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

IN RE: PUERTO RICO TEST FOR DEMAND RESPONSE AND ENERGY EFFICIENCY	**CASE NO:** NEPR-MI-2021-0009 **SUBJECT:** Adoption of the Puerto Rico Benefit- Cost Test.

RESOLUTION AND ORDER

I. INTRODUCTION AND BACKGROUND

Through this Resolution and Order, the Energy Bureau of the Puerto Rico Public Service Regulatory Board ("Energy Bureau") adopts the Puerto Rico Benefit-Cost Test ("PR Test") in accordance with the *Regulation for Demand Response* ("Regulation 9246")[1] and the *Regulation for Energy Efficiency* ("Regulation 9367")[2]. While the impetus for the development of the PR Test process was specific to demand response ("DR") and energy efficiency ("EE") resources, the Energy Bureau finds that the PR Test Framework should be applied to all types of Distributed Energy Resources ("DERs").

On May 14, 2021, the Energy Bureau issued a Resolution and Order ("May 14 Resolution") through which it initiated a proceeding to develop a Puerto Rico Benefit-Cost Test ("PR Test") as required by Regulations 9246 and 9367.[3]

The PR Test is defined as a cost-effectiveness screening test, reflecting Puerto Rico public policy, used to evaluate whether proposed or actual EE and DR programs or initiatives provide benefits greater than their costs.[4][5]

The Energy Bureau indicated that the *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*[6] ("NSPM for DERs") would be a guide to develop the PR Test to assess the benefits and costs of future DR and EE programs.

The Energy Bureau obtained stakeholder feedback regarding the specific benefits and costs to be included in the PR Test through four Technical Workshops. On June 16, 2021, the Energy Bureau issued a Resolution ("June 16 Resolution") establishing a schedule for the Technical Workshops.

The Technical Workshops were held over the course of four (4) months, following the five-step process for developing a jurisdiction specific cost-effectiveness test as included in the NSPM for DERs. The Technical Workshops focused on the identification of impacts to include in the PR Test. The Technical Workshops did not seek to develop methodologies to quantify and monetize those impacts.

LUMA Energy, LLC ("LUMA") and the Independent Consumer Protection Office ("ICPO") participated in all four Technical Workshops and provided comments. Additional stakeholders in attendance during the four workshops included the Solar and Energy Storage Association of Puerto Rico ("SESA"), TRC Companies, and Lawrence Berkeley National

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[1] *Regulation for Demand Response*, December 21, 2020.

[2] *Regulation for Energy Efficiency*, March 25, 2022.

[3] At the time of the May 14 Resolution the Energy Bureau cited the Proposed Energy Efficiency Regulation.

[4] Regulation 9246, Section 1.09(B)(20).

[5] Regulation 9367, Section 1.09(B)(45) and Section 5.02(B).

[6] National Energy Screening Project ("NESP"), *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources ("NSPM for DERs")*, August 2020. Available at: https://www.nationalenergyscreeningproject.org/wp-content/uploads/2020/08/NSPM-DERs_08-04-2020_Final.pdf. (last visit August 5, 2022)

Laboratory. At the conclusion of the Technical Workshops, Synapse Energy Economics submitted a report to the Energy Bureau that summarized each Technical Workshop, stakeholder comments, and recommendations for a PR Test Framework ("Synapse Report").

Based on the input gathered from stakeholders as part of the Technical Workshops and the recommendations within the Synapse Report, on February 7, 2022, the Energy Bureau issued a Resolution and Order ("February 7 Resolution"), proposing a PR Test Framework and seeking public comments. In response to the February 7 Resolution, LUMA and ICPO submitted written comments to the Energy Bureau.

After reviewing the public comments submitted, the Energy Bureau has amended the Proposed PR Test to incorporate suggestions made by the participants. Part II of this Resolution and Order explains the main modifications the Energy Bureau made to the PR Test. Attachment C contains a redlined version of the adopted PR Test.

The Energy Bureau is cognizant of the effort and time it will take to develop the values for the full list of impacts in the PR Test. Therefore, the Energy Bureau adopts the prioritization of PR Test impacts in Attachment B of this Resolution and Order for the first Three-Year Plan[7] and the Potential Study[8]. Attachment B lists each impact, whether it should be included and monetized, and the applicable source.

The Energy Bureau **ORDERS** PREPA and LUMA, as PREPA's contracted successor as operator of the transmission and distribution system, to use the PR Test as defined in Attachment A and Attachment B of this Resolution and Order to assess the costs and benefits of energy efficiency and demand response programs commencing with the first Three-Year Plan.

II. MAIN REVISIONS INCORPORATED INTO THE PUERTO RICO BENEFIT-COST TEST

Part II presents a discussion of the public comments received. It identifies and addresses the main revisions incorporated into the adopted PR Test. Attachment C to this Resolution contains a redline version of the adopted PR Test.

A. Comments on Puerto Rico Benefit-Cost Test

1. Definitions

a. Host Customer

ICPO requested clarification as to whether Electric Vehicle to Grid should be included in Host Energy Impacts and Utility Impacts.

