

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

IN RE: OPTIMIZATION PROCEEDING OF
MINIGRID TRANSMISSION AND
DISTRIBUTION INVESTMENTS

CASE NO.: NEPR-MI-2020-0016

SUBJECT: Questions for Stakeholders.


RESOLUTION

On December 22, 2020, the Energy Bureau of the Puerto Rico Public Service Regulatory Board (“Energy Bureau”) issued a Resolution and Order (“December 22 Resolution”) through which it initiated the instant case to commence the Optimization Proceeding described in the IRP Final Order.¹ As part of the December 22 Resolution, the Energy Bureau scheduled an initial two-day Technical Workshop, open to all stakeholders and the Puerto Rico Electric Power Authority (“PREPA”), primarily to establish the guiding principles and criteria that will be used to select the most cost-effective options for achieving resiliency solutions across Puerto Rico.²

On February 11, 2021, the Energy Bureau issued a Resolution through which it scheduled a series of additional Technical Workshops to further the analysis needed in the instant case.

As part of the process, the Energy Bureau has developed several questions, included as Attachment A to this Resolution, for which it is interested in gathering responses from PREPA and stakeholders. Responses to questions 1-4 shall be filed within **four (4) weeks** from the notification date of this Resolution. Responses to questions 5-11 shall be filed within **three (3) weeks** from the notification date of this Resolution.

Be it notified and published.



Edison Aviles Deliz
Chairman



¹ See Final Resolution and Order, In Re: Review of the Puerto Rico Electric Power Authority Integrated Resource Plan, Case No. CEPR-AP-2018-0001, August 24, 2020.

² December 22 Resolution, pp. 7-8.

Ángel R. Rivera de la Cruz
Associate Commissioner

Lillian Mateo Santos
Associate Commissioner

Ferdinand A. Ramos Soegaard
Associate Commissioner

Sylvia B. Ugarte Araujo
Associate Commissioner

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Bureau has so agreed on March 23, 2021. I also certify that on March 24, 2021 a copy of this Resolution was notified by electronic mail to the following: astrid.rodriguez@prepa.com, fabiola.rosa@prepa.com, marisol.pomales@prepa.com, vilmarie.fontanet@prepa.com, jorge.ruiz@prepa.com, kbolanos@diazvaz.law; jmarrero@diazvaz.law; mario.hurtado@lumamc.com; wayne.stensby@lumamc.com; Ashley.engbloom@lumamc.com; Legal@lumamc.com; margarita.mercado@us.dlapiper.com; Elias.sostre@aes.com; Jesus.bolinaga@aes.com; cfl@mcvpr.com; ivc@mcvpr.com; notices@sonnedix.com; leslie@sonnedix.com; victorluisgonzalez@yahoo.com; jcmendez@reichardescalera.com; r.martinez@fonroche.fr; gonzalo.rodriguez@gestampren.com; kevin.devlin@patternenergy.com; fortiz@reichardescalera.com; jeff.lewis@terraform.com; mperez@prrenewables.com; cotero@landfillpr.com; geoff.biddick@radiangen.com; hjcruz@urielrenewables.com; carlos.reyes@ecoelectrica.com; brent.miller@longroadenergy.com; tracy.deguise@everstreamcapital.com; agraitfe@agraitlawpr.com; h.bobea@fonrochepr.com; ramonluisnieves@rlnlegal.com; hrivera@oipc.pr.gov; info@sesapr.org; yan.oquendo@ddec.pr.gov; acarbo@edf.org; pjcleanenergy@gmail.com; Jmadej@veic.org; nicolas@dexgrid.io; javrua@gmail.com; JavRua@sesapr.org; lmartinez@nrdc.org; thomas.quasius@aptim.com; rtorbert@rmi.org; tjtorres@amscm.com; lionel.orama@upr.edu; noloseus@gmail.com; aconer.pr@gmail.com; dortiz@elpuente.us; wilma.lopez@ddec.pr.gov; gary.holtzer@weil.com; ingridmvila@gmail.com; rstgo2@gmail.com; agc@agcpr.com; presidente@ciapr.org; cpsmith@unidosporutuado.org; jmenen6666@gmail.com; cpares@maximosolar.com; CESA@cleanegroup.org; acasepr@gmail.com; secretario@ddec.pr.gov; julia.mignuccisanchez@gmail.com; professoraviles@gmail.com; gmch24@gmail.com; ausubopr88@gmail.com; carlos.rodriguez@valairlines.com; amaneser2020@gmail.com; acasellas@amgprlaw.com; presidente@camarapr.net; jmarvel@marvelarchitects.com; amassol@gmail.com; jmartin@arcainc.com; melitza.lopez@aep.pr.gov; eduardo.rivera@afi.pr.gov; leonardo.torres@afi.pr.gov; carsantini@gmail.com; directoralcaldes@gmail.com; imolina@fedalcaldes.com; crivera@fedalcaldes.com; LCSchwartz@fbg.gov; thomas@fundacionborincana.org; cathykunkel@gmail.com; joseph.paladino@hq.doe.gov; adam.hasz@ee.doe.gov; Sergio.Gonsales@patternenergy.com; energiaverdepr@gmail.com; Arnaldo.serrano@aes.com; gustavo.giraldo@aes.com; accounting@everstreamcapital.com; mgrpcorp@gmail.com; jczayas@landfillpr.com; auriarte@newenergypr.com;



