

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

**NEPR**

**Received:**

**Nov 4, 2021**

**4:46 PM**

**IN RE:**

THE PERFORMANCE OF THE PUERTO  
RICO ELECTRIC POWER  
AUTHORITY

**CASE NO.:** NEPR-MI-2019-0007

**SUBJECT:** LUMA's Presentation for the  
November 4, 2021 Technical Conference

**MOTION SUBMITTING LUMA'S PRESENTATION DURING THE  
TECHNICAL CONFERENCE OF NOVEMBER 4, 2021**

**TO THE PUERTO RICO ENERGY BUREAU:**

**COME NOW, LUMA ENERGY, LLC and LUMA ENERGY SERVCO, LLC** (collectively, **LUMA**), through the undersigned legal counsel and respectfully state and request the following:

1. On November 4, 2021 the Puerto Rico Energy Bureau held a technical conference to discuss aspects several reliability metrics involving both the Transmission and Distribution System and generators.
2. During the technical conference, LUMA used a presentation to illustrate the information provided. The presentation is attached as Exhibit 1.

**WHEREFORE**, LUMA respectfully submits its presentation of November 4, 2021 to be included in the docket of this proceeding.

**RESPECTFULLY SUBMITTED.**

In San Juan, Puerto Rico, on November 4, 2021.

I hereby certify that I filed this motion using the electronic filing system of this Energy Bureau and that I will send an electronic copy of this motion to the attorneys for PREPA, Joannely Marrero-Cruz, [jmarrero@diazvaz.law](mailto:jmarrero@diazvaz.law); and Katuska Bolaños-Lugo, [kbolanos@diazvaz.law](mailto:kbolanos@diazvaz.law).



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EXHIBIT 1



NEPR-MI-2019-0007

Performance Metrics

Technical Conference

November 4, 2021



# Overview

- On September 20, 2021, LUMA submitted 538 statistics related to Transmission & Distribution & 97 statistics for Generation for the period of June, July & August
- On October 15<sup>th</sup>, PREB scheduled a technical conference to discuss certain metrics in the T&D and Generation areas for further discussion:

## T&D and System Operations

- System Average Interruption Duration index (SAIDI)
- System Average Interruption Frequency Index (SAIFI)
- Purchased Energy from Power Purchasing Operating Agreements (PPOAs)

## Generation

- Forced Outage Percentages
- Availability Percentages

# Summary of Statistics Submitted to the Energy Bureau

- LUMA submitted statistics over the following 9 categories:
  - Overall System
  - Customer Service
  - Operations – Warehousing
  - Operations - Fuel
  - Generation
  - Transmission & Distribution
  - Finance
  - Operations – Fleet
  - Renewable Energy & Demand Side Management

As LUMA described during the Front-End Transition, many of the statistics lacked data collection procedures or supporting documentation; overall PREPA reporting had serious flaws and in several cases were misleading

As part of bringing utility functions up to industry standards LUMA is developing new processes in order to properly collect data, calculate and report statistics

**Overall, comparisons of PREPA's reported statistics with LUMA's are premature and caution should be used in comparing PREPA's reported numbers**

# Inconsistency and significant gaps in data pervasive at PREPA

Metrics related to PREPA's T&D System and Generation Fleet are plagued with poor data quality and inconsistent methodologies

Some examples of what LUMA has discovered to date:

- Safety metrics – removing casi casi from reporting
- Customer Service – call numbers based on truncated system and do not represent all calls placed to PREPA
- Reliability metrics – OMS not up to date, removal of over 50% of cause codes, calculations not based on industry standard
- Fleet – no supporting documentation regarding numbers
- Technical losses – do not have required data (meters at generation interconnection points) to accurately calculate metric

# Good Quality Data and Consistent Methodologies Required for Meaningful Metrics

Comparisons between a few months of data are inherently unreliable

- Metrics calculated using methodologies not consistent with industry standards do not represent actual performance or reflect customer experience; differing methodologies make comparisons of statistics inconclusive
- Changes to data collection methods, quality and business systems can lead to significant change to metrics with no underlying change in actual performance or customer experience
- Transformation process will take time and must be sustainable