The Energy Bureau clarifies that the PR Test applies to all DERs, including Electric Vehicle to Grid.

b. Distributed Energy Resources

ICPO recommended that a definition be included for "Off-Grid Distributed Energy Resources" because the proposed definition of DERs only includes those that are connected to the distribution system. ICPO provided examples of solar water heaters with an energy generator and storage built in, off grid lighting, water pumping, duct, or room ventilators for this category of resources.

The Energy Bureau does not adopt this recommendation. The intent of the PR Test is to assess DERs that provide utility system impacts. Customer interconnection to the distribution system is needed to create these impacts.

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[7] Regulation 9367, Sections 4.02 and 4.03. Note that the first Three Year Plan is due to be filed in March 2024.

[8] Regulation 9367, Section 3.02.

c. Social Cost of Carbon

ICPO also requested clarification for how the Social Cost of Carbon ("SCC") relates to the term renewable energy credits ("RECs") and to the Energy Bureau's draft regulation, *Renewable Energy Certificates Regulation and Compliance with Puerto Rico's Renewable Portfolio Standard* ("Preliminary Regulation") in Docket NEPR-MI-2021-0011[9].

There are two areas of potential interaction between the PR Test and the Preliminary Regulation. The first relates to the value for the SCC and the second relates to the treatment of RECs within the PR Test.

i. Value of SCC: In its July 23, 2021 Resolution and Order seeking comments on the Preliminary Draft, the Energy Bureau found that the SCC for the year 2020 as established in the February 2021 federal Interagency Working Group on the Social Cost of Greenhouse Gases ("Federal IWG") *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide*[10] ("February 2021 Report") is a reliable source.[11] In 2020, this value is $51 per metric ton of carbon dioxide ("CO_2") using a discount rate of 3 percent (3.0%).[12]

The Proposed PR Test had defined the SCC as the Federal IWG SCC but calculated with a 2 percent (2.0%) discount rate, which equals $128 per short ton of CO_2-equivalent on a 15-year levelized basis.

Because Case No. NEPR-MI-2021-0011 is ongoing, it is premature for the Energy Bureau to adopt a specific value for the SCC within this Resolution and Order. The Energy Bureau has amended the definition of the SCC in the PR Test.

ii. Treatment of RECs in the PR Test: The value of the SCC should not be double counted with the value of a REC.

For DERs like EE that only reduce electricity load, there is no overlap between RECs and the SCC. EE will reduce electricity sales, reducing the compliance costs associated with the Renewable Portfolio Standard ("RPS").

For DERs that produce a REC, it is possible there will be overlap between the carbon benefits attributable to that REC and the SCC. As defined in the Preliminary Regulation, a REC represents one MWh of energy produced by a renewable energy resource and environmental and social attributes, including carbon dioxide, of that MWh.[13]

A REC therefore includes a portion of the monetary impacts of avoided carbon emissions. To avoid double counting, the value of the RECs produced by a DER should be subtracted from the total Societal Impacts, which includes the SCC. The Energy Bureau added a new definition to the PR Test to reflect this method.

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[9] *In Re: Reglamento de Mercado de Certificados de Energía Renovable y Cumplimiento con la Cartera de Energía Renovable de Puerto Rico*, Case No.: NEPR-MI-2021-0011.

[10] *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide*, February 2021, Available in content/uploads/2021/02/TechnicalsupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

[11] Case No. NEPR-MI-2021-0011 Resolution and Order, July 23, 2021.

[12] February 2021 Report, p. 24.

[13] Preliminary Regulation, p. 6.

2. Proposed Puerto Rico Benefit-Cost Test Impacts

a. Ancillary Services

ICPO recommended a revision to the description of Ancillary Services to include a category on transmission since these tasks are shared by generation and transmission to maintain service. ICPO also recommended that the operation and maintenance impact be included in Distribution Costs.

The Energy Bureau does not adopt this recommendation. Ancillary Services within Utility System impacts is only related to generation. Any distribution and transmission impacts, including operation and maintenance impacts, should be included with the Distribution and Transmission categories of the PR Test.

b. Program Incentives

ICPO recommended changing the term Program Incentives to Utility Provided Program Incentives to specify these incentives come from the utility.

The Energy Bureau does not adopt this recommendation because the term Program Administrator is used in the PR Test instead of Utility. However, the Energy Bureau amended the description of this impact to clarify it relates to incentives paid by the Program Administrator.

c. Credit and Collection Costs

ICPO urged caution to ensure that the impact of Credit and Collection Costs only relates to those caused by EE and DR activities. The Energy Bureau agrees that care must be taken in quantifying these impacts and added additional language to this description.

d. Risk

ICPO requested clarification as to whether the term "uncertainty" in the description of Risk included the possibility that the utility may not adapt rapidly enough to DERs and EV adoption.

The Energy Bureau clarifies that the term "uncertainty" in the description of Risk includes operational risk to the electric system inclusive of a utility not being able to adapt to the adoption of DERs and EVs.

e. Resilience

LUMA commented that the description of "adapting to changing conditions" used for resilience under both Utility System Impacts and Host Customer Impacts is overly broad. LUMA then recommended the following replacement language, "[t]he ability to anticipate, prepare for, and adapt to high impact, low frequency grid events and withstand, respond to, and recover rapidly from these events."

