

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

<b>NEPR</b>  <b>Received:</b>  <b>Jan 15, 2021</b>  <b>3:20 PM</b>
--

**IN RE:** OPTIMIZATION PROCEEDING OF  
MINIGRID TRANSMISSION AND  
DISTRIBUTION INVESTMENTS

**CASE NO.:** NEPR-MI-2020-0016

**SUBJECT:** Responses to Appendix B

**MOTION TO CLARIFY INFORMATION SUBMITTED ON JANUARY 7, 2021  
AND TO REITERATE REQUEST FOR CONFIDENTIAL TREATMENT**

COMES NOW the Puerto Rico Electric Power Authority through its legal representation and respectfully submits and requests as follows:

1. On January 7, 2021, the Puerto Rico Electric Power Authority (the “Authority”) submitted its responses to Appendix B of the *Resolution and Order* entered by the Puerto Rico Energy Bureau of the Public Service Regulatory Board (the “Energy Bureau”).<sup>1</sup>

2. Because of a clerical mistake, the Authority did not attach the files responsive to questions 1, 2 and 7 of Appendix B. The responses are attached. *See* Response to Question 1, Response to Question 2 and Response to Question 7.

3. Further, the Authority incorporates by reference all the arguments made in the memorandum of law included in response to question 8 and reiterates that the files produced in response to questions 1 and 7 contain confidential information and thus, should remain under seal.

WHEREFORE, the Authority respectfully requests the Energy Bureau to note the filing of information responsive to questions 1, 2 and 7 of Appendix B; determine that the files produced in response to questions 1 and 7 of Appendix B are confidential; and order that the files produced in response to questions 1 and 7 remain under seal.

---

<sup>1</sup> *The Puerto Rico Electric Power Authority’s Responses to Appendix B of the Resolution and Order Entered on December 22, 2020* filed on January 7, 2021, by the Authority.

RESPECTFULLY SUBMITTED.

In San Juan, Puerto Rico, this 15<sup>th</sup> day of January 2021.

*s/ Katuska Bolaños-Lugo*  
Katuska Bolaños-Lugo  
[kbolanos@diazvaz.law](mailto:kbolanos@diazvaz.law)  
TSPR No. 18888

DÍAZ & VÁZQUEZ LAW FIRM, P.S.C.  
290 Jesús T. Piñero Ave.  
Oriental Tower, Suite 1105  
San Juan, PR 00918  
Tel. (787) 395-7133  
Fax. (787) 497-9664

Response to Question 1

*[This information has been submitted under seal.]*

## Response to Question 2

**Revised Cost Estimates per 10 Yr Plan (Class 5 Estimates): Assets listed in IRP Exhibits 2-85 to 2-93**

<b>Minigrig Transmission System Required Investment</b>			
<b>Item</b>	<b>Description</b>	<b>Cost (\$M)</b>	<b>Notes</b>
<b>1</b>	<b>Controllers &amp; SCADA: 8 Minigrigs</b>	<b>\$ 6.75</b>	<i>No change in estimate from IRP</i>
<b>2</b>	<b>115 kV Transmission system investment</b>	<b>\$ 2,863.71</b>	<b>Class 5 Cost Estimates: Please refer to corresponding tab</b>
	2a. Existing Lines to Harden:	\$ 447.44	List of 24 Projects ~198 miles from IRP Ex 2-11
	2b. New Lines (OH & UG):	\$ 1,462.17	List of 16 Projects ~141 miles from IRP Ex 2-09
	2c. Existing Stations to Harden: 43 Projects	\$ 954.10	List of Stations per IRP Ex 2-12
<b>3</b>	<b>38 kV Transmission system investment</b>	<b>\$ 4,865.61</b>	<b>Class 5 Cost Estimates: Please refer to corresponding tab</b>
	3a. Existing Lines to Harden:	\$ 476.97	List of ~241 miles per IRP Ex 24, 36, 44, 52, 62, 71, 84
	3b. New Lines (OH & UG):	\$ 4,388.65	List of ~318 miles per IRP Ex 23, 35, 43, 51, 61, 69, 83
	3c. New Stations & Harden to Existing Stations:		List of Stations per IRP Ex 24, 36, 44, 52, 62, 71, 84

