideration, including a description of its ability to interconnect intermittent renewable generation projects and microgrids, as applicable, and with as much specificity as practical;
Regulation 9021	2.03(J)(1)(a)(iii)	A schematic map of the transmission and sub-transmission network showing transfer limits, which shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time; and
Regulation 9021	2.03(J)(1)(a)(iv)	A map showing the actual, physical routing of the transmission and sub-transmission, geographic landmarks, major metropolitan areas, and the location of substations and generating plants, and interconnections with distribution substations. The IRP shall include two copies of this map on a 1:250,000 scale. Such map shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(b)	Existing Distribution Facilities Description - The IRP shall include a brief narrative description of the distribution system, including description of its ability to accommodate incremental penetration of distributed generation, including intermittent distributed generation, and its ability to receive new loads overtime, such as, for example, increasing penetrations of electric vehicles. In addition, the IRP shall provide PREPA's current distribution system design criteria. Information of PREPA's current distribution system shall include:
Regulation 9021	2.03(J)(1)(b)(i)	Load flow or other system analysis by voltage class of the electric utility's distribution system performance that identifies and considers each of the following:
Regulation 9021	2.03(J)(1)(b)(i)(A)	Any thermal overloading of distribution circuits and equipment.
Regulation 9021	2.03(J)(1)(b)(i)(B)	Any voltage variations on distribution circuits that do not comply with the current version of the American National Standard Institute ("ANSI") Standard C 84.1, Electric Power Systems and Equipment Voltage Ratings or Standard as later amended.
Regulation 9021	2.03(J)(1)(b)(i)(C)	[The utility] shall identify any portion of this analysis that it deems Confidential Energy Infrastructure Information. The Commission will handle it in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(b)(ii)	Adequacy of the electric utility distribution system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(c)	Existing Advanced Grid Technologies Description - The IRP shall identify the areas within the service territory where advanced meters and other advanced grid technologies have been installed, along with any plans to expand the integration of any such technologies into its system. The IRP shall include a brief description of the installed advanced grid technologies.
Regulation 9021	2.03(J)(1)(d)	Planned Transmission Facilities Description - The IRP shall provide a detailed narrative description of any planned electric transmission and sub-transmission, and a description of the plans for development of facilities during the next ten years of the Planning Period. The description shall include, at a minimum, all information regarding:
Regulation 9021	2.03(J)(1)(d)(i)	New lines, including any requirements of new rights-of-way;
Regulation 9021	2.03(J)(1)(d)(ii)	Lines in which changes in capacity, either in terms of current, voltage or both, are scheduled to take place; and
Regulation 9021	2.03(J)(1)(d)(iii)	Other changes in transmission lines or rights-of-way, which would be considered as substantial additions.
Regulation 9021	2.03(J)(1)(d)(iv)	A listing of all proposed substations including size and location;
Regulation 9021	2.03(J)(1)(d)(v)	The transmission forecast shall include maps of the planned transmission system as follows: A. A map showing the planned transmission lines, substation, and generating plants as they will tie into the existing system to provide as complete a picture of the system as is possible.
Regulation 9021	2.03(J)(1)(d)(vi)	[The utility] shall submit a justification of its transmission development plans, including: A. Description and transcription diagrams of the base case load flow studies, one for the current year and one as projected five and ten years into the future, and provide base case load flow studies in a standard industry format (such as PSS/E or PSLF) along with transcription diagrams for the base cases. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(d)(vii)	A tabulation of and transcription diagrams for a representative number of contingency cases studied along with brief statements concerning the results.
Regulation 9021	2.03(J)(1)(d)(viii)	Adequacy of [the utility's] transmission system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(d)(ix)	A high-level analysis of [the utility's] transmission system's ability to permit power interchange with microgrids and other independent power producers. [The utility] should provide examples of interconnection studies from recent renewable integration projects.