The Energy Bureau accepts this recommendation and has edited the description for resilience within Utility System and Host Customer Impacts.

f. Tax Incentives

ICPO recommends the term Tax Incentives be changed to Program Incentives to broaden the scope of any type of incentive.

The Energy Bureau does not adopt this recommendation because of the confusion it would create with Program Incentives under Utility System

Impacts. Treat Tax Incentives as a separate impact because they are meant to capture only incentives in reduced local, state, or federal taxes.

The category of Program Incentives captures only incentives paid by the Program Administrator.

g. Other Fuels and Water

LUMA requested clarification that the Other Fuels and Water under Host Customer Energy Impacts pertains to customers. LUMA proposed the following new language for the description, "Change in customer's consumption of oil gasoline, propane, natural gas and water due to the installation of a DER."

While the Energy Bureau finds that the category of Host Customer Energy Impacts indicates these impacts pertain to customers, it does not object to the additional clarifying language proposed by LUMA's. The description for Other Fuels and Water has been updated to reflect this recommendation.

h. *Health and Safety*

LUMA recommends an edit to the description of Health and Safety Impacts under Host Customer Energy Impacts to reflect the potential negative impacts of increased risk of fire-related property damage due to Li-ion batteries. LUMA proposed the following new language, "Change in risk of fire and fire-related property damage."

A key principle of the NSPM for DERs is to ensure symmetry of costs and benefits. Therefore, we agree with LUMA's recommendation and updated the description of Health and Safety Impacts with LUMA's proposed language.

i. Economic and Jobs

LUMA commented there are two potential alternatives for addressing Economic and Job Impacts under Societal Impacts. LUMA suggested it could be considered as a qualitative metric or as a quantitative metric using job-years and associated financial value. LUMA indicated that calculating job-years is a significant undertaking and recommends the metric be considered qualitatively during the initial years.

The Energy Bureau agrees that the quantification of economic and job impacts is a significant undertaking. The Energy Bureau indicated this impact be treated qualitatively in the first Three-Year Plan. Therefore, no changes are needed.

j. Energy Security

LUMA raised concerns that Energy Security under Societal Impacts could be double counted with energy imports if those are already included in Energy Generation within Utility System Impacts. LUMA recommended Energy Security be kept as a qualitative metric.

The Energy Bureau does not adopt this recommendation. If energy imports are already included in Energy Generation within Utility System Impacts, it does not capture Energy Security. Energy Security pertains to the risks associated with imports, such as volatile prices or supply curtailment. Whether or not the impact of Energy Security should be kept as qualitative in future Three-Year Plans will be addressed during the review of the PR Test as part of future Three-Year planning cycles. To provide additional clarity on this impact, we added additional language to the definition.

ICPO commented that within Energy Security, the financial terms or structure of renewable energy that can affect the availability of adequate renewable energy capital investment resources or customer access to energy from those renewable energy course in term of costs be considered.

The Energy Bureau does not find that ICPO's comment warrants an amendment to the PR Test. Energy Security, as included in the PR Test, relates to the impact of DERs on the electric utility system. The financial terms or structure of renewable energy is outside the scope of the PR Test.

B. Comments on Prioritization of Puerto Rico Benefit-Cost Test Impact Development

Public comments also addressed issues related to the prioritization of PR Test impact development and components of the PR Test for the first Three-Year Plan and Potential Study as included in Attachment B to the February 7 Resolution.

1. Impact Prioritization

a. Property Asset Value

LUMA commented that an adder should not be used for Property Asset Value under Host Customer Impacts. LUMA recommends this impact be treated qualitatively due to limited benchmarking data for this value for the mainland US and that this value can vary widely by jurisdiction and within a jurisdiction.

The Energy Bureau agrees with this recommendation for the first Three-Year Plan and amended this impact to be qualitative.

b. Empowerment, Satisfaction, and Pride

LUMA commented that an adder should not be used for Empowerment, Satisfaction, and Pride under Host Customer Impacts. LUMA cites a lack of benchmarking data for this value.

The Energy Bureau agrees with this recommendation for the first Three-Year Plan and amended this impact to be qualitative.

c. Energy Security

ICPO recommended that Energy Security be changed from qualitative to quantitative because it is possible to measure fuel import reduction and have an inventory of capital investment of renewable energy assets with fixed forecasted energy costs.

The Energy Bureau does not adopt this recommendation. Energy Security pertains to the risks associated with imports, such as volatile prices or supply curtailment and therefore will be one of the more difficult impacts to quantify. It is therefore appropriate to keep the impacts of Energy Security as qualitative for the first Three-Year Plan.

2. PR Test Components for the Potential Study and First Three-Year EE Plan

a. *Use of adders*

LUMA recommends that it begin with benchmarking information to develop specific adders by sector and DER type. Then it would refine those initial adders based on Puerto Rico specific adders. LUMA indicated it would review and update adders on a regular basis.

The Energy Bureau finds this an appropriate approach to the development of adders for use in the first Three-Year Plan. The Energy Bureau also broadened this definition to proxies to include both adders and multipliers.

b. *Discount rate*

LUMA commented that Puerto Rico does not have a developed EE and DR market, indicating that mainland benchmarking should not be a basis for its discount rate. LUMA stated there are risks related to Puerto Rico's nascent EE and DR market that the Energy Bureau should consider in its determination of the discount rate used in the PR Test. These include capital risks related to the current and forecasted financial status and credit rating of PREPA, project risks related to an untrained workforce, and portfolio risk of newly established programs.