# Reliability Metrics



# PREPA's reliability metrics (SAIDI and SAIFI) were not calculated using industry standard methodology<sup>1</sup>

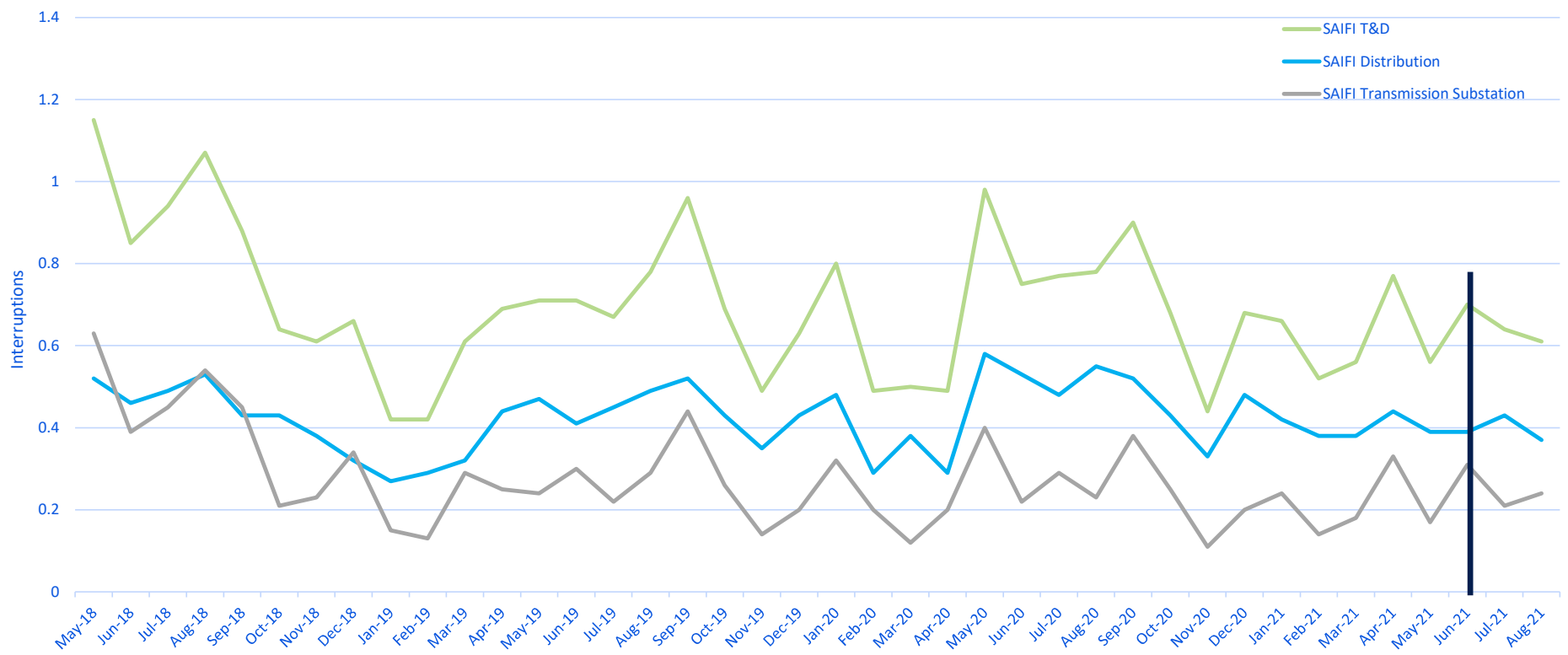
- Prior to March 2021 PREPA **did not calculate reliability metrics according to IEEE Std. 1366-2012™ methodology**
  - 1) Major Event Day Threshold (TMED) **had not been calculated since 2017** (calculation was based on 4 years of data)
  - 2) **Transmission and substation events were excluded** from PREPA's calculations
  - 3) Nearly **Over 50%** of the interruption event cause codes **excluded** from calculations (Interruptions caused by 28 of PREPA's predefined 43 cause codes were *not* used in calculation of SAIFI and SAIDI)

<sup>1</sup>LUMA addressed this issue on February 5, 2021 in Exhibit 2 of LUMA's comments regarding PREPA's performance and baselines, NEPR-2019-MI-0007.

## LUMA has reviewed and recalculated reliability statistics

- LUMA recalculated PREPA's reliability metrics according to IEEE Std. 1366-2012™ methodology based on information available

