



Development of the Puerto Rico Test Technical Workshop #2

July 21, 2021

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Agenda

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|-------------|--|
| 9:30-10:15 | Summary of comments on policy goals |
| 10:15-11:00 | Step 2: Identification of utility system impacts <ul style="list-style-type: none">• Determine impacts for inclusion• Developing definitions• Recommendations for quantification methods |
| 11:00-11:15 | Break |
| 11:15-12:20 | Continuation of Step 2 discussion |
| 12:20-12:30 | Wrap-up and next steps |

Summary of Workshop #1 Comments

Summary of Stakeholder Comments

Impact Category	Count of Category Mapped to Policy
Electric Utility System Impacts	15
Other Environmental	9
GHG Emissions	8
Participant Impact (Host Customer)	8
Resilience Impacts	7
Price Stability/low cost	7
Public Health	7
Economic Development/Jobs	6
Other Fuels (ex. oil)	5
Reliability	4
Energy Security	4
Low-Income Customer	4
Innovation	4
Equity	3
Renewable Integration	2
Education and Awareness	2

Summary of Stakeholder Comments

Rank	Policy, Statute or Decision	Electric Utility System Impacts	Resilience Impacts	Reliability	GHG	Other Environmental	Public Health	Economic Developments/Job	Energy Security	Participant Impact (Host customer)	Low-Income Customer	Price Stability/low cost	Other Fuels (ex. oil)	Innovation	Equity	Renewable Integration	Education and Awareness
High	Act 17-2019. Puerto Rico Energy Public Policy Act	ALL DERS	Others	All	LUMA - All			All	All	All	All	EE, DR		All	All	DR, Others	LUMA - All
High	Act 57-2014. Puerto Rico Energy Transformation and RELIEF Act.	LUMA - EE/DR OIPC - All			All	LUMA - All OIPC - EE, Others	LUMA - Others OIPC - All		LUMA - Others OIPC - All			LUMA - All OIPC - EE/DR					
LUMA - High OIPC - medium	Act 60-2019, as amended. Puerto Rico Incentives Code.	LUMA - Others OIPC - All						LUMA - Others OIPC - All									
LUMA - High OIPC - Low	Act 114-2007. Electric Power Authority Net Metering Program	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others					LUMA - All OIPC - DR				LUMA - All OIPC - EE, Others				
High	Act 120-2018. Puerto Rico Electric Power System Transformation Act	All										All					

Summary of Stakeholder Comments Continued

Rank	Policy, Statute or Decision	Electric Utility System Impacts	Resilience Impacts	Reliability	GHG Emissions	Other Environmental	Public Health	Economic Development/Jobs	Energy Security	Participant Impact (Host customer)	Low-Income Customer	Price Stability/low cost	Other Fuels (ex. oil)	Innovation	Equity	Renewable Integration	Education and Awareness
LUMA - High OIPC - Low	Act 82-2010. Puerto Rico Energy Diversification Policy	All			LUMA - Other OIPC - EE, Others	All	LUMA - Others OIPC - All	All		All	EE/DR	All	LUMA - Others OIPC - All			LUMA - Others OIPC - DR	
LUMA - High OIPC - Low	Act 218-2008. Light Pollution Control and Prevention Act	LUMA - DR OIPC - EE				LUMA - Others OIPC - EE	LUMA - Others OIPC - EE										
LUMA - High OIPC - Low	Act 33-2019. Climate Change Mitigation, Adaptation, and Resilience Act	LUMA - All OIPC - EE, Others	LUMA - All OIPC - EE, Others		All	All	LUMA - Others OIPC - All	All				LUMA - DR OIPC - All	LUMA - Others OIPC - EE, Others	LUMA - Others OIPC - EE, Others	LUMA - Others OIPC - EE, Others		
LUMA - Medium OIPC - Low	PREB Regulation No. 9028. Microgrid Development	LUMA - DR OIPC - DR, Others	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others		LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others		LUMA - Others OIPC - DR, Others		LUMA - Others OIPC - DR, Others		LUMA - Others OIPC - DR, Others			
LUMA - Medium OIPC - High	PREB Regulation No. 9021. IRP	All	All		All	All											
Medium	PREB Regulation 8818. (CILTA)	LUMA - EE/DR OIPC - EE, Others								LUMA - EE/DR OIPC - EE		LUMA - All OIPC - EE, Others					