Code	Subsection	Description
Regulation 9021	2.03(J)(1)(d)(x)	A diagram showing [the utility's] import and export transfer capabilities and identifying the limiting element(s) during each season of the next ten years. In addition, [the utility] will provide a listing of transmission loading relief (TLR) procedures called during the last two seasons for which actual data are available. For each TLR event, the listing shall include the maximum level, and the duration at the maximum level, and the magnitude (in MW) of the power curtailments.;
Regulation 9021	2.03(J)(1)(d)(xi)	A description of any studies regarding transmission system improvement, including, but not limited to, any studies of the potential for reducing line losses, thermal loading, and low voltage, and for improving access to alternative energy resources.
Regulation 9021	2.03(J)(1)(d)(xii)	A one-line diagram of the transmission network. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time.
Regulation 9021	2.03(J)(1)(e)	Planned Distribution Facilities Description - The IRP shall provide a detailed narrative description of any planned changes in approach, standard practice, or broadly applicable substation, circuit, or feeder design for [the utility's] distribution system for the next ten years. This description shall address any changes in distribution facilities that impact the ability to accommodate incremental penetration of distributed generation, including intermittent distributed generation, and the ability to receive new loads over time. [The utility] shall submit a substantiation of distribution development plans, including, if available:
Regulation 9021	2.03(J)(1)(e)(i)	Load flow or other system analysis by voltage class of the electric utility's distribution system performance that identifies and considers each of the following: A. Any thermal overloading of distribution circuits and equipment. B. Any voltage variations on distribution circuits that do not comply with the current version of the American National Standard Institute ("ANSI") Standard C 84.1, Electric Power Systems and Equipment Voltage Ratings or Standard as later amended.
Regulation 9021	2.03(J)(1)(e)(ii)	Adequacy of the electric utility distribution system to withstand natural disasters and overload conditions.
Regulation 9021	2.03(J)(1)(e)(iii)	Analysis and consideration of any studies regarding distribution system improvement, including, but not limited to, any studies of the potential for reducing line losses, thermal loading and low voltage or any other problems, and for improving access to alternative resources.
Regulation 9021	2.03(J)(2)(a)	Transmission and Distribution System Analysis - The IRP shall identify [the utility's] transmission standards and shall confirm that the [the utility's] transmission standards are in compliance with the standards of the North American Electric Reliability Corporation. If any of [the utility's] transmission standards are inconsistent with standards from the North American Electric Reliability Corporation, then [the utility] shall identify each such inconsistent standard and provide the explanation and rationale for the inconsistency.
Regulation 9021	2.03(J)(2)(b)	The IRP shall include a System Stability Analysis, which shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time. The analysis shall provide operational criteria, define Ancillary Services requirements, and demonstrate least-cost mitigation solutions to maintain system stability;
Regulation 9021	2.03(J)(2)(c)	The IRP shall identify thermal and voltage reliability issues in [the utility's] transmission system and distribution systems. Such information shall be treated as Critical Energy Infrastructure Information and handled in accordance with the procedures set forth in CEPR-MI-2016-0009 as currently amended and may be amended from time to time;
Regulation 9021	2.03(J)(2)(d)	The IRP shall identify transmission, distribution, and substation potential improvements to increase reliability and meet minimum transmission standards;
Regulation 9021	2.03(J)(2)(e)	The IRP shall document the transmission and distribution implications of the Preferred Resource Plan, including assessing if the plan requires incremental transmission or distribution mitigation or changes.

108 **Q.13 Please briefly explain the difference between LUMA's transmission and**
109 **distribution systems.**

110 A. The transmission system is the critical backbone of higher voltage towers, lines, and
111 substations that connect major generation resources to denser urban load centers. The
112 distribution system, by contrast, is an expansive network of over 340 distribution
113 substation transformers and over 1,100 distribution circuits that directly serve
114 customer loads, feed new load requests, and integrate distributed generation that
115 connects to customer rooftops.

116 **Q.14 Please summarize LUMA’s methodology for planning the transmission and**
117 **distribution systems.**

118 A. The strategic objectives driving LUMA include: system stabilization, updating end-
119 of-life assets, reliability improvement, generation and renewable integration, and
120 resilience hardening. Investment priorities are defined after completing thorough
121 assessments that include: asset and field condition verification; operational
122 experiences; transmission planning analysis and studies; studies in support of
123 customer load requests; and studies ~~in support of~~ supporting generation and renewable
124 projects.

125 LUMA’s methodology for planning the transmission system includes first stabilizing
126 the system by restoring critical out-of-service facilities ~~to service~~, then addressing
127 critical performance deficiencies through reconfiguration and redesign, and finally
128 optimizing the grid’s performance by rebuilding and hardening critical assets. These
129 factors must all ~~account~~ be accounted for when integrating ~~both~~ new customer loads,
130 and ~~renewable energy, as well as~~ new generation projects, which are growing rapidly
131 across the system. The system must be planned to achieve essential reliability
132 performance based on NERC Transmission Planning criteria (TPL-001-5) and related

133 reliability standards; for example, loss of a single transmission line, substation breaker,
134 transformer or busbar (known as N minus 1 or “N-1”) should not result in
135 consequential load loss.

136 The distribution system planning methodology, in order of emphasis for distribution
137 circuits, includes: (i) focus on restoration of critical out-of-configuration circuits,
138 circuit breakers at substations, and substation transformers; (ii) focus on worst-
139 performing reliability circuits and distribution automation device deployments to
140 improve customer experience and reliability; and (iii) rebuilding and hardening of
141 circuit backbones and selected branches to address reliability deficiencies.

142 Substations that supply distribution circuits are also a major focus including rebuilding
143 of existing substations that are in poor physical condition and those with a history of
144 operational deficiencies, and mitigating flood risk with barriers, elevation or
145 relocation of substation assets as practicable. -Also, ~~in~~at individual substations, LUMA
146 focuses on reinforcing and upgrading existing system infrastructure to improve
147 reliability, including replacing aging transformers, oil circuit breakers, distribution
148 circuit breakers, other high-voltage equipment, and other systems as necessary to
149 improve asset performance, system reliability, and safety.

150 **V-IV. THE EXISTING TRANSMISSION AND DISTRIBUTION SYSTEM**

151 **Q.15 Please describe the state of the T&D system when LUMA assumed operational**
152 **responsibility.**

153 A. The T&D System was operated and maintained exclusively by PREPA prior to
154 LUMA’s commencement of operations on June 1, 2021. By all accounts, LUMA
155 inherited a T&D System that was significantly deteriorated, in bankruptcy, and being

156 operated in a manner inconsistent with Prudent Utility Practices¹, i.e., operational
157 indicators, such as reliability metrics, price, wait times, and billing accuracy, indicated
158 that PREPA was not performing at the same level as its comparable utilities. The T&D
159 System was fragile, having suffered decades of neglect.