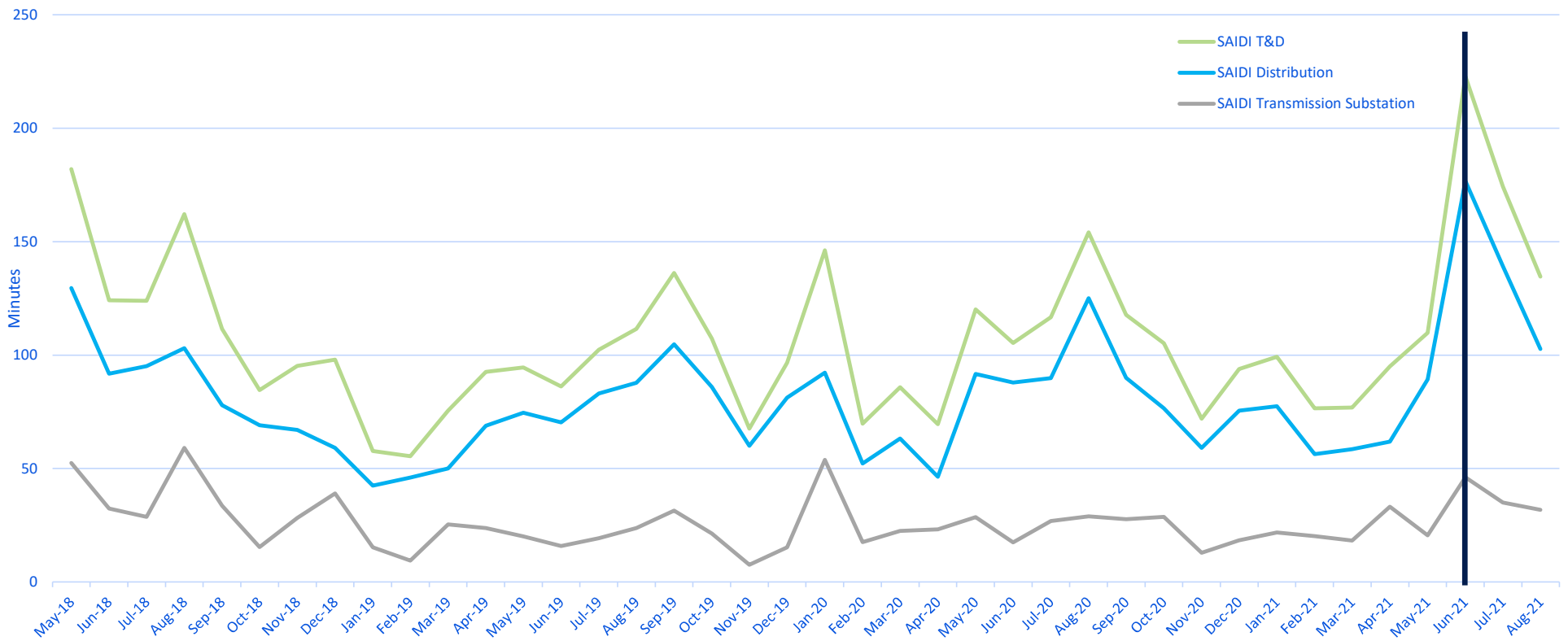
# System Average Interruption Frequency Index (SAIFI) May 2018 – August 2021 (Recalculated)



Graph depicts recalculated SAIFI values.



# System Average Interruption Duration Index (SAIDI) May 2018 – August 2021 (Recalculated)



Graph depicts recalculated SAIDI values.

NEPR-MI-2019-0007  
November 4, 2021



# LUMA immediately faced challenges in four key areas

1) Significant Backlog	2) Blocked Access to equipment and workspaces	3) Declining T&D Asset Quality	4) Outdated Information System
<ul style="list-style-type: none"> <li>A significant outage backlog (outages that had not been restored by PREPA)</li> </ul>	<ul style="list-style-type: none"> <li>An inadequate number of safe, working fleet vehicles (e.g., bucket trucks, derrick digger, etc.) impaired repair work</li> <li>UTIER blocked yard &amp; work location access, requiring security escorts and caused significant delays</li> </ul>	<ul style="list-style-type: none"> <li>Significant number of breakers &amp; reclosers out of service</li> <li>Many breakers double-circuited due to failure of breakers – operation of one breaker takes out two circuits</li> <li>Annealed conductors due to long duration overloads leading to mechanical failure</li> </ul>	<ul style="list-style-type: none"> <li>OMS upgrade executed in May (first one in 12 years)</li> <li>Further modifications required</li> <li>DOE National Lab study concluded “...utilities that install or upgrade their OMS report higher SAIDI by nearly 14%”<sup>1</sup></li> </ul>

<sup>1</sup>Lawrence Berkley National Laboratory Distribution-level electricity reliability: Temporal trends using statistical analysis. Joseph H. Eto. Energy Policy. Volume 49, 2012-10-31, Pages 243 - 252