**\$ 7,736.07**

**Notes**

- 1** A class 5 cost estimate is one that is prepared at an early stage in the project development process and is expected, based on industry standards, to range from 50% below to 100% above the actual final project cost. Leading industry practice is to revise estimates, so they become more accurate as engineering design progresses and project requirements are solidified.
- 2** PREPA will begin in Q1 2021 performing field assessment and A&E design on T&D assets. Once completed, PREPA can provide more accurate estimates
- 3** Cell G15 will be updated no later than COB Jan 13, 2021

Per Exhibit 2-11: New Lines (OH & UG): 24 Projects ~ 198 miles				
ID	Project	Miles	Cost Estimate: 10 YR PLAN (M\$)	M\$/mi
1	Reconstruction Line 37800 Cayey TC - Caguas TC @1192.5 kcmil ACSR Bunting	12.25	\$ 25.13	\$ 2.05
2	Reconstruction Line 36300 Maunabo TC - Juan Martin Sect. @1192.5 kcmil ACSR Bunting	4.86	\$ 12.15	\$ 2.50
3	Line 37800 Jobos TC - Cayey TC @1192.5 kcmil ACSR Bunting	15.32	\$ 26.87	\$ 1.75
4	Reconstruction Line 36200 Monacillo TC - Juncos TC @1192.5 kcmil ACSR Bunting	20.11	\$ 42.74	\$ 2.13
5	Reconstruction Line 39100 Cambalache TC - Hatillo TC @1192.5 kcmil ACSR Bunting	6.64	\$ 14.05	\$ 2.12
6	Reconstruction Line 37400 Bayamon TC - Hogar Crea Sub. - H. Tejas TC - Candelaria Arena Sub. - Dorado TC @1192.5 kcmil ACSR Bunting	10.23	\$ 25.58	\$ 2.50
7	Reconstruction Line 37500 Bayamón TC - Rio Bayamón Sect. - Grana Substations @ 1192.5 kcmil ACSR Bunting	2.36	\$ 5.90	\$ 2.50
8	Reconstruction Line 41500 Dorado TC - Bo. Piñas GIS @1192.5 kcmil ACSR Bunting	7.54	\$ 14.22	\$ 1.89
9	Reconstruction Line 36100 Bayamón TC - Caná Sect. - Bo. Piñas GIS @1192.5 kcmil ACSR Bunting	9.5	\$ 23.75	\$ 2.50
10	Reconstruction Line 36800 S. Llana TC to Canóvanas TC@1192.5 kcmil ACSR Bunting	7.76	\$ 15.05	\$ 1.94
11	Reconstruction Line 41200 S. Llana TC to Canóvanas TC@1192.5 kcmil ACSR Bunting	7.76	\$ 14.76	\$ 1.90
12	Reconstruction Line 37800 Monacillo TC - Buen Pastor TC @1192.5 kcmil ACSR Bunting	4.27	\$ 11.03	\$ 2.58
13	Reconstruction Line 37900 Sabana Llana TC - Encantada Sub. - Conquistador Sub. @1192.5 kcmil ACSR Bunting	5.99	\$ 14.98	\$ 2.50
14	Reconstruction Line 37100 C.Sur - Guánica TC@1192.5 kcmil ACSR Bunting	11.5	\$ 28.75	\$ 2.50
15	Reconstruction Line 36700 Mayaguez Planta - Alturas de Mayaguez - Mayaguez TC@1192.5 kcmil ACSR Bunting	3.46	\$ 8.65	\$ 2.50
16	Reconstruction Line 37200 Mayaguez Planta - Mayaguez TC@1192.5 kcmil ACSR Bunting	3.46	\$ 8.65	\$ 2.50
17	Reconstruction Line 37200 Mayaguez TC - Añasco TC@1192.5 kcmil ACSR Bunting	4.04	\$ 10.10	\$ 2.50
18	Reconstruction Line 39800 Mayaguez Planta - Acacias TC@1192.5 kcmil ACSR Bunting	15	\$ 29.09	\$ 1.94
19	Reconstruction Line 36900 C.Sur - Canas TC - Ponce TC @1192.5 kcmil ACSR Bunting	10.38	\$ 21.96	\$ 2.12
20	Reconstruction Line 37000 C.Sur - Ponce TC @1192.5 kcmil ACSR Bunting	11	\$ 23.29	\$ 2.12
21	Reconstruction Line 40300 Aguirre - Santa Isabel TC - Ponce TC @1192.5 kcmil ACSR Bunting	17.57	\$ 56.18	\$ 3.20
22	Line 38900 M. Peña GIS - Berwind GIS Relocation/Hardening @1192.5 kcmil ACSR	4.36	\$ 9.37	\$ 2.15
23	Line 38900 Berwind GIS - Parque Escorial Relocation/Hardening @1192.5 kcmil ACSR	1.4	\$ 3.25	\$ 2.32
24	Line 38900 Parque Escorial - Sabana Llana Relocation/Hardening @1192.5 kcmil ACSR	1	\$ 1.96	\$ 1.96
		<b>197.76</b>	<b>\$ 447.44</b>	