160 — The Puerto Rico Legislature included findings on the dire state of the T&D
161 System when it enacted both Act 120-2018, which allowed the process to select a
162 private operator for the T&D System and laid the groundwork for the transformation
163 of Puerto Rico’s electric power system, and Act 17-2019. For example, in enacting
164 Act 120-2018, the legislature stated that “[p]ractically no infrastructure maintenance
165 was performed during the past decade.” The Puerto Rico legislature also stated that
166 Puerto Rico’s electric power generation and distribution systems were deficient and
167 obsolete.

168 — The 2017 Rate Order¹ and the 2020 Fiscal Plan also acknowledged PREPA’s
169 chronic underinvestment in the system. Specifically, the 2017 Rate Order notes that
170 PREPA’s infrastructure spending was not based on actual system needs.² The 2020
171 Fiscal Plan stated that, “in recent years, capital investments in the T&D System were
172 limited to the most urgent projects to avoid imminent system failure rather than to
173 proactively improve the grid for the future.”³

174 — Though these conditions were known, and therefore, not entirely
175 unanticipated, the severity of the deterioration and consequent challenges that LUMA

¹ Resolution and Order dated January 10, 2017, as amended in reconsideration in Case No. ~~CEPRAP~~CEPR-AP-2015-0001 (“2017 Rate Order”).

² See 2017 Rate Order, at p. 3.

³ See 2020 Fiscal Plan for the Puerto Rico Electric Power Authority as Certified by the FOMB on June 29, 2020 (“2020 Fiscal Plan”), at p. 14, available at https://docs.pr.gov/files/AAFAF/Financial_Documents/Fiscal%20Plans/CERTIFIED%20FISCAL%20PLANS/2020-PREPA-Fiscal-Plan-as-Certified-by-FOMB-on-June-29-2020.pdf.

176 still faces cannot be overstated. A 2016 Study commissioned by the Energy Bureau in
177 PREPA’s last rate case, which was conducted by Synapse Energy Economics, Inc.
178 (“Synapse T&D Study”) found that the T&D System was “falling apart quite
179 literally”⁴ due, in part, to capital constraints and an inability to replace and construct
180 lines. Lack of funds forced PREPA to play “a catch-up game on maintenance –
181 following outages, instead of improving the fundamental system.”⁵

182 — During the Front-End Transition Period (“FET”),⁶ LUMA conducted a system-
183 wide gap assessment and identified over 1,000 gaps.⁷ ~~Over 600 initiatives were~~
184 ~~identified to~~To address ~~those “gaps” (i.e., these conditions, LUMA developed~~ the
185 ~~difference between the state of the T&D System, work practices, procedures,~~
186 ~~Remediation Plan (SRP) that provides~~ and ~~processes at the time of the FET compared~~
187 ~~to~~appropriately transitions toward Prudent Utility Practice, ~~applicable codes~~ and
188 ~~standards, and the compliance with~~ T&D OMA)⁸ – provisions. The gap assessment
189 spanned the entire T&D System, including physical infrastructure, operational

⁴ Synapse Report at 18, *see also* at 12, 26, *available at* <https://energia.pr.gov/wp-content/uploads/sites/7/2016/11/Expert-Report-Revenue-Requirements-Fisher-and-Horowitz-Revised-20161123.pdf>.

⁵ *Id.* at 33.

⁶ The FET was the period of time from and including the Effective Date (that is, June 22, 2020) and until Commencement Date (this period, the “Front-End Transition Period”) as defined by the Puerto Rico Transmission and Distribution System Operations and Maintenance Agreement and the Supplemental Agreement (“T&D OMA”) executed among PREPA, the Puerto Rico Public Private Partnership Authority, and LUMA dated June 22, 2020. During the FET, LUMA was required to provide “Front-End Transition Services” to ensure an orderly transition of the responsibility for the management, operation, maintenance, repairs, restoration and replacement of the T&D System, without ~~disruption of~~disrupting customer service and business continuity. The Front-End Transition Services ~~was~~were included in the T&D OMA to complete the transition and handover to LUMA of the operation, management and other rights and responsibilities with respect to the T&D System.

⁷ *See* System Remediation Plan at p. 1, *available at* <https://energia.pr.gov/wp-content/uploads/sites/7/2021/05/Motion-in-Compliance-with-Order-Submitting-Revised-Redacted-Version-of-SRP-and-Redacted-Attachments-to-Responses-to-RIs-NEPR-MI-2020-0019.pdf>.

⁸ ~~*Id.*~~

190 procedures and protocols, supporting infrastructure and information systems, and
191 administrative practices (including employee training and certifications).

192 ——— These legislative findings, the findings of the Energy Bureau, LUMA’s FET
193 evaluation and independent studies, reflect a consistent theme: the decades-long
194 degradation of Puerto Rico’s energy system is predominantly driven by a well-
195 documented historical lack of investment in the grid, resulting from both poor
196 planning and insufficient funding.

197 **Q.16 What has LUMA done since assuming operational responsibility to improve the**
198 **T&D system?**

199 A. In compliance with Section 4.1(d)(ii) of the T&D OMA, LUMA developed a System
200 Remediation Plan (“SRP”). At the highest level, the SRP provides a roadmap for the
201 transition from a state in which utility assets and activities are not in compliance with
202 Contract Standards and Prudent Utility Practices, to one where the minimum
203 conditions are met to achieve the vision of providing safe and reliable electric service
204 to customers. The SRP was approved by the Energy Bureau in Case No. NEPR-MI-
205 2020-2019.⁹

206 Since the approval of the SRP, LUMA has implemented multiple programs ~~that focus~~
207 ~~on improving to improve~~ the T&D System, ~~which have resulted~~ resulting in tremendous
208 progress across all facets of Puerto Rico’s electric grid. Examples include:

⁹ Case No.: NEPR-MI-2020-0019, Determination on LUMA’s Proposed System Remediation Plan, Resolution & Order of June 23, 2021.