The Energy Bureau considered LUMA's comments and retained a discount rate of two percent (2.0%), in real terms, for the PR Test. While the Energy Bureau understands there are risks related to PREPA's bankruptcy status and the development of deploying new EE and DR programs, it finds these are distinct from factors that should influence the choice of discount rate used in benefit-cost assessments.

The risks cited by the Energy Bureau in the February 7 Resolution relate to the relative risk of EE and DR resources compared to the procurement of generation supply and distribution. The Energy Bureau is not persuaded that the nascency of the EE and DR market in Puerto Rico increases the risk of these resources relative to traditional investments.

Risk is not the only consideration when determining the appropriate discount rate to use. The discount rate in the PR Test is used to assess the cost-effectiveness of EE and DR programs. The function of a benefit-cost test is to identify those resources that will most likely provide safe, reliable, low-cost electricity services over the long term, while also achieving related policy goals of Puerto Rico. Therefore, the discount rate should reflect the policies of Puerto Rico used to develop the PR Test.[14] The policy goals of Puerto Rico include achieving long-term societal benefits including climate change mitigation, protection of low-income customers, and equitable access to programs.

The choice of discount rate will determine how much weight is given to long-term versus short-term benefits and costs.[15] A higher discount rate gives more weight to short-term impacts, while a lower discount rate gives more weight to long-term impacts. As the regulator, one of the Energy Bureau's role is to protect the short and long-term interests of consumers and finds that a lower, societal, discount rate more accurately captures this balance and reflects the long-term policy goals of Puerto Rico.

III. APPLICATION OF THE PUERTO RICO BENEFIT-COST TEST FRAMEWORK

All impacts in the PR Test should be included in future benefit-cost assesssments of DERs, even those that are difficult to quantify and monetize. However, the Energy Bureau acknowledges that it will take time to quantify and monetize all proposed impacts. Developing monetized values for impacts to include in a cost-effectiveness test will depend on completing avoided cost studies, evaluations, and research. These will take time and funding resources. There will be a phased-in approach to using the PR Test.

[14] NSPM for DERs, pp. 5 - 17.

[15] *Id.*, pp. 5 - 16.

1. Transition Period Plan

   Regulation 9367 includes a two-year Transition Period Plan.[16] During this transition period, programs will not be screened for cost-effectiveness, and therefore the PR Test need not be quantified for this purpose.

2. First Three-Year Plan and Potential Study

   The Energy Bureau **ADOPTS** the prioritization of PR Test impacts in Attachment B of this Resolution and Order for the first Three-Year Plan and the Potential Study. For each impact that cannot be quantified and monetized, the Energy Bureau directs LUMA and PREPA to discuss the anticipated positive or negative effects of the impact in a qualitative manner. Attachment B also includes a limited use of adders to allow for non-energy impacts ("NEIs") to be included in the PR Test before the completion of the studies. Using adders and qualitative impacts is an interim solution and will be rexamined before the second Three-Year Plan.

3. Process for Developing Impact Values

   The prioritization of PR Test impacts in Attachment B of this Resolution and Order includes sources for the values to be included in the first Three-Year Plan and the Potential Study.

   The Avoided Cost Study for Energy Efficiency ("Avoided Cost Study") is underway in this proceeding to provide values for many of the Utility System Generation Impacts of the PR Test. The Energy Bureau will continue this process and hold additional technical conferences to facilitate the development of these values.

   Impacts may best be developed and provided by LUMA and PREPA. This includes impacts related to Distribution, Transmission, Program Incentives, Program Administration Costs, Program Administrator Performance Incentives, Credit and Collection Costs, and Utility Rate Riders. The Energy Bureau will hold one or more workshops or technical conferences to discuss the valuation of these impacts with LUMA, PREPA, and stakeholders to inform the development of these values.

IV. CONCLUSION

This Resolution and Order establishes the working version of the Puerto Rico Test. The Energy Bureau **ORDERS** LUMA and PREPA to use the PR Test as defined in Attachments A and B to this Resolution and Order for all required cost-effectiveness screening of demand response and energy efficiency programs.

The Energy Bureau will revisit the PR Test as part of future three-year planning cycles. This process may include updates to avoided costs, incorporation of evaluation results, and the commissioning of additional studies to quantify and monetize impacts.

Be it notified and published.

Edison Avilés Déliz
Chairman

Lillian Mateo Santos
Associate Commissioner

Ferdinand A. Ramos Soegaard
Associate Commissioner

Sylvia B. Ugarte Araujo
Associate Commissioner

[16] Regulation 9367, Article 2.

NEGOCIADO DE ENERGÍA DE PUERTO RICO
NEPR
JUNTA REGLAMENTADORA DE SERVICIO PÚBLICO

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Bureau has so agreed on August 12, 2022. I also certify that on August 12, 2022 a copy of this Resolution and Order was notified by electronic mail to the following: margarita.mercado@us.dlapiper.com, kbolanos@diazvaz.law and laura.rozas@us.dlapiper.com. I also certify that today, August 12, 2022, I have proceeded with the filing of the Resolution and Order issued by the Puerto Rico Energy Bureau.