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I also certify that today, March 24, 2021, I have proceeded with the filing of the Resolution issued by the Puerto Rico Energy Bureau.

For the record, I sign this in San Juan, Puerto Rico, today March 24, 2021.



Sonia Seda/Gaztambide
Clerk



Attachment A Questions to Stakeholders

1. 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 / Bayamón region.
 - a. State specifically which projects make up what is referred to as the “San Juan underground loop” in the FEMA infrastructure filing/report.
 - b. Describe the San Juan underground loop project and why it is needed.
 - c. Of these 13 projects, which are most critical for overall transmission reliability in the San Juan / Bayamón and adjoining regions under extreme weather event conditions?
 - d. As best as able, provide a priority order ranking of importance for these projects.
 - e. Provide further additional explanation as warranted to support the priority ranking.
 - f. Are any of these 13 projects required to support operations under “blue sky” conditions? If so, explain why for each project.
 - g. Explain the relative importance of the last three projects, #14-16, in comparison to the new underground proposed projects.

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 Dagua 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 Martín 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

2. There are more than 100, 38 kV 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 Bayamón 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 feeder or 38kV-connected critical loads.
 - b. Provide additional explanation or support for prioritized 38 kV new underground work.



- c. Are any of the 35 projects in the San Juan / Bayamón region required to support operations under “blue sky” conditions? If so, explain why for each project.
- 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 from 38 kV undergrounding?