- 209
- **Strengthened the energy system against storms and hurricanes:** by replacing
210 more than 32,400 utility poles with new stronger poles able to withstand winds of
211 ~~±160±~~ mph;
 - **Reduced the size and the impact of outages:** by installing over 10,500 grid
212 automation devices, which have served to avoid over 460 million service
213 interruption minutes for our customers;
214
 - **Addressed the largest cause of outages:** by clearing vegetation from over 6,491
215 miles of powerlines and electric infrastructure;
216
 - **Improved community safety and energy efficiency:** by replacing over 84,000
217 streetlights as part of LUMA’s Community Streetlight Initiative;
218
 - **Enabled the adoption of Distributed Solar Photovoltaics (“DPV”):** by
219 connecting over 175,000 customers to rooftop solar, representing 1,282 MW of
220 clean, renewable energy for Puerto Rico, along with a recorded 153,000 Battery
221 Energy Storage Systems representing 850 MW and 2,600 MWh of energy storage
222 capacity, and;
223
 - **Improved reliability during generation shortfalls:** by launching the Customer
224 Battery Energy Sharing (“CBES”) initiative to aggregate customer home batteries
225 to provide system support during known generation shortfall events. By October
226 2025, CBES had over 80,000 participants reliably providing up to 65 MW of
227 response over 4-hour events during the summer of 2025.
228

229 ~~A.~~ V. Existing Transmission System

230 Q.17 Please describe the existing transmission system.

231 A. Puerto Rico's electric transmission system includes approximately 424 miles of
232 230kV, 711 miles of 115kV and 1,563 miles of 38kV transmission lines and 299
233 substation sites spread across eight transmission planning zones spanning the Island.

234 **Q.18 Please summarize the transmission constraints and critical contingencies on the**
235 **existing system.**

236 A. The detailed technical analysis used to evaluate the performance of the transmission
237 network identified 26 critical contingencies that lead to significant thermal overloads
238 for loss of a single element, and another 17 critical contingencies that lead to
239 significant voltage violations across areas of the Puerto Rico grid. -These thermal and
240 voltage issues are so significant that they can lead to area-wide disturbances; or have
241 ~~been shown~~ historically ~~to cause~~caused cascading failures that can impact large
242 regions of the island. Examples include ~~for~~ a single 115/38kV transformer tripping,
243 multiple elements ~~overload~~overloaded by ~~as much as~~up to 190% of rated capacity,
244 potentially triggering cascading failures ~~of~~in other lines and transformers.

245 **Q.19 Has LUMA conducted a system analysis to assess the adequacy of the existing**
246 **transmission system to withstand natural disasters and overload conditions?**

247 A. ~~Yes~~-LUMA has conducted physical assessments of field assets to ~~determine~~identify
248 those at risk ~~which likely would~~of not ~~withstand~~withstanding high winds ~~in~~during
249 natural disasters. Note that a detailed engineering 'Pole Loading Analysis' would be
250 required to calculate a structure's probability to withstand specified wind speeds;
251 however, visual inspections only identified the at-risk assets that would be highly
252 likely to fail in high winds. -LUMA has also conducted an assessment ~~involving~~that
253 included extensive load-~~flow~~ simulations, including 982 N-1 and 77,006 N-1-1

254 contingencies. These simulations evaluated the transmission system’s performance
255 under various operational scenarios and identified potential vulnerabilities. The
256 contingencies consider a broad listing of equipment ~~types~~types, including
257 transmission line segments, substation transformers, generators, buses, breakers, and
258 other equipment. The guidance in LUMA’s Transmission Planning Criteria
259 document ~~are~~is derived directly from the North American Reliability Corporation
260 (“NERC”) Transmission Planning (TPL 001-05) active standard for transmission
261 planning entities.

262 ~~B.~~ **VI. Existing Distribution System**

263 **Q.20 Please describe the existing distribution facilities.**

264 A. Puerto Rico’s electric distribution system includes 342 distribution substations that
265 supply loads to 1,127 distribution circuits (also referred to as feeders). -The source of
266 the substation is fed from either 115 or ~~38kV~~38 kV transmission, and the load side of
267 substations and feeders are energized at one of five primary voltage levels: 13.2 kV,
268 8.32 kV, 7.2 kV, 4.8 kV or 4.16 kV. LUMA manages six operational regions across
269 Puerto Rico: Arecibo, Bayamón, Caguas, Mayaguez, Ponce and San Juan. Section 5.1
270 of Appendix 1 ~~provides a description~~describes of the existing distribution system.

271 **Q.21 Please summarize the existing distribution system’s ability to accommodate
272 incremental penetration of distributed generation and its ability to receive new
273 loads over time.**

274 A. LUMA has worked to incorporate and mitigate the impact of distributed energy
275 resources (“DERs”) on Puerto Rico’s system through both corrective action and
276 forward-looking strategies. On one hand, LUMA continues to identify required

277 upgrades, such as service transformers, voltage regulators and thermal capacity
278 improvements. On the other hand, a proactive approach is being implemented through
279 the adoption of Smart Inverter Settings, aligned with Institute of Electrical and
280 Electronics Engineers (IEEE-2018-) -1547 standard. These settings were developed
281 through robust stakeholder engagement ~~and were,~~ informed by operational data and
282 system simulations; and are designed to improve grid stability and reliability.