Cost per mile (\$M/mi) from 10 Yr Plan (Class 5) considers that a line will have both segments to be hardened & segments to be rebuilt. It also considers terrain adjustment: urban & rural routing

**Per Exhibit 2-9: New Lines (OH & UG): 16 Projects ~ 141 miles**

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

**Per Exhibit 2-12: 115 kV Stations to Harden- 43 Projects**

<b>Item No.</b>	<b>Project Description</b>	<b>Technical Justification</b>	<b>Cost Estimate (Class 5- \$M)</b>
1	Manati TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	20
2	Cambalache - TC 115 kV and 46 kV Switchyards	Minigrid Main Backbone	23.5
3	Dos Bocas HP - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	19.1
4	Barceloneta TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	20
5	Mora TC Gas Insulated Substation 115 kV and 46 kV Switchyards	Minigrid Main Backbone	11.5
6	Bayamon TC - 230 kV, 115 kV and 46 kV Switchyards	Minigrid Main Backbone	65.7
7	Vega Baja TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	20.5
8	Dorado TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	27.1
9	Juncos TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	25.5
10	Caguas TC -115 kV and 46 kV Switchyards	Minigrid Main Backbone	29.4
11	Rio Blanco HP - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	35.8
12	Cayey TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	16.2
13	Humacao TC - Hardening and Expansion 115 kV and 46 kV	Minigrid Main Backbone	23.9
14	Canóvanas TC - 115 kV and 46 kV Switchyards (includes 46 kV bus extension	Minigrid Main Backbone	9.8
15	Sabana Llana TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	34.7
16	Fajardo TC - 115 kV and 46 kV. Extension of 46 kV Bus for New UG to Fajardo Hospital,	Minigrid Main Backbone	19.4
17	Daguao TC - 115 kV and 46 kV Switchyards	Minigrid Main Backbone	18.4
18	Victoria TC - 115 kV and 38 kV Switchyards	Minigrid Main Backbone	31.1
19	San Sebastián TC - 115 kV and 38 kV Switchyards	Minigrid Main Backbone	17.8
20	Mayaguez GP - 115 kV and 38 kV Switchyards	Minigrid Main Backbone	23.9
21	Acacias TC - 115 kV and 38 kV Switchyards (includes extension for new underground	Minigrid Main Backbone	40
22	San Germán TC - 115 kV and 46 kV Switchyard Costa Sur Gas Insulated Substat	Minigrid Main Backbone	12.7
23	Switchyards (in addition to hardening should at least include protection and	Minigrid Main Backbone	93.3
24	Aguirre 230 kV, 115 kV and 46 kV Switchyards	Minigrid Main Backbone	42.2
25	Maunabo TC Hardening/Reconstruction 115 kV and 46 kV Switchyards	Minigrid Main Backbone	4.5
26	Jobos TC 115 kV and 46 kV Gas Insulated Substation (includes new 230/115 kV	Minigrid Main Backbone	27.6
27	Ponce TC 115 kV and 46 kV Switchyards GIS	Minigrid Main Backbone	17.1
28	San Juan GIS 115 kV Switchyard	Minigrid Main Backbone	3.5
29	Isla Grande TC - Hardening GIS 115 kV and 46 kV Switchgear	Minigrid Main Backbone	3.5