## Two major causes for distribution outages are equipment failure and overgrown vegetation

- Vegetation Management & Wire Down account for as much as 50% of distribution outages
  - PREPA's VM efforts since Hurricane Maria have not resulted in control of vegetative growth impacting T&D lines; typical electric utility trim cycle in the U.S. is 3-4 years
  - Asset health is low and is declining

29 Distribution Outage Causes		
115 kV Transmission Line	Defective Cutout	Other Causes
38 Kv Transmission Line	Defective Pole	Overload
Animal	Defective Switch	Secondary Defective Pole
Atmospheric Disturbance	Faulty Power Transformer	Secondary Vegetation
Bad Weather	Faulty Transformer	Secondary Wire down
Breaker (Transmission)	Fire	Switch
Broken Cable	Human Error	Transmission Substation Bus Outage
Broken Insulator / Pin	Lightning Arresters	Vegetation
Broken Splice / Terminal	Miss Coordination	Wire Down
Broken / Rusty Hardware	No Cause Reported	

*Wire Down & Vegetation  
attribute to 30-50% of the  
outages*



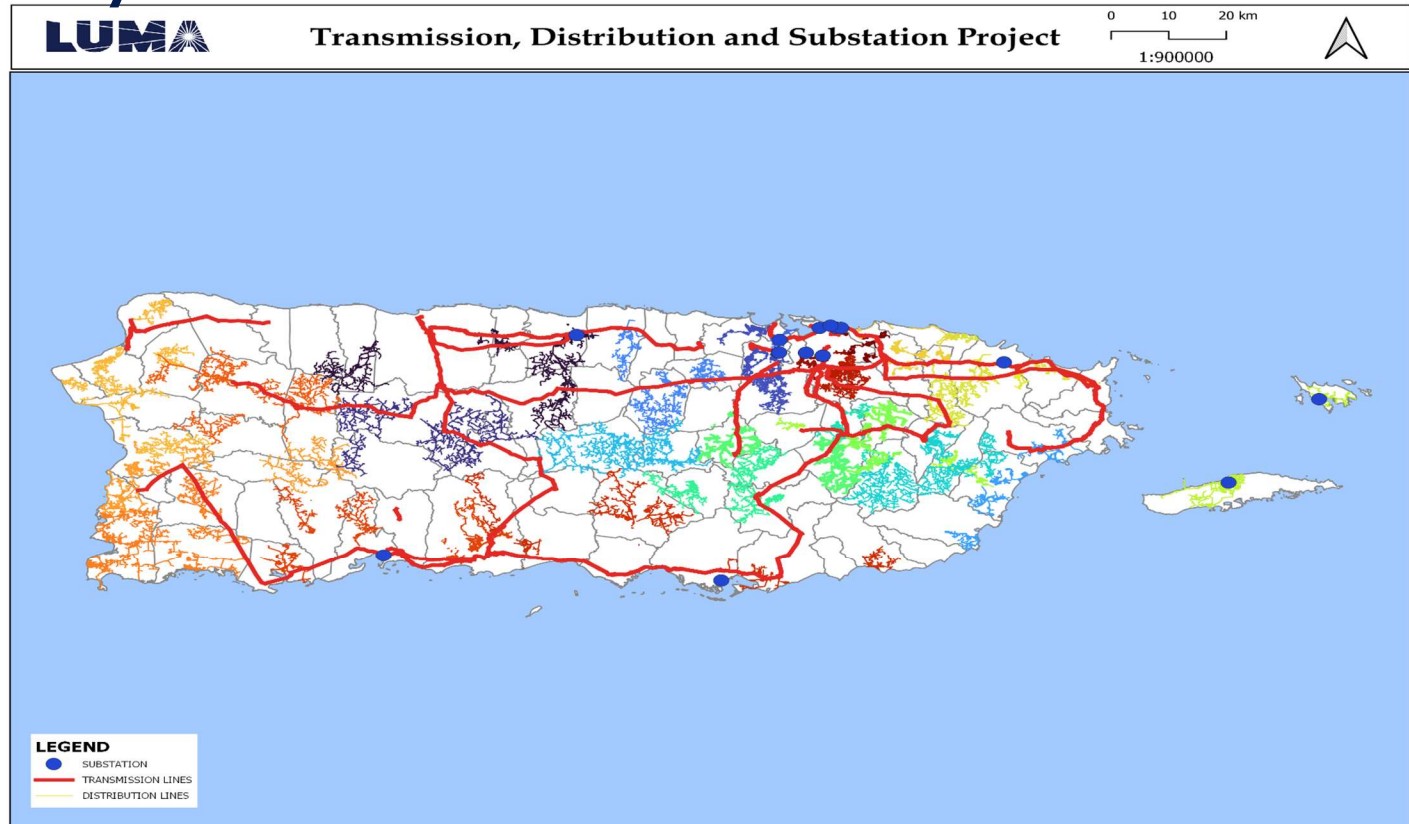
## LUMA focused on systematically improving reliability for sustainable improvement