For the record, I sign this in San Juan, Puerto Rico, today August 12, 2022.

Sonia Seda Gaztambide
Clerk

NEGOCIADO DE ENERGÍA DE PUERTO RICO
JUNTA REGLAMENTADORA DE SERVICIO PÚBLICO
NEPR

Attachment A: The Puerto Rico Benefit-Cost Test Framework

I. Introduction

The Puerto Rico Benefit-Cost Test ("PR Test") is the test to use for determining whether distributed energy resources ("DERs") are cost-effective. The PR Test will evaluate whether, and to what extent, proposed or actual DER programs or initiatives provide benefits greater than their costs.

Section II of the Framework sets forth a set of definitions used in the PR Test. Section III of the Framework includes the impacts by category to be included in the PR Test and a description of each impact.

II. Definitions

A) These definitions are to be used for the Puerto Rico Benefit-Cost Test and are not intended to modify the definitions used in any other Energy Bureau regulation or order.

B) For the Puerto Rico Benefit-Cost Test, the following terms will have the meaning established below, unless the context of the content of any provision clearly indicates something else:

1) "Distributed Energy Resource" or "DER" means distributed generation, energy storage, microgrids, or any other resource, including but not limited to energy efficiency or demand response, that is connected to the distribution system and that assists in meeting at least one customer's electrical load.

2) "Host Customer" means a participant in PREPA's Program that installs a DER at their home or business.

3) "PREPA" means the Puerto Rico Electric Power Authority, a corporate entity created by Act No. 83 of May 2, 1941, as amended, and any successor distribution, transmission or generation owner or operator. Unless specified otherwise, if PREPA has a successor as the operator of the Transmission and Distribution System that entity shall be the primary entity responsible for performance as "PREPA" under this regulation.

4) "Program" means a collection of defined services and/or measures carried out by PREPA and/or its vendors and subcontractors that support the Distributed Energy Resources.

5) "Program Administrator" means PREPA in the role of implementing and delivering DER Programs.

6) "Social Cost of Carbon" or "SCC" means a value in dollars ($) that attempts to monetize the current and future damages resulting from CO_2 emissions.

III. Global Inputs to Puerto Rico Benefit-Cost Test

1) Discount Rate

A) Benefits and costs projected to occur over time shall be in present value terms in the PR Test calculation using a discount rate that appropriately reflects that energy efficiency or demand response is a low-risk resource in terms of cost of capital risk, project risk, and portfolio risk.

B) A discount rate of two percent (2.0%), in real terms, shall be used for the PR Test.

C) A two percent (2.0%) discount rate, in real terms, reflects both the low-risk nature of EE and DR and accounts for the societal focus of the PR Test. This discount rate is reasonable given the typical range of societal discount rates between one percent (1.0%) and three percent (3.0%), in real terms.

2) Social Cost of Carbon

A) The societal impacts of greenhouse gas emissions should be included in the PR Test as the Social Cost of Carbon ("SCC").

B) The SCC should be based on Puerto Rico-specific marginal abatement costs to achieve its greenhouse gas reduction goals and should be based on the same discount rate as the PR Test.

C) Before the development of a Puerto Rico-specific value, the Energy Bureau establishes the use of the most recent analysis conducted by the federal Interagency Working Group on the Social Cost of Greenhouse Gases ("Federal IWG") SCC.

3) Proxies

A) Using proxies such as adders and multipliers is permitted as an interim solution for impacts currently not monetized.

B) Using a proxy should be specific to the program sector (residential, low-income, commercial, and industrial), the program (retrofit, new construction, point of sale), and to the DER type.

C) The magnitude of the proxies should reflect the likely impacts of the DER, accounting for differences across programs, sectors, and rate classes.

IV. Puerto Rico Benefit-Cost Test Impacts

Category	Impact	Description
Utility System Impacts		
Generation	Energy Generation	The production or procurement of energy (i.e., kWh) from generation resources on behalf of customers. Includes the costs associated with the fuel cost and variable operations and maintenance costs. These costs can vary by season and time of day.
	Capacity	The generation capacity (i.e., kW) required to meet the forecasted system peak load.
	Environmental Compliance	Compliance costs associated with environmental regulations; net of those already embedded in Energy Generation.
	Renewable Portfolio Standard Compliance	Compliance cost associated with Puerto Rico's renewable portfolio standard as defined by the Puerto Rico Energy Public Policy Act.
	Ancillary Services	Services required to maintain electric grid stability and power quality (e.g., frequency regulation, voltage regulation, spinning reserves, and operating reserves).
Transmission	Transmission Capacity	Maintaining the availability of the transmission system to transport electricity safely and reliably. Locational transmission values should be used when feasible.