Table 2.- 38 kV New Underground Proposed Projects – San Juan and Bayamón Regions

Project Description	Region	Technical Justification	Miles	Total Cost in Millions
Underground Line 3500 46 kV Circuit Caparra Sect. – Cachete Sect. – Las Lomas Sect. – Monacillo TC @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	4.2	18.3
Baldrich Sect. 46 kV GIS (including interconnection to new underground to Auxilio Mutuo)	San Juan	Interconnection of Critical Loads	-	15.1
New Underground Line 46 kV M. Peña GIS - Villamar Sect. @ 2000 kcmil Cu	San Juan	Interconnection of Critical Loads	3.7	14.4
New Underground Line Segment 46 kV Hato Rey TC - San Juan Medical Center Sect. @ 2000 kcmil Cu	San Juan	Interconnection of Critical Loads	3.2	12.6
Underground 46 kV Line 4300 Caparra Sect - Juan Domingo Sect. - Bayamón TC @ 2-800 kcmil Cu	San Juan	Minigrd Backbone Extensions to Create H	2.5	10.9
New Underground Line 46 kV Venezuela TC - Fonalledas - San Juan Medical Center Sect. @ 2000 kcmil Cu	San Juan	Interconnection of Critical Loads	2.5	9.9
New Underground Line 46 kV Line Planta San Juan - New Crematorio 46 kV Sect. @ 2-800 kcmil Cu (linea expreso)	San Juan	Interconnection of Critical Loads	1.7	8.2
Underground Line 10100 Las Lomas Sect - ACB10133/10131 (Suiza Dairy) - Reparto Metropolitano TO @ 2-800 kcmil Cu (includes underground of line tap to	San Juan	Interconnection of Critical Loads	1.7	7.6
Underground 46 kV Line 15300 Berwind TC – Los Angeles Sect. @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	1.7	7.6
New Underground Line 46 kV Monacillo TC - San Juan Medical Center Sect. @ 2000 kcmil Cu	San Juan	Interconnection of Critical Loads	1.9	7.2
New Underground Line New Crematorio 46 kV Sect. - AAA (subs 1572) - SAM's (sub 1571) @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	1.5	6.6
Underground subtransmission system and circuits for internal facilities at San Juan Medical Center @ 2-800 kcmil Cu (includes integration of critical loads	San Juan	Interconnection of Critical Loads	1.2	5.3
New Underground 46 kV Line Venezuela TC – Auxilio Mutuo – Baldrich Sect. @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	1.1	4.8
Underground Line 3300 Viaducto TC - Egozcue Sect. @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	0.8	3.6
New Underground 46 kV Line Fonalledas Sect. GIS - Hosp. El Maestro 2-800 kcmil (ACB 89298)	San Juan	Interconnection of Critical Loads	0.7	3.1
New Underground 46 kV Line San Juan Medical Center Sect. - 8900 Tap Americo Miranda @ 2-800 kcmil Cu (includes integration of critical loads to new loo	San Juan	Interconnection of Critical Loads	0.7	2.9
Interconnection/Sectionalizing Underground 46 kV Line 6300 to Isla Grande TC GIS @ 1-800 kcmil Cu	San Juan	Minigrd Backbone Extensions to Create H	0.7	2.6
Underground Line 10600 Viaducto TC - Villamil Sub. @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	0.5	2.2
Underground 46 kV Circuit Las Lomas Sect. GIS – Hospital Metropolitano (ACB 10101) @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	0.3	1.5
New Underground 46 kV Line New Trujillo Alto 46 kV Sect. - Sergio Cuevas Substations @ 1-800 kcmil Cu	San Juan	Interconnection of Critical Loads	0.3	1.0
New Underground 46 kV Line Vega Baja TC - Hospital Wilma Vazquez - Walmart - Ortho - Manati TC @ 2-800 kcmil Cu	San Juan	Interconnection of Critical Loads	4.7	20.7
Underground 46 kV Line 7800 Dorado TC - New Dorado Pueblo Sect. @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	3.4	15.1
New Underground 46 kV Line Dorado TC - ACB 10729 (Walmart) - Holsum - AAA Sub. 9384 - Sub. 9368 (Pepsi) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	3.1	13.6
Underground 46 kV Line 9400 Dorado TC - Toa Alta Sub. 9401 @ 2-800 kcmil Cu (backup shall be provided by hardened tap from hardened line 2200 Dorado	Bayamón	Interconnection of Critical Loads	2.5	11.1
Underground 46 kV Line 4300 Bayamón TC - Juan Domingo Sect. - Caparra Sect. @ 2-800 kcmil Cu	Bayamón	Minigrd Backbone Extensions to Create H	2.5	10.9
New Underground 46 kV Circuit Bayamón TC – Cataño Sect. @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	2.1	9.3
New Underground 46 kV Circuit P. Seco - AAA (New ACB between 9501C and Sub. 1883) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	1.8	8.1
New Underground 46 kV Line Guaruao Sect. - Pan Pepin - AAA Superacueductos - COSTCO @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	1.6	6.8
New Underground 46 kV Circuit Cataño Sect. - Centro Medico Carcel/Carcel Regional (New ACB between 9503C and 9503D) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	1.4	6.0
Underground of 46 kV Line 4300 Bayamón TC – Hosp. San Pablo (ACB 4301) – Bayamón Pueblo Sect. @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	1.4	6.0
New Underground 46 kV Circuit Cataño Sect. - Zona Industrial Goya (New 3 Way GOABs between 9623A and 96078) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	1.4	5.9
New Underground 46 kV Short Line New Cana TC - New Rexville Zone (Big Kmart, Home Depot) with backup from aerial 4000 tap to avoid unnecessary out	Bayamón	Existing Infrastructure Hardening for Relia	1.4	5.6
Complete Underground 46 kV Line 4900 Bayamón Pueblo Sect. – ACB 4905B (Plaza del Sol, H. Depot, Walmart) @ 2-800 kcmil Cu (extender el soterrado exi	Bayamón	Interconnection of Critical Loads	1.0	4.3
Underground Line 6200 Cataño Sect - Puma Energy (Sub. 1771) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	0.8	3.3
Underground 46 kV Line 8200 Cataño Sect - ACB 8215A (Sub. 1882, Claro) @ 2-800 kcmil Cu	Bayamón	Interconnection of Critical Loads	0.2	0.7