- LUMA's strong focus on **safety and work methods** can, at first, cause some delay in restoration
- LUMA **identifying & repairing outage root cause** as opposed to quickest fix that are often unsustainable and result in repeat outages
  - Past techniques consisted mainly of putting service back on; therefore, customers would experience repeated outages for the same cause
  - LUMA's service restoration technique is to fix the underlying problem that is causing these outages, which can take more time
- Over 800 malfunctioning or out-of-service grid elements identified
  - 259 distribution circuit breakers out of service on June 1; 90 have since been repaired or replaced



# Major improvements to reliability will depend on progress of Federally Funded Work

94 projects currently in the pipeline to recover the grid, improve resilience and reliability

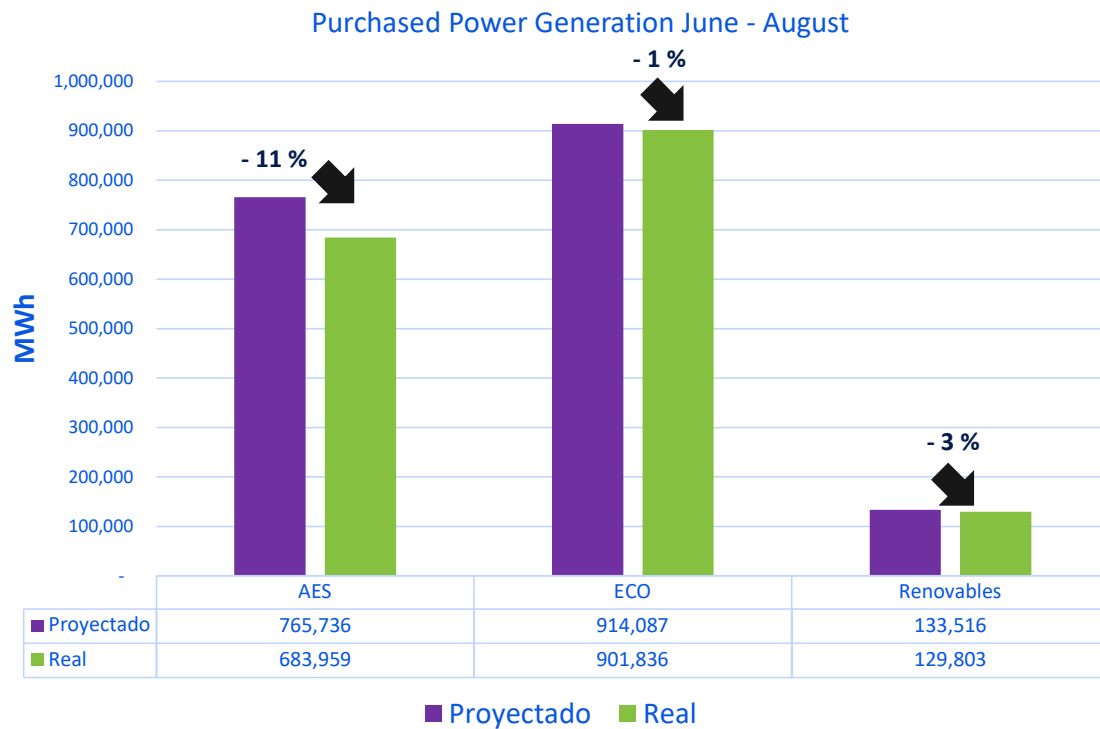


# Purchased Energy Metrics

NEPR-MI-2019-0007  
November 4, 2021



# Actual purchased power in Q1 FY22 was ~5% lower than projected



## 3-month Total Generation Comparison:

- Forecasted: 1,813,338 MWh
- Actual: 1,715,598 MWh
- Variance: -97,740 MWh (-5.4%)

## Key Factors

- **AES** production was modeled assuming full capacity which is 454 MW, (227 MW per unit) – UI actual capacity is derated.
- **EcoEléctrica** slight difference is due to the use of these units for regulation of the system
- **Renewable** variance is directly affected by the climate conditions, thus explaining the variance



This slide was presented to PREB September 22, 2021 in a Technical Conference for NEPR-MI-2020-0001.



Thank You

