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

IN RE: OPTIMIZATION PROCEEDING OF MINIGRID TRANSMISSIONS AND DISTRIBUTION INVESTMENTS	**CASE NO.:** NEPR-MI-2020-0016 **SUBJECT:** Questions for Stakeholders

INDEPENDENT CONSUMER PROTECTION OFFICE
ANSWERS TO QUESTIONS (1-4) FOR STAKEHOLDERS

TO THE PUERTO RICO ENERGY BUREAU:

COMES NOW, INDEPENDENT CONSUMER PROTECTION OFFICE ("ICPO"), through its Executive Director, and respectfully submit answers to Questions 1-4 for Stakeholders pursuant PREB's Resolution dated March 24, 2021:

1. On December 22, 2020, the Energy Bureau of the Puerto Rico Public Service Regulatory Board ("PREB" or "Energy Bureau") issued a Resolution and Order through which it initiated the referenced case to commence the Optimization Proceeding described in the IRP Final Order of August 24, 2020. As part of the December 22, 2020 Resolution, the PREB scheduled an initial two-day Technical Workshop, open to all stakeholders and PREPA. On March 24, 2021, the PREB issued a Resolution including several questions with the purpose of gathering input form PREPA and stakeholders. In said Resolution, the PREB required that answers by PREPA and stakeholders to questions 1 to 4 be filed within four (4) weeks from the notification date of the same.

2. As required by the PREB, herein the ICPO provides general comments and its answers to questions 1-4.

GENERAL COMMENTS

- Underground wires do not necessarily increase resilience. Underground wires will be less prone to damage by extreme winds and rain events; however, they will be more susceptible to seismic and flooding events, depending on the soil characteristics and how susceptible to area is to flooding. Repairing an underground wire system takes more time than an overhead system type. Therefore, recovery time and hence resilience may be easier to attain with overhead wiring rather than underground alternatives. During underground wiring recovery repairs, critical loads have to be supplied by other means that may include microgrids or standalone DER solutions.
- Distribution lines are radial by design, making switching interchange to supply loads by alternative available routes very limited compared with the transmission network.
- All investment in T&D should consider maintenance operations constraints, such as accessibility and right of way favorable conditions now and in the foreseeable future based on past cultural behavior, in order to avoid unfavorable future conditions.

QUESTIONS 1-4:

-QUESTION # 1:

Q: Refer to table 1. – Exhibit 2-9 (PREPA response to Appendix B questions of December 22 Resolution), below. There are thirteen (13), 115 kV new underground projects listed. Five are within the San Juan/Bayamon region.

a. State specifically which projects make up what is referred to as the "San Juan underground loop" in the FEMA infrastructure filling/report.

Currently in public PREPA documentation, the underground transmission lines loop goes from Palo Seco Steam Plant to Bayamon TC, Monacillos, Venezuela, Martin Peña, Viaducto, Isla Grande, and San Juan Steam Plant, and is closed at Palo Seco Steam Plant. As Table 1 shows, the underground loop in San Juan will be extended to Berwind and Sabana Llana to the east, and Hato Tejas TC and Dorado TC to the west.

b. Describe the San Juan underground loop project and why it is needed.

If hardening the San Juan loop project is necessary, making it partially or completely underground, will depend on more detailed studies at the site route. We recommend the PREB request PREPA proof that those studies have been done and that they support acceptable risk levels of damages on those lines due to seismic or flooding events.

c. Of these 13 projects, which are most critical for overall transmission reliability in the San Juan / Bayamon and adjoining regions under extreme weather event conditions?

Most critical may be the following two projects.

1. **The underground line from Palo Seco Steam Plant to Hato Tejas TC and then up to Dorado TC can provide options to supply power to the west from the metro area generation plants or bring power to the metro area from power plants to the west, depending on contingency circumstances. For example, San Juan and Palo Seco power plants are close to each other; therefore, the probability of impaired ability to generate or to supply power caused by the same kind of weather or seismic event may be higher than for a generation source to the west or even south from Caguas TC as an addition to harden San Juan area.**

2. **The other most critical project is completion of underground loop with Sabana Llana and Berwind. Sabana Llana had a 20 MW BESS system in the nineties to support Volt/Freq regulation. If the feasibility assumptions were right at that time, and still valid today, it may be a suitable to be one of the first modern BESS facilities to be integrated to the system.**

d. As best as able, provide a priority order ranking of importance for these projects.

N/A

e. Provide further additional explanation as warranted to support the priority ranking.

N/A

f. Are any of these 13 projects required to support operations under "blue sky" conditions? If so, explain why for each project.

All projects have to be available to "blue sky" conditions to ensure continued service, lower line losses, and facilitate maintenance process and schedule. All that should be done with the fewest service interruption events with the shortest duration possible. In addition, these improvement will allow more flexibility to wheeling services and microgrids or community solar arrangements.

g. Explain the relative importance of the last three projects, #14-16, in comparison to the new underground possible projects.

The last three projects will harden the lines that connect south and west generation with the north generation.