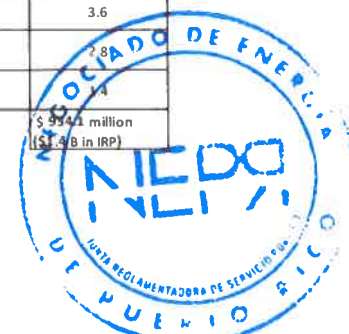


3. For the 115 kV and 38 kV new underground projects listed in the above questions (San Juan/Bayamón region):
 - a. Are there clearly identifiable clusters of critical load that in total represent the most densely loaded areas of the San Juan / Bayamón region, that could benefit from increased reliability through specific undergrounding projects? If so, please identify those clusters with as much specificity as possible.
 - b. For those clusters, identify which projects are necessary, in combination, in order to serve the critical load.
 - c. Specify the critical loads in question, and the magnitude (confidential response).

4. 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.
 - b. Which projects are recommended for hardening separate from any consideration of a MiniGrid configuration across the Island? Why?

Table 3. PREPA response to Appendix B

Per Exhibit 2-12: 115 kV Stations to Harden- 43 Projects					
Item No.	Project Description	Cost Estimate (Class 5- \$M)	Item No.	Project Description	Cost Estimate (Class 5- \$M)
1	Manati TC - 115 kV and 46 kV Switchyards	20	23	Switchyards (in addition to hardening should at least include protection and control systems modernization + remote	93.3
2	Cambalache TC - 115 kV and 46 kV Switchyards	23.5	24	Aguirre 230 kV, 115 kV and 46 kV Switchyards	42.2
3	Dos Bocas HP - 115 kV and 46 kV Switchyards	19.1	25	Maunabo TC Hardening/Reconstruction 115 kV and 46 kV Switchyards	4.5
4	Barceloneta TC - 115 kV and 46 kV Switchyards	20	26	Jobos TC 115 kV and 46 kV Gas Insulated Substation (includes new 230/115 kV Transformer connected to 230 kV line to AES)	27.6
5	Mora TC Gas Insulated Substation 115 kV and 46 kV Switchyards	11.5	27	Ponce TC 115 kV and 46 kV Switchyards GIS	17.1
6	Bayamon TC - 230 kV, 115 kV and 46 kV Switchyards	65.7	28	San Juan GIS 115 kV Switchyard	3.5
7	Vega Baja TC - 115 kV and 46 kV Switchyards	20.5	29	Isla Grande TC - Hardening GIS 115 kV and 46 kV Switchgear	3.5
8	Dorado TC - 115 kV and 46 kV Switchyards	27.1	30	Monacillo TC - 115 kV, 46 kV and 13.2 kV Switchyards	49
9	Juncos TC - 115 kV and 46 kV Switchyards	25.5	31	Hato Rey TC - 115 kV, 46 kV and 13.2 kV Switchyards	29.2
10	Caguas TC - 115 kV and 46 kV Switchyards	29.4	32	Via ducto TC - 115 kV and 46 kV Switchyards	36.3
11	Rio Blanco HP - 115 kV and 46 kV Switchyards	35.8	33	Berwind TC - 115 kV, 46 kV and 13.2 kV Switchyards	14.8
12	Cayey TC - 115 kV and 46 kV Switchyards	16.2	34	New Venezuela TC Gas Insulated Substation for 115 kV, 46 kV and	4.4
13	Humacao TC - Hardening and Expansion 115 kV and 46 kV	23.9	35	Yabucoa TC - 115 kV extension includes provision for 115 kV underground circuits and future generation	21.5
14	Canovanas TC - 115 kV and 46 kV Switchyards (includes 46 kV bus	9.8	36	Mayaguez TC - Hardening/Reconstruction 230 kV and 115 kV Switchyards	14.2
15	Sabana Llana TC - 115 kV and 46 kV Switchyards	34.7	37	Comerio TC - Hardening/Extension 115 kV and 46 kV Switchyards (includes extension to interconnect new 46 kV line to new	12.4
16	Fajardo TC - 115 kV and 46 kV Extension of 46 kV Bus for New UG to Fajardo	19.4	38	Palmer TC - Hardening/Reconstruction 115 kV and 46 kV Switchyards	15.5
17	Daguao TC - 115 kV and 46 kV Switchyards	18.4	39	Añasco TC - Hardening/Reconstruction 115 kV Switchyard	3
18	Victoria TC - 115 kV and 38 kV Switchyards	31.1	40	Rio Bayamon Sect - 115kV Hardening/Reconstruction	8.3
19	San Sebastián TC - 115 kV and 38 kV Switchyards	17.8	41	Crea (Hogar Crea) 115 kV Sect.	3.6
20	Mayaguez GP - 115 kV and 38 kV Switchyards	23.9	42	Candelaria Arenas 115 kV Sect.	2.8
21	Acañas TC - 115 kV and 38 kV Switchyards (includes extension for new	40	43	Juan Martin 115 kV Sect.	1.4
22	San Germán TC - 115 kV and 46 kV Switchyard Costa Sur Gas Insulated	12.7			\$ 954.1 million (SFB in IRP)