283 However, LUMA is quickly approaching the physical and technical ~~limit~~limits of the
284 distribution system to accommodate incremental distributed generation.— Without
285 significant intervention, the distribution grid will collapse under the current pace of
286 interconnections. This means that LUMA will be unable to manage system voltage,
287 control thermal loads, and ensure the safety and reliability of the distribution circuit
288 infrastructure.

289 The safety aspect of this condition is significant. The presence of customer-owned
290 generation throughout the distribution system means de-energized conditions can no
291 longer be assumed during outages or maintenance activities, as DERs could potentially
292 continue to provide power to isolated portions of the system. This situation places
293 service personnel— and even customers at an increased level of risk due to unexpected
294 energization and limits LUMA’s ability to verify that these areas are free from all
295 energy sources prior to performing repairs. As penetration rises, so does the
296 operational complexity of managing these conditions safely.

297 **Q.22 Has LUMA conducted a system analysis to assess the adequacy of the existing**
298 **distribution system to withstand natural disasters and overload conditions?**

299 A. Yes. The analysis reveals that portions of the network are well equipped to withstand

300 natural disasters (e.g., those with underground or covered conductors and rebuilt
301 infrastructure). However, it also reveals that a large portion of the network is very
302 exposed to natural disasters. The analysis also reveals that a significant number of
303 circuits and circuit sections are experiencing thermal overloads and ~~need to be~~
304 ~~rebuilt~~require rebuilding to accommodate existing and planned future growth.

~~C.~~ **VII. Advanced Grid Technologies**

306 **Q.23 Please describe the current state of advanced grid technologies employed on the**
307 **existing T&D system.**

308 A. LUMA is in the process of advancing its grid modernization efforts by deploying
309 automated switchgear, fault sensors, and advanced monitoring technologies across its
310 distribution and transmission systems to enhance reliability and resilience. The
311 program includes the installation of three-phase and single-phase smart reclosers with
312 microprocessor-based controllers, enabling remote monitoring and control via
313 Supervisory Control and Data Acquisition (“SCADA”), as well as the deployment of
314 communicating Fault Circuit Indicators (“FCIs”) to improve fault location accuracy
315 and ~~speed up~~expedite service restoration. The initiative also involves upgrading
316 outdated protection devices and implementing feeder automation schemes that allow
317 for automatic isolation and restoration of feeder segments, thereby minimizing
318 outages. Additionally, LUMA is integrating advanced sensor technologies such as
319 Phasor Measurement Units (“PMUs”) to provide high-speed, synchronized data for
320 real-time system monitoring, event analysis, and support for renewable energy
321 integration. These technologies are being deployed in substations, on feeders, and as
322 part of microgrid projects in Vieques and Culebra, where they will enhance situational

323 awareness, power quality monitoring, and operational flexibility. Collectively, these
324 efforts are designed to create a more reliable, efficient, and future-ready electric grid
325 for Puerto Rico.

326 **Q.24 Does LUMA have plans to expand the integration of advanced grid**
327 **technologies?**

328 A. Yes. As of September 2025, LUMA has ~~already~~ installed a total of 308 three-phase
329 reclosers and 674 single-phase reclosers under its distribution automation initiative,
330 impacting 156 distribution feeders. LUMA has plans to deploy over 13~~-thousand,000~~
331 single-phase reclosers and over 3~~-thousand-three,000~~three-phase reclosers by FY2035.
332 Additionally, LUMA has already installed thousands of FCIs and plans to continue
333 expanding this deployment through 2029, with optimal device placement determined
334 by reliability studies.

335 **Q.25 Are there any other conclusions you would like to draw from the existing T&D**
336 **System?**

337 A. Yes. Puerto Rico is at a critical juncture where the ~~policy~~policies, laws and regulations
338 ~~impacting that impact~~ the integration of distributed renewable energy systems must be
339 updated to reflect the pace and volume of existing conditions, and to allow for the
340 hardening of the grid to accommodate these installations before future installations are
341 deployed. LUMA stands ready to support accelerated deployment of customer owned
342 resources, but the balanced approach must include: (a.) enabling customer
343 technologies and leveraging their capabilities like smart inverter settings, (b.)
344 protecting the grid from physical damage so safety and reliability are available to all

345 customers, and (c.) ensuring costs are equitably assigned to protect the affordability
346 of both technology adopters and non-participants alike.

347 ~~VI.~~VIII. **PLANNED TRANSMISSION AND DISTRIBUTION FACILITIES**

348 ~~Q.26~~ Q.26 **Please describe the electric transmission and sub-transmission facilities**
349 **planned to be installed during the 2025 IRP planning period.**

350 **A.**—The electric transmission and sub-transmission facilities in LUMA infrastructure
351 plans during the 2025 IRP planning period can be divided into two categories: (1)
352 those that were developed prior to commencement of the 2025 IRP; and (2) those
353 that arise from the selection of the Preferred Resource Plan.

354 With respect to the first category, Appendix 1 outlines LUMA’s comprehensive five-
355 year strategy to enhance Puerto Rico’s transmission and sub-transmission
356 infrastructure, driven by: (a.) System Stabilization efforts to restore out-of-service
357 transmission and substation infrastructure, and (b.) findings from the 2025
358 Transmission Planning Assessment. The assessment identified a range of projects to
359 address reliability, resilience, and the integration of renewable energy, including the
360 construction of new transmission lines, reconductoring to increase the capacity of
361 existing lines, restoring additional facilities to service, rebuilding and reconfiguring
362 substations, and adding and restoring out-of-service transformers.