Category	Impact	Description
	Transmission System Losses	Electricity lost through the transmission system.
Distribution	Distribution Costs	Maintaining the availability of the distribution system to transport electricity safely and reliably. Includes capacity, O&M, voltage. Locational values should be used when feasible.
	Distribution System Losses	Electricity lost through the distribution system.
General	Program Incentives	Financial support provided by the Program Administrator to host customers (participants) or other market actors. May include rebates, upstream payments, interest rate buy-down.
	Program Administration Costs	Costs incurred by the Program Administrator related to the design, implementation, and evaluation DER programs. May include payments to trade allies, technical training, marketing, and payments to third-party consultants.
	Program Administrator Performance Incentives	Incentives offered to PREPA to encourage successful, effective implementation of DER programs.
	Credit and Collection Costs	PREPA's costs associated with arrearages, disconnections, and reconnections that are affected by DERs.
	Utility Rate Riders	PREPA's costs related to "Help to Humans Subsidies" such as low-income rate subsidies and municipal street lighting.
	Risk	Uncertainty including operational, technology, cybersecurity, financial, legal, reputational, and regulatory risks.
	Reliability	Maintaining generation, transmission, and distribution system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components.
	Resilience	The ability to anticipate, prepare for, and adapt to high impact, low frequency grid events and withstand, respond to, and recover rapidly from disruptions.
Host Customer Impacts		
Host Customer Energy Impacts	Host Customer portion of DER costs	Costs incurred to install and operate DERs (net of the incentive received from the Program).
	Interconnection fees	Cost paid by the Host Customer to interconnect DERs to the electric grid.
	Risk	Uncertainty including price volatility, power quality, outages, and operational risk related to failure of installed DER equipment and user error; may depend on the type of DER.
	Reliability	The ability to prevent or reduce the duration of Host Customer outages.
	Resilience	The ability to anticipate, prepare for, and adapt to high impact, low frequency grid events and withstand, respond to, and recover rapidly from disruptions.
	Tax Incentives	Federal, Commonwealth, and local tax incentives provided to host customers to defray the costs of some DERs.
Host Customer Non-Energy Impacts ("NEIs")	Other Fuels and Water	Change in the Host Customer's consumption of oil, gasoline, propane, natural gas, and water due to the installation of a DER.

Category	Impact	Description
	Property Asset Value	Changes in the value of a home or business because of the DER (e.g., increased building value, improved equipment value, extended equipment life).
	Health & Safety	Changes in customer health or safety (e.g., fewer sick days from work or school, reduced medical costs, improved indoor air quality, reduced deaths). Change in risk of fire and fire-related property damage.
	Empowerment, Satisfaction & Pride	The satisfaction of being able to control one's energy consumption and energy bill and the satisfaction of helping to reduce environmental impacts
	Comfort	Changes in comfort level (e.g., thermal, noise, and lighting impacts).
	Productivity	Changes in a Host Customer's productivity (e.g., changes in labor costs, O&M costs, reduced waste streams, reduced spoilage).
	Low-Income Host Customer NEIs	All the above Host-Customer NEIs besides Reduced Home Foreclosures
Societal Impacts		
Societal Impacts	Greenhouse Gas Emissions	Social Cost of Carbon net of greenhouse gas compliance costs already embedded in Energy Generation.
	Other Environmental	Other air emissions, solid waste, land, water, and other environmental impacts.
	Economic and Jobs	Incremental economic development and job impacts represented in job-years. Job-years should be quantified but should not be directly included as a monetary value in cost-effectiveness.
	Energy Security	Risks associated with imports, such as volatile prices or supply curtailment.

Attachment B: Application of the Puerto Rico Benefit-Cost Test for the First Three-Year Plan

I. Introduction

The Puerto Rico Benefit-Cost Test ("PR Test") is the test to use for determining whether distributed energy resources ("DERs") are cost-effective. The PR Test will evaluate whether, and to what extent, proposed or actual DER programs or initiatives provide benefits greater than their costs.

While all the impacts in the PR Test should be included in the assessment of DER cost-effectiveness, it is not reasonable to conduct the needed studies to quantify and monetize all proposed impacts before the first Three-Year Plan and Potential Study.[17] Therefore, the prioritization of PR Test impacts in this Attachment B shall be used for the first Three-Year Plan and Potential Study.

This prioritization should be applied only to the first Three-Year Plan. In advance of the second Three-Year Plan and each next three-Year Plan, the Energy Bureau will initiate a process to review and update how impacts are included in the PR Test. This may include updates to avoided costs, incorporation of evaluation results, and the commissioning of additional studies to quantify and monetize impacts.

II. Definitions

A) These definitions are to be used for the Puerto Rico Benefit-Cost Test and are not intended to modify the definitions used in any other Energy Bureau regulation or order:

1) **Include**: A "Yes" in this column indicates the impact should be included in the PR Test for the Potential Study and the first Three-Year EE Plan. A "No" indicates it is likely too difficult to include the impact in the near-term but does not mean it should not be included.

2) **Monetize**: A "Yes" in this column indicates that an impact should be studied to determine a dollar value to represent the impact of a DER to include in the PR Test. A "No" indicates it is likely too difficult in the near-term to determine a monetized value for the impact. It may become possible to develop a monetized value for impacts listed as "No".

3) **Sources:** This column proposes where the value for the impact can be obtained. The sources for impacts will depend on whether they are monetized or not.

1. Monetized Impacts: These impacts can be derived from modeling, a jurisdiction-specific study, or directly from PREPA/LUMA.

2. Non-Monetized Impacts: These impacts can be included in the PR Test either qualitatively or using a proxy.

   A qualitative impact is described in writing but is not included as a dollar value within the cost-effectiveness test.