Summary of Stakeholder Comments Continued

Rank	Policy, Statute or Decision	Electric Utility System Impacts	Resilience Impacts	Reliability	GHG Emissions	Other Environmental	Public Health	Economic Development/Jobs	Energy Security	Participant Impact (Host customer)	Low-Income Customer	Price Stability/low cost	Other Fuels (ex. oil)	Innovation	Equity	Renewable Integration	Education and Awareness
LUMA - Medium OIPC - Low	PREPA Regulation 8915 and 8916. Interconnection and Net Metering	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others	LUMA - Others OIPC - DR, Others					OIPC - DR	LUMA - EE/DR			OIPC - EE, Others				
LUMA - N/A OIPC - Medium	Energy Star-EPA	EE/DR			LUMA - All OIPC - EE/DR	LUMA - All OIPC - EE/DR				EE/DR	EE/DR						
LUMA - N/A OIPC - Medium	State Energy Program -PPPE	LUMA - EE/DR OIPC - All			All	All	LUMA - Others OIPC - All			LUMA - EE/DR OIPC - All	LUMA - EE/DR OIPC - All		LUMA - EE/DR OIPC - All		LUMA - EE/DR OIPC - All		
LUMA - N/A OIPC - Low	LEED-USGBC	All	LUMA - Others		All	All	LUMA - All	LUMA - All		LUMA - Others				LUMA - Others			LUMA - All

Today's Task

Step 2: Identify Utility System Impacts

Potential Electric Utility System Impacts

Type	Utility System Impact	EE	DR	DG	Storage	Electrification
Generation	Energy Generation	●	●	●	●	●
	Capacity	●	●	●	●	●
	Environmental Compliance	●	●	●	●	●
	RPS/CES Compliance	●	●	●	●	●
	Market Price Effects	●	●	●	●	●
	Ancillary Services	●	●	●	●	●
Transmission	Transmission Capacity	●	●	●	●	●
	Transmission System Losses	●	●	●	●	●
Distribution	Distribution Capacity	●	●	●	●	●
	Distribution System Losses	●	●	●	●	●
	Distribution O&M	●	●	●	●	●
	Distribution Voltage	●	●	●	●	●
General	Financial Incentives	●	●	●	●	●
	Program Administration Costs	●	●	●	●	●
	Utility Performance Incentives	●	●	●	●	●
	Credit and Collection Costs	●	●	●	●	●
	Risk	●	●	●	●	●
	Reliability	●	●	●	●	●
	Resilience	●	●	●	●	○

● = typically, a benefit for this resource type; ● = typically a cost for this resource type; ● = either a benefit or cost for this resource type, depending upon the application of the resource; ○ = not relevant for this resource type

Key Considerations for Today's Discussion

- Utility system impacts are foundational to cost-effectiveness
 - Indicates to what extent total utility system costs are reduced or increased by a DER
- DERs should be treated as a utility system resource and account for all relevant, material impacts
 - Important to distinguish between two questions:
 - whether an impact should be included in the framework
 - the value of the impact
 - Depending on the program and the DER an impact can be a cost or a benefit
 - Need to determine whether certain costs (environmental, carbon, resilience) are utility system, host customer, or societal impacts
- Concurrent avoided cost study
 - Calculation of avoided energy costs underway
 - Feedback from these workshops will inform development of additional avoided cost values

Process and Key Questions

For each utility system impact we will discuss the following:

1. How should the impact be defined?
 - The definition should be specific to Puerto Rico
 - For example, what is considered an environmental compliance cost from a PR perspective (carbon, air quality compliance costs, etc.)?
2. What are potential methods for quantification?
 - What type of analysis is needed to quantify and monetize the impact?
 - At what level should the impact be quantified (hourly vs annual) and should temporal/locational aspects be considered?
 - If an impact could also be considered for host customer or societal, how do you ensure its not double counted?
 - Identify if there is already an existing standard to ensure DER impacts are incremental

Energy Generation

The production or procurement of energy (kWh) from generation resources on behalf of customers.

- DERs can lead to an increase or decrease in energy generation.
- Points to consider
 - Temporal (on/off peak), granularity (hourly, monthly, seasonal)
 - Treatment of line losses
 - Embedded costs – current or future environmental regulations

Generation Capacity

The generation capacity (kW) required to meet the forecasted system peak load.

- Capacity costs can be avoided when utilities do not have to build new generation facilities or construction can be deferred due to a reduction in coincident peak demand
- Points to consider
 - System peak (single hour, % of top load)
 - Locational (zones or regions of system)
 - Reserve margin, line losses, derating of DER during peak

Environmental Compliance

Actions to comply with environmental regulations.

- DERs can reduce the cost of complying with regulations that require reductions in GHG, SO₂, NO_x, ozone, particulates, and mercury
- Points to consider
 - What are the existing federal and Puerto Rico-specific mandates?
 - Are there anticipated future requirements?
 - Marginal emissions rate of DER
 - Are costs already embedded in energy prices?