363 Extensive load flow simulations and contingency analyses (N-1 and N-1-1) were conducted
364 to ~~pinpoint~~identify system vulnerabilities and thermal or voltage violations ~~under~~across
365 various operational scenarios, including natural disasters and peak loading conditions. Key
366 planned transmission line rebuild projects are listed in Section 4.3.4. which are anticipated to
367 utilize FEMA funding. Additionally, \$89.6-\$129M have been requested in an ongoing Rate
368 Case Filing for the next three fiscal years to address the thermal overloads and voltage

369 violations needing immediate mitigation. No new substations were proposed as a result of the
370 2025 Transmission Planning assessment.

371 With respect to the second category of planned transmission projects to support the Preferred
372 Resource Plan, these will be identified concurrent with LUMA's PSS®E analysis, which ~~will~~
373 ~~be~~was filed with the Energy Bureau on November 21, 2025.

374 **Q.27 Please describe the planned changes in approach, practice, and design of the**
375 **distribution system over the 2025 IRP planning period.**

376 A. As with LUMA's proposed changes to the transmission system, the changes to the
377 distribution system fall into two categories: (1) those planned before release of the
378 2025 IRP; and (2) those needed as a result of the Preferred Resource Plan selected in
379 the 2025 IRP. With respect to the first category, the planned changes span substation
380 and feeder rebuilds, automation, reliability upgrades, and targeted infrastructure
381 improvements, as detailed below:

382 • Substation Rebuilds and Upgrades: The Substation Rebuild program focuses on
383 the rebuilding of existing substations that are in poor physical condition, the
384 rebuilding of substations with a history of operational deficiencies, the
385 mitigation of flood risk where applicable, and the relocation of substations with
386 a high risk of flooding when flood mitigation alone is not an option.

387 • Substation Reliability: This program will reinforce and upgrade existing system
388 infrastructure to improve reliability, including replacing aging transformers, oil
389 circuit breakers, distribution circuit breakers, other high-voltage equipment,
390 alternating current/direct current (AC/DC) systems, standby generators, relays,

391 remote terminal units, and auxiliary systems. It will also include protection and
392 control upgrades and procurement of emergency spares.

393 • Distribution Line Rebuilds: The Distribution Line Rebuild program focuses on
394 rebuilding distribution feeders with poor reliability performance and those that
395 serve critical power facilities, targeting the worst-performing feeders first. This
396 program will result in significant ~~system~~short-term improvements ~~in the short~~
397 ~~term~~ and incremental improvements ~~for~~over the remainder of the remaining
398 program ~~duration~~.

399 • Distribution Pole and Conductor Repair: This program focuses on minimizing
400 ~~the~~ safety hazards caused by distribution poles, equipment, and conductors that
401 ~~must be repaired~~require repair or ~~replaced~~replacement. Major repairs and
402 ~~replacement~~replacements will be based ~~upon~~on the results of assessments of the
403 distribution system and on an analysis by engineers to schedule ~~the~~ repair or
404 ~~replacement~~replacements based on the ~~structure~~structure's criticality. Following
405 this process, safety hazards and priority poles will be replaced, along with
406 damaged equipment, conductors, and hardware.

407 • Distribution Automation: This program involves deploying automated
408 switchgear and fault sensors on distribution feeders to improve grid reliability.
409 It will take place as part of LUMA's efforts to enhance system performance
410 through remote operations, fault detection, and faster service restoration,
411 utilizing advanced communication tools and system analysis.

412 • Distribution Grid Reliability: This program focuses on reducing outages,
413 improving response times, and ensuring the delivery of safe and reliable

414 electricity to customers. Assessing the worst performing feeders, targeting
415 localized reliability concerns, and performing reliability system upgrades, such
416 as integrating FCIs and fuse coordination are the three main drivers of this
417 program.

418 ~~Distribution Streetlighting: This program deals with upgrading and replacing
419 distribution streetlights that are a physical and safety hazards scheduled for repair or
420 replacement based on their criticality. Along with increasing the number of
421 distribution streetlights in service, this process will include light emitting diode
422 (“LED”) replacements and geographic information system (“GIS”) data entry of all
423 streetlights.~~

424 ~~The second category of planned distribution changes will be identified
425 concurrent with LUMA’s PSSE analysis, which will be filed with the Energy Bureau
426 on November 21, 2025.~~

427 ~~LUMA did not conduct a distribution-system analysis for the PRP because DPV and
428 EV charging installations are driven entirely by customer choice and therefore cannot
429 be forecast with the location- specific detail required for a meaningful assessment. The
430 distribution system is already nearing technical limits due to increasing distributed
431 generation. Given the absence of necessary data and the impracticality of performing
432 a detailed analysis without knowing resource locations, LUMA has requested a waiver
433 of the requirement to complete the distribution analysis.~~

434 ~~**VII.IX. TRANSMISSION AND DISTRIBUTION SYSTEM ANALYSIS**~~

435 **Q.28 Please describe the transmission system standards LUMA adheres to.**

436 A. LUMA’s transmission system standards are covered in two documents – (i.)
437 Transmission Planning Criteria and (ii.) LUMA Transmission Design Criteria and
438 Manual. The Transmission Planning Criteria document is derived from the NERC
439 reliability standards and incorporates best practices from other Regional Reliability
440 Organizations. The Transmission Design Criteria document provides the physical and
441 structural requirements for designs to meet or exceed current American Society of
442 Civil Engineers (“ASCE”) and Institute of Electrical and Electronics Engineers
443 (“IEEE”) codes and standards, ~~which include~~including wind loading and other
444 parameters such as ground and ~~structure~~structural clearances. These two together
445 ensure that transmission network performance meets essential reliability and
446 applicable codes and standards.