Table 1.- PREPA response to Appendix B

Per Exhibit 2-9: New Lines (OH & UG): 16 Projects ~ 141 miles					Region
ID	Project	Miles	Cost Estimate: 10 YR PLAN	M$/mi	
1	New 115 kV Underground Circuit Vega Baja TC – Manati TC @2750 kcmil Cu XLPE	6.78	$ 98.95	$ 14.59	Arecibo
2	New 115 kV Underground Circuit Cambalache TC – Barceloneta TC @2750 kcmil Cu XLPE	8.46	$ 123.46	$ 14.59	Arecibo
3	New 115 kV Underground Circuit Palo Seco Steam Plant –Hato Tejas TC - Dorado TC @2750	10.88	$ 158.78	$ 14.59	Bayamon
4	New Underground Line 115 kV Yabucoa TC- Humacao TC @ 2750 kcmil Cu XLPE	2.50	$ 32.29	$ 12.92	Caguas
5	Underground 115 kV Line Yabucoa TC - Sun Oil - Juan Martin Sect @ 2750 kcmil Cu	5.12	$ 74.72	$ 14.59	Caguas
6	New 115 kV Underground Circuit Juncos TC – Caguas TC- Bairoa TC @2750 kcmil Cu XLPE	9.17	$ 118.43	$ 12.92	Caguas
7	New 115 kV Underground Circuit Humacao TC - Juncos TC @ 2750 kcmil Cu XLPE	10.60	$ 136.90	$ 12.92	Caguas
8	New 115 kV Underground Circuit Daguao TC – Fajardo TC@ 2750 kcmil Cu XLPE (manhole to	10.16	$ 148.32	$ 14.60	Carolina
9	New 115 kV Underground Circuit Canóvanas TC – Palmer TC@2750 kcmilCu XLPE	11.00	$ 160.53	$ 14.59	Carolina
10	Line 40500 extension to Interconnect Venezuela TC GIS @2750 kcmil Cu XLPE	0.68	$ 8.79	$ 12.92	San Juan
11	New Underground 115 kV Line Martin Peña GIS - Berwind TC @ 2750 kcmil Cu XLPE	6.60	$ 85.24	$ 12.92	San Juan
12	New Underground 115 kV Line Sabana Llana TC- Berwind TC @ 2750 kcmil Cu XLPE	2.70	$ 34.87	$ 12.92	San Juan
13	New 115 kV Underground Circuit Caguas TC/Bairoa TC – Monacillo TC @2750 kcmil Cu XLPE	10.59	$ 154.55	$ 14.59	San Juan
14	Construction of 115 kV Line 37800 for Bairoa TC @ 1192.5 kcmil ACSR	1.55	$ 4.29	$ 2.77	Caguas
15	New 115 kV Line Hatillo TC - Mora TC @1192.5 kcmil ACSR Bunting	17.33	$ 47.93	$ 2.77	Arecibo
16	New 115 kV Line Costa Sur - Dos Bocas HP @1192.5 kcmil ACSR Bunting @ 230 kV	26.80	$ 74.11	$ 2.77	Isla
		140.92	$ 1,462.17		
		13 UG:	$ 1,335.84		

-QUESTION # 2:

Q: There are more than 100, 38kV undergrounding projects, for roughly 318 miles, listed in IRP Exhibits 23, 35, 43, 51, 61, 69, 83 (and approximately 35 projects in the San Juan/ Bayamón region- see Table 2 below).

a. For the San Juan and Bayamon region projects listed, provide a rough ranking of the projects, or groups of projects, that would be required to serve what PREPA understands to be the densest clusters of feeders or 38 kV – connected critical loads.

N/A

b. Provide additional explanation or support for prioritized 38 kV new underground work.

The primary side of the distribution substations are typically 38 kV; therefore, hardening, and even BESS installation, should be considered in order to help maintain balance of energy stability and supply on the specific local distribution network to which that substation belongs, as well as thorough the Island-wide transmission network.

c. Are any of the 35 projects in the San Juan / Bayamon region required to support operations under "blue sky" conditions? If so, explain why for each project.

Refer to Answer 1F.

d. What is PREPA's best estimate of the total costs of additional distribution system hardening work required to enable delivery of power to critical loads attached to the hardened network or lines resulting for 38 kV undergrounding?

N/A

-QUESTION # 3:

Q: For the 115 kV and 38 kV new underground projects listed in the above questions (San Juan/Bayamon region):

a. Are there clearly identifiable clusters of critical load that in total represent the most densely loaded areas of the San Juan / Bayamon region that could benefit from increased reliability through specific undergrounding projects? If so, please identify those clusters with as much specificity as possible.

The more densely populated or developed the area is, the more relevant wire undergrounding may be to avoid damage from surrounding debris to nearby transmission lines, especially 38 kV and distribution lines, which have less right of way clearance requirements than 115 kV.

b. For those clusters, identify which projects are necessary, in combination, in order to serve the critical load.

N/A

c. Specify the critical loads in question, and the magnitude (confidential response).

N/A

-QUESTION # 4:

Q: Of the 43 substation hardening projects listed in response to Appendix B questions (see Table 3 below):

a. For each project, state with specificity the underlying rationale for the proposed hardening.

Project number 26 of Jobos TC should be re-evaluated to see whether it is relevant or in alignment with the IRP to harden that infrastructure tied to generation assets that are programmed to be retired in the short term.

Project #35 of Yabucoa TC refers to "future generation". That project may need to be re-evaluated with regard their IRP alignment.

b. Which projects are recommended for hardening separate from any consideration of a MiniGrid configuration across the Island? Why?

Projects number 1, 6, 18, 24, 30, 32, 33, and 40 are recommended for hardening because they are also included in the Table: Short Term Priority: HV Lines Per PREPA LUMA alignment process, due to so called "equipment beyond industrial standard useful life leaking or causing failures" from PREPA Motion of Compliance

with March 26 Order of April 14, 2021 document on case number NEPR-MI-2021-0002.

Any other faulty T&D infrastructure that may exist should be a priority as part of the T&D hardening plan.

WHEREFORE, the ICPO respectfully requests that the Energy Bureau take notice of the abovementioned comments and answers to questions 1-4 of its March 24,2021 Resolution.

RESPECTFULLY SUBMITTED, in San Juan, Puerto Rico, this 20th day of April.

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