Renewable Portfolio Standard (RPS) Compliance

Actions to comply with renewable portfolio standards or clean energy standards.

- An increase or decrease in electricity consumption can reduce compliance with clean energy requirements
- Points to consider
 - Existence of binding targets
 - Whether costs are embedded in electricity prices

Ancillary Services

Services required to maintain electric grid stability and power quality.

- Frequency regulation, voltage regulation, spinning reserves, and operating reserves
- Points to consider
 - May apply to some DERs and not others
 - The impact of a DER will depend on the timing of operation and the real-time system conditions

Transmission Capacity and System Losses

- Capacity: maintaining the availability of the transmission system to transport electricity safely and reliably
 - Points to consider
 - When DERs reduce electric load they can actively and passively help to eliminate or defer investments in transmission
 - How will new transmission build/rebuild affect this impact?
 - With load declining impact may be zero but should be included
 - Island-wide versus locational value
- System Losses: electricity lost through the transmission system
 - Points to consider
 - If a customer is meeting its own load through a DER it could avoid electricity transmission and therefore transmission losses.

Distribution Capacity and System Losses

- Capacity: maintaining the availability of the distribution system to transport electricity safely and reliably
 - Points to consider
 - How will new distribution build/rebuild affect this impact?
 - Island-wide versus locational value
- System Losses: electricity lost through the distribution system.
 - Points to consider
 - If a customer is meeting its own load through a DER it could avoid electricity distribution and therefore distribution losses.

Distribution Operations and Maintenance

Expenses related to operating and maintaining the distribution system.

- A portion of these expenses are related to the volume of energy flowing through the system and can therefore be impacted by an increase or decrease in load
- Points to consider
 - Intermittency of DERs
 - Marginal vs. average impacts (impact of marginal changes in load may differ from impact of changes in average load)

Distribution Voltage

Maintaining voltage levels within an acceptable range to ensure that both real and reactive power production are matched with demand.

- Points to consider
 - Impact will depend on the DER operation profile relative to real-time system conditions.
 - Risk of double counting with ancillary services and distribution capacity benefit

Financial Incentives

Utility financial support provided to DER host customers or other market actors to encourage DER implementation.

- Typically includes rebates, interest-rate buy-downs, and/or upstream payments to retail stores or contractors

Program Administration

Utility outreach to trade allies, technical training, marketing, payments to third-party consultants, and administration and management of DERs programs.

- These costs are not known or established, but will be in the future
- Points to consider:
 - Should only ratepayer costs be included, or also PR taxpayer or federal program costs?
 - Treatment of non-utility programs

Utility Performance Incentives

Incentives offered to utilities to encourage successful, effective implementation of DER programs.

- LUMA performance incentives subject of PREB proceedings

Credit and Collection

Utility costs associated with arrearages, disconnections, and reconnections.

- Points to consider
 - DERs that help customers save energy and lower energy bills may lead to fewer defaults
 - How are credit and collection costs recovered?

Proposed Category: subsidy/rate coverage

Utility costs associated providing electricity to municipalities, streetlights, etc.

- Points to consider
 - DERs can reduce electricity costs, creating a utility system benefit in addition to the avoided energy and capacity costs.

Risk

Uncertainty including operational, technology, cybersecurity, financial, legal, reputational, and regulatory risks.

- DERs can reduce risk by limiting exposure to volatile fossil fuel prices and increasing the diversity of the energy supply
- DERs can increase risk related to cybersecurity, customer willingness to participate in demand response events, and new technologies
- Points to consider
 - Should not be double counted with reliability and resilience impacts

Reliability

Maintaining generation, transmission, and distribution system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components

- Points to consider
 - Lowering electricity demand or increasing distributed generation can reduce strain on the electric grid
 - To what extent is reliability already being quantified? How would it be valued, in \$ terms?
 - Ex. system average interruption duration index (SAIDI), system average interruption frequency index (SAIFI), customer average interruption duration index (CAIDI).
 - Impact will relate to available capacity on the system
 - T&D system investments to return to standard levels are already planned so what incremental value will DERs create?

Resilience

The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions

- Points to consider
 - Distributed generation and storage can provide power to residents during power outages
 - T&D system and DER investments to provide an increased level of resilience are already planned (see Optimization Proceeding) so what incremental value will marginal additional DERs create?
 - How to distinguish between host customer and utility system impacts (avoid double counting)
 - Should not be double counted with reliability and risk

Next Steps

Comments and Next Meeting

- Comments can be submitted until Friday, August 13th on topics covered in this workshop
- *We will review before next workshop and begin the meeting with a discussion of any outstanding issues, comments, or questions related to Workshop #2*
- Third workshop will focus on identifying non-energy impacts