447 **Q.29 Is the transmission system that LUMA inherited in compliance with those**
448 **standards?**

449 A. No. As discussed previously, transmission planning criteria is not met, as 26 critical
450 contingencies produce thermal violations and 17 critical contingencies produce
451 widespread voltage violations.- Also, present transmission design criteria ~~was~~were not
452 the standard in place at the time when most transmission facilities were constructed, so
453 poles, structures, and associated infrastructure do not meet current codes and standards
454 today. For example, Act 17 - 2019 requires wind loading of 155 mph, but very few
455 transmission structures are designed or built to this existing requirement.

456 **Q.30 Did LUMA conduct a system stability analysis of the T&D system?**

457 A. Yes. The discussion and results of the System Stability Analysis are located in Section
458 7.0 of Appendix 1.

459 **Q.31 What thermal and voltage reliability issues were identified in the T&D systems?**

460 A. For the “as operated” transmission system, 26 critical contingencies cause major
461 overloads on neighboring transmission facilities, with overloads greater than 190% of
462 a line rating in some cases. These cause cascading overloads ~~of on~~ other facilities ~~that~~
463 ~~can result~~ resulting in regional or island-wide instability and outages. Additionally,
464 another 17 critical contingencies cause major voltage disturbances that can impact
465 regions or lead to island-wide instability and outages. Due to the sensitive nature of
466 these facilities, LUMA requests ~~to treat that~~ these critical contingencies be treated as
467 CEII.- Transmission analysis concludes that the Puerto Rico grid is not in compliance
468 with NERC Transmission Planning standards for system performance.

469 Distribution substation analysis discussed in Section 5.3.1 identified 25
470 distribution substations at a loading of 90% of the ~~transformer~~ transformer’s maximum
471 thermal loading or higher.- When including already requested new business customers,
472 an additional 22 transformers would exceed 90% or more of the
473 ~~transformer~~ transformer’s maximum thermal loading or higher. This means that
474 significant increases in transformer capacity ~~increases~~ or new distribution substations
475 will be required over the 3-year and 10-year investment planning horizons.

476 Distribution circuit analysis discussed in Section 5.3.1 identified approximately
477 304 of 1,127 circuits with notable voltage violations ~~due,~~ especially due to night-time
478 and evening peaks in hot summer months, and 164 circuits with thermal overloads.

479 **Q.32 Are there specific issues on the distribution system with respect to DER**

480 integration? .

481 A. Yes, it was also found that DER and the bi-directional flows during daytime, and
482 during lightly loaded shoulder months ~~also~~ contribute to violations in 660 feeders,
483 split into 285 voltage issues, and 638 thermal issues including service transformer
484 overloads and primary circuit conductors in neighborhoods across the island. -Note,
485 the timeframe of study for DER and PV injection impacts (light load, often in
486 February – April) and mid-day load and generation levels means that these violations
487 are mostly unique from the evening peak thermal and voltage violations that occur
488 when PV is not producing, and demand is high, especially in the summer months
489 (June – October). Beyond their impact on system performance metrics, sustained
490 thermal overload and persistent voltage excursions of this nature carry direct safety
491 consequences that go beyond ordinary grid reliability concerns. Most critical is the
492 risk of unintentional islanding. This is a condition where portions of the distribution
493 system remain energized by customer-owned DERs even after being electrically
494 isolated from the main system. Although current interconnection regulations include
495 anti-islanding requirements, the sheer volume and geographic density of DERs
496 across the system has significantly increased the complexity of verifying de-
497 energized conditions in the field. The decentralized and uncontrolled nature of
498 interconnection severely limits LUMA’s ability to have full visibility for control or
499 isolation of all potential sources of energy in a given work area, placing crews,
500 emergency responders and even customers at risk of encountering feeders (or lines)
501 that appear to be deenergized, but remain live due to DER injection. At the same
502 time, the proliferation of inverter-based resources, such as DERs, is reducing

503 conventional short-circuit levels, distorting conventional protection schemes and
504 increasing the potential for missed fault detection. These conditions reinforce the
505 urgency of prudent regulatory revisions that explicitly address these challenges and
506 impact safety and reliability.

507
508 **Q.32 Q. 33 What potential transmission, distribution, and substation improvements**
509 **are planned to increase reliability and meet minimum ~~transmission~~ standards?**

- 510 A. As discussed above, LUMA’s investment strategy is driven by strategic pillars of
511 system stabilization and asset replacements to improve public and worker safety and
512 equipment and community support, reliability and resilience improvements to address
513 the worst reliability impacts first and harden the grid against resilience threats, while
514 supporting regulatory and community objectives of driving deep decarbonization and
515 supporting distributed energy integration. The activities in the System Stabilization
516 plan include, but are not limited to, restoring out of service transmission lines,
517 ~~restoring out of service~~and substation transformers, deploying grid automation devices
518 and enabling technologies ~~likesuch as~~ information technology and
519 telecommunications investments ~~and enabling technologies like, including~~ substation
520 relays and remote terminal units. -These will have the near-term impact of improving
521 reliability, but facilities ~~likesuch as~~ transmission lines will not be upgraded to
522 withstand higher wind speeds (as only necessary ~~structure~~structural installations
523 ~~necessary~~ to return the lines to service are being implemented).
- 524 LUMA also has requested funding in an active Rate Case (NEPR-AP-2023-0003) to
525 begin addressing high priority capacity constrained transmission and distribution

526 circuit thermal and voltage violations, as well as emergent safety and reliability risks
527 due to DERs.