No Regrets Options – DERs – Questions

5. What are the best “no regrets” distributed energy resource solutions for Puerto Rico? Why? How should they be deployed, implemented, or procured? Please be as specific in your response as is possible, including identifying the scale and type of distributed resource solution, and the likely physical locations (i.e., e.g., rooftops, substations, brownfields, greenfields) and any other relevant attribute or consideration.
6. How should the resiliency value of specific distributed resource solutions be gauged?
7. How can the Energy Bureau support the most rapid deployment of distributed energy solutions for increased resiliency?
8. What is PREPA’s role or LUMA’s role in facilitating DERs for resiliency? Please comment on each of the following potential roles for PREPA or LUMA.
 - a. Should PREPA or LUMA be responsible for analysis of microgrid options? Why or why not?
 - b. PREPA currently facilitates the development and integration of distributed generation through procurement of VPPs, and through development of Demand Response programs. Should PREPA or LUMA support direct installation of DERs through specific procurement tariffs?
 - c. Should PREPA or LUMA directly participate in the installation and maintenance of distributed photovoltaic systems with storage? Would this be in alignment with Act 17-2019 and other Puerto Rico public policy that supports “prosumers”?
9. In general, concerning the best microgrid candidate sites across Puerto Rico:
 - a. Comment on the number, size, facility type, and resource configurations identified at the microgrid sites in the Sandia microgrid report (159 sites) and in PREPA’s Appendix 1 IRP filing (“50 potential zones”).
 - b. Should all of these sites be specifically targeted for microgrid development for resiliency reasons? Explain why or why not.
 - c. Comment on how microgrid applications should be paid for, differentiating between “public” and “private” microgrids.
10. In general, concerning stand-alone DER solutions (i.e., not microgrids) across Puerto Rico:
 - a. How should stand-alone DER solutions be procured or paid for?
 - b. Should the Energy Bureau differentiate between resiliency provided by public purpose DER solutions (e.g., town centers, municipal buildings, water and sewer facilities), and private purpose DER solutions, when considering alternative deployment and procurement vehicles for these resources?
11. Provide any other additional comment, response, or supporting documentation that will help the Energy Bureau determine the optimum combinations of distributed resources and more conventional wires hardening approaches for providing resiliency for Puerto Rico load.