   An adder is meant to capture benefits that cannot be monetized. These are commonly used for non-energy impacts.

[17] Regulation 9367, Sections 3.02, 4.02, and 4.03.

III. Puerto Rico Benefit-Cost Test Impact Prioritization

Category	Impact	Include	Monetize	Sources
Utility System Impacts				
Generation	Energy Generation	Yes	Yes	Modeling
	Capacity	Yes	Yes	Modeling
	Environmental Compliance	Yes	Yes	Modeling
	Renewable Portfolio Standard Compliance	Yes	Yes	Jurisdiction-specific value
	Ancillary Services	Yes	Yes	Modeling
Transmission	Transmission Capacity	Yes	Yes	Jurisdiction-specific value
	Transmission System Losses	Yes	Yes	Jurisdiction-specific value
Distribution	Distribution Costs	Yes	Yes	Jurisdiction-specific value
	Distribution System Losses	Yes	Yes	Jurisdiction-specific value
General	Program Incentives	Yes	Yes	PREPA Plan Filing
	Program Administration Costs	Yes	Yes	PREPA Plan Filing
	Program Administrator Performance Incentives	Yes - if applicable	Yes	PREPA
	Credit and Collection Costs	No	Yes	PREPA
	Utility Rate Riders	No	Yes	PREPA
	Risk	Yes	No	Qualitative
	Reliability	Yes	No	Qualitative
	Resilience	Yes	No	Qualitative
Host Customer Impacts				
Host Customer Energy Impacts	Host customer portion of DER costs	Yes	Yes	Market data or proxy
	Interconnection fees	No	Yes	N/A
	Risk	No	No	N/A
	Reliability	No	No	N/A
	Resilience	No	No	N/A
	Tax Incentives	No	No	N/A
Host Customer Non-Energy Impacts (NEIs)	Other Fuels and Water	Yes	Yes	Jurisdiction-specific value
	Property Asset Value	Yes	No	Qualitative
	Health & Safety	Yes	No	Adder
	Empowerment, Satisfaction & Pride	Yes	No	Qualitative
	Comfort	Yes	No	Adder
	Productivity	Yes	No	Adder
	Low-Income Host Customer NEIs	Yes	No	Adder
Societal Impacts				
Societal Impacts	Greenhouse Gas Emissions	Yes	Yes	Social Cost of Carbon
	Other Environmental	Yes	No	Qualitative
	Economic and Jobs	Yes	No	Qualitative
	Energy Security	Yes	No	Qualitative

Attachment C: The Puerto Rico Benefit-Cost Test Framework – Redlined

I. Introduction

The Puerto Rico Benefit-Cost Test ("PR Test") is the test to use for determining whether distributed energy resources ("DERs") are cost-effective. The PR Test will evaluate whether, and to what extent, proposed or actual DER programs or initiatives provide benefits greater than their costs.

Section II of the Framework sets forth a set of definitions used in the PR Test. Section III of the Framework includes the impacts by category to be included in the PR Test and a description of each impact.

II. Definitions

C) These definitions are to be used for the Puerto Rico Benefit-Cost Test and are not intended to modify the definitions used in any other Energy Bureau regulation or order.

D) For the purposes of the Puerto Rico Benefit-Cost Test, the following terms will have the meaning established below, except when the context of the content of any provision clearly indicates something else:

7) "Distributed Energy Resource" or "DER" means distributed generation, energy storage, microgrids, or any other resource, including but not limited to energy efficiency or demand response, that is connected to the distribution system and that assists in meeting at least one customer's electrical load.

8) "Host Customer" means a participant in PREPA's Program that installs a DER at their home or business.

9) "PREPA" means the Puerto Rico Electric Power Authority, a corporate entity created by Act No. 83 of May 2, 1941, as amended, and any successor distribution, transmission or generation owner or operator. Unless specified otherwise, if PREPA has a successor as the operator of the Transmission and Distribution System that entity shall be the primary entity responsible for performance as "PREPA" under this regulation.

10) "Program" means a collection of defined services and/or measures carried out by PREPA and/or its vendors and subcontractors that support the Distributed Energy Resources.

11) "Program Administrator" means PREPA in the role of implementing and delivering DER Programs.

12) "Social Cost of Carbon" or "SCC" means a value in dollars ($) that attempts to monetize the current and future damages resulting from CO_2 emissions.

III. Global Inputs to Puerto Rico Benefit-Cost Test

1) Discount Rate

A) Benefits and costs that are projected to occur over time shall be stated in present value terms in the PR Test calculation using a discount rate that appropriately reflects that energy efficiency or demand response is a low-risk resource in terms of cost of capital risk, project risk, and portfolio risk.

B) A discount rate of two percent (2.0%), in real terms, shall be used for the PR Test.

C) A two percent (2.0%) discount rate, in real terms, reflects both the low-risk nature of EE and DR and accounts for the societal focus of the PR Test. This discount rate is reasonable given the typical range of societal discount rates between one percent (1.0%) and three percent (3.0%), in real terms.

2) Social Cost of Carbon

A) The societal impacts of greenhouse gas emissions should be included in the PR Test as the Social Cost of Carbon ("SCC").

B) The SCC should be based on Puerto Rico-specific marginal abatement costs to achieve its greenhouse gas reduction goals and should be based on the same discount rate as the PR Test.