30	Monacillo TC - 115 kV, 46 kV and 13.2 kV Switchyards	Minigrad Main Backbone	49
31	Hato Rey TC - 115 kV, 46 kV and 13.2 kV Switchyards	Minigrad Main Backbone	29.2
32	Viaducto TC - 115 kV and 46 kV Swichyards	Minigrad Main Backbone	36.3
33	Berwind TC - 115 kV, 46 kV and 13.2 kV Switchyards	Minigrad Main Backbone	14.8
34	New Venezuela TC Gas Insulated Substation for 115 kV, 46 kV and	Minigrad Main Backbone	4.4
35	Yabucoa TC - 115 kV extension includes provision for 115 kV underground circuits	Minigrad Main Backbone	21.5
36	Mayaguez TC - Hardening/Reconstruction 230 kV and 115 kV Switchyards	Minigrad Main Backbone	14.2
37	Comerio TC - Hardening/Extension 115 kV and 46 kV Switchyards (includes extension	Minigrad Main Backbone	12.4
38	Palmer TC - Hardening/Reconstruction 115 kV and 46 kV Switchyards	Minigrad Main Backbone	15.5
39	Añasco TC - Hardening/Reconstruction 115 kV Switchyard	Minigrad Main Backbone	3
40	Rio Bayamon Sect - 115kv Hardening/Reconstruction	Minigrad Main Backbone	8.3
41	Crea (Hogar Crea) 115 kV Sect.	Minigrad Main Backbone	3.6
42	Candelaria Arenas 115 kV Sect.	Minigrad Main Backbone	2.8
43	Juan Martin 115 kV Sect.	Minigrad Main Backbone	1.4

\$	<b>954.10</b>
----	---------------

**Per Exhibits 2-24 to 2-84: Hardening OH ~ 241 miles**

ID	Region	Miles (total)	Cost Estimate: 10 YR PLAN (M\$)	NOTES
1&2	Mayaguez	24.05	\$ 47.48	IRP Exhibit 2-24
3&4	Caguas/Cayey	75.3	\$ 148.66	IRP Exhibit 2-36
5	Carolina	4.48	\$ 8.84	IRP Exhibit 2-44
6	Arecibo	63.81	\$ 125.97	IRP Exhibit 2-52
7	San Juan	58.61	\$ 115.71	IRP Exhibit 2-62
	Bayamon	12.91	\$ 25.49	IRP Exhibit 2-71
8	Ponce	2.44	\$ 4.82	IRP Exhibit 2-84

**Total c.miles: 241.6 \$ 476.97**

Hardening OH (M\$/mi)
\$ 1.97

Cost per mile (\$M/mi) from 10 Yr Plan (Class 5) considers that a line will have both segments to be hardened & segments to be rebuilt. It also considers terrain adjustment: urban & rural routing

**Per Exhibits 2-23 to 2-83: New Lines (OH & UG): ~ 319 miles**

ID	Region	Miles (total)		Cost Estimate: 10 YR PLAN (M\$)	NOTES
		OH	UG		
1&2	Mayaguez	71.67		\$ 799.73	IRP Exhibit 2-23
		21.33	50.34		
3&4	Caguas/Cayey	43.81		\$ 532.11	IRP Exhibit 2-35
		9.73	34.08		
5	Carolina	26.56		\$ 399.73	IRP Exhibit 2-43
		0	26.56		
6	Arecibo	23.05		\$ 346.90	IRP Exhibit 2-51
		0	23.05		
7	San Juan	31.11		\$ 468.21	IRP Exhibit 2-61
		0	31.11		
	Bayamon	27.7		\$ 416.89	IRP Exhibit 2-69
		0	27.7		
8	Ponce	94.69		\$ 1,425.08	IRP Exhibit 2-83
		0	94.69		

New OH (M\$/mi)	New UG (M\$/mi)
\$ 1.974	\$ 15.05

**Total c.miles: 318.59**

**\$ 4,388.65**

Response to Question 7

*[This information has been submitted under seal.]*