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528 **VIII.X. TRANSMISSION & DISTRIBUTION IMPLICATIONS OF THE**
529 **PREFERRED RESOURCE PLAN**

530 **Q.33 Q.34** What is your understanding of the requirements for the portion of the
531 **T&D System Planning section of the 2025 IRP that you are sponsoring?**

532 A. With respect to the T&D System section of the 2025 IRP Report, LUMA followed the
533 requirements set forth in Section 2.03(J)(2)(e) of Regulation 9021. This section
534 requires the 2025 IRP to document the T&D implications of the PRP, including
535 assessing if an assessment of whether the PRP requires incremental T&D mitigation or
536 changes.

537 **Q.34 Q.35** Did LUMA receive any clarifications regarding the Energy Bureau's
538 **expectation for LUMA's 2025 IRP fulfilling the T&D requirements in**
539 **Regulation 9021?**

540 A. Yes. On April 15, 2024, the Energy Bureau issued a Resolution and Order in this case,
541 granting a portion of LUMA's request for a waiver of certain specific requirements in
542 Regulation 9021 and denying LUMA LUMA's request for waivers to other
543 requirements. In addition, in this R&O, the Energy Bureau clarified that: LUMA
544 cannot provide information it does not have.

545 **Q.35 Q.36** What portion of the T&D system analysis of the implications of the PRP
546 **does your testimony address?**

547 A. As noted above, my testimony addresses the existing state of the T&D system, which
548 was used as inputs input into the analysis of the PRP's impacts to on the transmission

549 system (addressed by LUMA witness Ajit Kulkarni). My testimony also addresses the
550 analysis of the PRP implications on the distribution system.

551 ~~Q.36~~ **Q.37** What analysis did LUMA perform to assess the implications of the PRP
552 on the distribution system?

553 A. LUMA did not complete a comprehensive analysis of the implications of the PRP on
554 the distribution system. The inclusion of distributed photovoltaic (DPV) and electric
555 vehicle (EV) charging installations in the PRP ~~represent~~reflects forecasts of customer
556 choices for these installations ~~that, which~~ are not under ~~the~~LUMA's control ~~of LUMA~~
557 and are driven solely by customer choice. Therefore, the location and quantity of the
558 distributed resources ~~is not within~~are outside LUMA's planned resource deployment
559 ~~but~~and must be addressed reactively ~~addressed according to present~~in accordance with
560 current laws and regulations.

561 LUMA has developed recommended smart-inverter settings whose adoption
562 is imperative to improve near-term distribution circuit voltage performance under
563 normal conditions; and ~~also~~to support transmission grid stability by ~~having~~enabling
564 inverters to respond to grid frequency and grid voltage disturbances; however, these
565 recommended ~~smart inverter~~ settings require PREB action to implement. LUMA re-
566 iterates again, ~~as stated in response to question 22~~ that the system is already quickly
567 approaching the physical and technical limit of the distribution system to
568 accommodate incremental distributed generation (evidenced by the prevalence of DG
569 related high voltages, distribution transformer and circuit thermal overloads being
570 identified, and volume of repairs and upgrades that are being newly driven by DPV).
571 These items will need to be considered in any implementation plan to execute the

572 improvements needed for a reliable grid that meets minimum industry requirements.
573 Given the impossibility of performing a detailed distribution system analysis of the
574 PRP without knowing where on the system the resources may be placed, and the
575 waivers and clarifications granted by the Energy Bureau in its R&O of April 15,
576 2024, which recognized and waived LUMA's ability to comply with Regulation
577 9021 when it did not possess the required data, LUMA has requested the Energy
578 Bureau to waive the requirement of completing the distribution analysis of the PRP.

579 ~~Q.37~~ Q.38 Does this conclude your direct testimony?

580 A. Yes.

ATTESTATION

Affiant, ~~Daniel Haughton~~Pedro A. Meléndez-Meléndez, being first duly sworn, states the following:

The prepared Direct Testimony that I am sponsoring constitutes my Direct Testimony in the above-styled case before the Puerto Rico Energy Bureau. I would provide the answers set forth in the Direct Testimony if asked the questions included in the Direct Testimony. I further state that the facts and statements provided herein are my Direct Testimony and, to the best of my knowledge, are true and correct.

~~Daniel Haughton, Ph.D. SMIEEE~~Pedro

A. Meléndez-Meléndez

Affidavit No. ____

Acknowledged and subscribed before me by ~~Daniel Haughton~~Pedro A. Meléndez-Meléndez, in his capacity as ~~Planning and Renewables Integration Director of~~Chief Capital Programs & Grid Transformation Officer at LUMA Energy ServCo, LLC, of legal age, married, and resident of San Juan, Puerto Rico, who is personally known to me.

In San Juan, Puerto Rico, this ~~20th~~ th day of ~~November 2025~~April 2026.

Notary Public