C) Prior to the development of a Puerto Rico-specific value, the Energy Bureau establishes the use of the most recent analysis conducted by the federal Interagency Working Group on the Social Cost of Greenhouse Gases ("Federal IWG") SCC.

3) Proxies

A) The use of proxies such as adders and multipliers are permitted as an interim solution for impacts that are currently not monetized.

B) The use of a proxy should be specific to the program sector (residential, low-income, commercial, and industrial), the program (retrofit, new construction, point of sale), and to the DER type.

C) The magnitude of the proxies should reflect the likely impacts of the DER, accounting for differences across programs, sectors, and rate classes.

IV. Proposed Puerto Rico Benefit-Cost Test Impacts

Category	**Impact**	**Description**
Utility System Impacts		
Generation	Energy Generation	The production or procurement of energy (i.e., kWh) from generation resources on behalf of customers. Includes the costs associated with the fuel cost and variable operations and maintenance costs. These costs can vary by season and time of day.
	Capacity	The generation capacity (i.e., kW) required to meet the forecasted system peak load.
	Environmental Compliance	Compliance costs associated with environmental regulations; net of those already embedded in Energy Generation.
	Renewable Portfolio Standard Compliance	Compliance cost associated with Puerto Rico's renewable portfolio standard as defined by the Puerto Rico Energy Public Policy Act.
	Ancillary Services	Services required to maintain electric grid stability and power quality (e.g., frequency regulation, voltage regulation, spinning reserves, and operating reserves).
Transmission	Transmission Capacity	Maintaining the availability of the transmission system to transport electricity safely and reliably. Locational transmission values should be used when feasible.

Category	Impact	Description
	Transmission System Losses	Electricity lost through the transmission system.
Distribution	Distribution Costs	Maintaining the availability of the distribution system to transport electricity safely and reliably. Includes capacity, O&M, voltage. Locational values should be used when feasible.
	Distribution System Losses	Electricity lost through the distribution system.
General	Program Incentives	Financial support provided by the Program Administrator to host customers (participants) or other market actors. May include rebates, upstream payments, interest rate buy-down.
	Program Administration Costs	Costs incurred by the Program Administrator related to the design, implementation, and evaluation DER programs. May include payments to trade allies, technical training, marketing, and payments to third-party consultants.
	Program Administrator Performance Incentives	Incentives offered to PREPA to encourage successful, effective implementation of DER programs.
	Credit and Collection Costs	PREPA's costs associated with arrearages, disconnections, and reconnections, that are impacted by DERs.
	Utility Rate Riders	PREPA's costs related to "Help to Humans Subsidies" such as low-income rate subsidies and municipal street lighting.
	Risk	Uncertainty including operational, technology, cybersecurity, financial, legal, reputational, and regulatory risks.
	Reliability	Maintaining generation, transmission, and distribution system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components.
	Resilience	The ability to anticipate, prepare for, and adapt to high impact, low frequency grid events and withstand, respond to, and recover rapidly from disruptions.
Host Customer Impacts		
Host Customer Energy Impacts	Host Customer portion of DER costs	Costs incurred to install and operate DERs (net of the incentive received from the Program).
	Interconnection fees	Cost paid by the Host Customer to interconnect DERs to the electric grid.
	Risk	Uncertainty including price volatility, power quality, outages, and operational risk related to failure of installed DER equipment and user error; may depend on the type of DER.
	Reliability	The ability to prevent or reduce the duration of Host Customer outages.
	Resilience	The ability to anticipate, prepare for, and adapt to high impact, low frequency grid events and withstand, respond to, and recover rapidly from disruptions
	Tax Incentives	Federal, Commonwealth, and local tax incentives provided to host customers to defray the costs of some DERs.
Host Customer Non-Energy Impacts ("NEIs")	Other Fuels and Water	Change in the Host Customer's consumption of oil, gasoline, propane, natural gas, and water due to the installation of a DER.

Category	Impact	Description
	Property Asset Value	Changes in the value of a home or business because of the DER (e.g., increased building value, improved equipment value, extended equipment life).
	Health & Safety	Changes in customer health or safety (e.g., fewer sick days from work or school, reduced medical costs, improved indoor air quality, reduced deaths). Change in risk of fire and fire-related property damage.
	Empowerment, Satisfaction & Pride	The satisfaction of being able to control one's energy consumption and energy bill and the satisfaction of helping to reduce environmental impacts
	Comfort	Changes in comfort level (e.g., thermal, noise, and lighting impacts).
	Productivity	Changes in a Host Customer's productivity (e.g., changes in labor costs, O&M costs, reduced waste streams, reduced spoilage).
	Low-Income Host Customer NEIs	All the above Host-Customer NEIs besides Reduced Home Foreclosures
Societal Impacts		
Societal Impacts	Greenhouse Gas Emissions	Social Cost of Carbon net of greenhouse gas compliance costs already embedded in Energy Generation.
	Other Environmental	Other air emissions, solid waste, land, water, and other environmental impacts.
	Economic and Jobs	Incremental economic development and job impacts represented in job-years. Job-years should be quantified but should not be directly included as a monetary value in cost-effectiveness.
	Energy Security	Risks associated with imports, such as volatile prices or supply curtailment.