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

IN RE: PERFORMANCE METRICS TARGETS FOR LUMA ENERGY SERVCO, LLC	**CASE NO. NEPR-AP-2020-0025** **SUBJECT:** **LUMA Witnesses' Additional Rebuttal Testimonies**

LUMA'S MOTION SUBMITTING ADDITIONAL REBUTTAL TESTIMONIES

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

COME now **LUMA Energy, LLC** ("ManagementCo"), and **LUMA Energy ServCo, LLC** ("ServCo"), (jointly referred to as the "Operator" or "LUMA"), and respectfully state and request the following:

1. On January 14, 2022, the Energy Bureau issued a Resolution and Order amending the procedural calendar in this instant proceeding ("January 14th Resolution and Order"). The Energy Bureau ordered LUMA to submit its witnesses' rebuttal testimonies on or before February 1, 2022.

2. On January 28, 2022, LUMA filed *LUMA's Request for an Extension of Time to File Rebuttal Testimonies*. Therein, LUMA informed the Energy Bureau that it expected to file some of its witnesses' rebuttal testimonies by the February 1st deadline. However, LUMA disclosed that it understood that the remaining witnesses' rebuttal testimonies could not be finalized until LUMA received the outstanding supplemental responses to the discovery requests issued by the Local Environmental and Civil Organizations ("LECO") and the Independent Consumer Protection Office ("ICPO"). Those supplemental responses were due no earlier than

February 4, 2022. Thus, LUMA requested that the Energy Bureau extend the timeframe to submit the rebuttal testimonies to February 17, 2022.

3. On January 31, 2022, the Energy Bureau issued a Resolution and Order granting LUMA until February 17, 2022, to file rebuttal testimonies on the intervenors' pre-filed direct testimonies.

4. On February 1, 2022, LUMA filed the *Motion Submitting Rebuttal Testimonies*. LUMA submitted the rebuttal testimonies of five of its witnesses and reiterated that the remaining testimonies would be filed by the set date of February 17, 2022.

5. In compliance with the January 14th and 31st Resolutions and Order, LUMA respectfully submits with this motion as **Exhibit 1** the following pre-filed witnesses' rebuttal testimonies. All of these witnesses are employees of LUMA and are presenting their rebuttal testimonies on behalf of LUMA:

a. Mr. Donald Hall – Senior Director - Engineering & Asset Management

b. Mr. Don Cortez – Vice President – Utility Transformation

c. Ms. Jessica Laird – Vice President of Customer Experience

d. Mr. Lee Wood – Director, Business Transformation

6. LUMA also submits with this motion as **Exhibit 2**, the pre-filed expert witnesses rebuttal testimonies of Mr. Branko Terzic and Mr. Juan Lara. Both are presenting their expert rebuttal testimonies on behalf of LUMA.

7. As required, all of the above-described pre-filed witnesses' and expert witnesses' testimonies have been duly notarized by public notaries in Puerto Rico, with the exceptions of the

pre-filed testimonies of Mr. Donald Hall, which was notarized in the State of Delaware, and Mr. Branko Terzic that was notarized and legalized in the State of Virginia.

8. Diligences are underway to submit the certification of the Delaware Secretary of State, Division of Corporations, to complete the legalization of the testimony of Mr. Donald Hall. LUMA will submit the evidence of legalization by the Delaware Secretary of State, Division of Corporations, as soon as it is received in the following days.

9. In view of the foregoing, LUMA respectfully requests that this Energy Bureau receive and accept the above-described pre-filed witnesses' and expert witnesses' rebuttal testimonies. LUMA also petitions that the Energy Bureau receive and accept the pre-filed witness testimony of Mr. Donald Hall, notarized in Delaware, and allow LUMA to supplement the filing by submitting the evidence of authentication and legalization forthwith once the process has been completed.

10. As informed in *LUMA's Urgent Request for an Extension of Time to File the Rebuttal Testimony of Mario Hurtado*, due to an unexpected urgency, LUMA will submit the rebuttal testimony of Mr. Mario Hurtado by February 25, 2022.

WHEREFORE, LUMA respectfully requests that the Energy Bureau **receive and accept** the rebuttal testimonies submitted as Exhibits 1 and 2 of this Motion; and **deem** that LUMA partially complied with the requirements of this Energy Bureau's Resolutions and Order dated January 14 and 31, 2022, with regards to the pre-filed witnesses rebuttal testimonies. Furthermore, LUMA requests that the Energy Bureau accept the pre-filed witness testimony of Mr. Donald Hall, notarized in Delaware, and allow LUMA to supplement the filing by submitting the evidence of authentication and legalization forthwith once the process has been completed.

RESPECTFULLY SUBMITTED.

We hereby certify that we 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; and Katiuska Bolaños-Lugo, kbolanos@diazvaz.law, the Office of the Independent Consumer Protection Office, Hannia Rivera Diaz, hrivera@jrsp.pr.gov, and counsel for the Puerto Rico Institute for Competitiveness and Sustainable Economy ("ICSE"), Fernando Agrait, agraitfe@agraitlawpr.com, counsel for the Colegio de Ingenieros y Agrimensores de Puerto Rico ("CIAPR"), Rhonda Castillo, rhoncat@netscape.net, and counsels for Comité Diálogo Ambiental, Inc., El Puente de Williamsburg, Inc., Enlace Latino de Acción Climatica, Alianza Comunitaria Ambientalista del Sureste, Inc., Coalicion de Organizaciones Anti-Incineración, Inc., Amigos del Río Guaynabo, Inc., CAMBIO, Sierra Club and its Puerto Rico Chapter, and Unión de Trabajadores de la Industria Eléctrica y Riego (jointly, Puerto Rico Local and Environmental Organizations), larroyo@earthjustice.org, rstgo2@gmail.com, notificaciones@bufete-emmanuelli.com, pedrosaade5@gmail.com., jessica@bufete-emmanuelli.com; rolando@bufete-emmanuelli.com, rmurthy@earthjustice.org, flcaseupdates@earthjustice.org

In San Juan, Puerto Rico, this 17th day of February 2022.

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Exhibit 1

Pre-Filed Witnesses' Rebuttal Testimonies

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Rebuttal Testimony of
Mr. Donald Hall
Senior Director - Engineering & Asset Management, LUMA Energy ServCo LLC
February 17, 2022

Q. Please state your name.

A. My name is Donald Hall.

Q. Please state your business mailing address, title, and employer.

A. My business mailing address is PO Box 363508 San Juan, Puerto Rico 00936-3508. I am the Senior Director of Engineering & Asset Management for LUMA Energy.

Q. Please state your educational background.

A. I graduated from Kansas State University in 2010 with a Master of Science Degree in Electrical Engineering with a Power Systems Emphasis, and from Capitol Technology University in 1986 with a Bachelor of Science Degree in Electronics Engineering Technology and in 1982 with an Associate in Arts Degree in Electronics Engineering Technology.

Q. Please state your professional experience.

A. I have approximately 40 years of professional experience in the utility industry. I joined LUMA Energy as a Senior Director in Engineering & Asset Management in 2020. My professional experience includes the Engineering, Operations, and Regulatory areas of the Distribution & Transmission segments of the electric utility industry. Recent focus includes business and technical integration of Distributed Energy Resources / Non-Wires Alternatives, Distribution System Load Forecasting methods incorporating DER, the addition of stakeholder involvement and transparency in the Distribution System Planning process, Transmission and Distribution Reliability, Outage Management Systems, initial development of performance indicators to be used in performance-based rate-making proposals, and development of performance metrics to be used in incentivizing Transmission and Distribution Operations. I have an extensive background in state and

federal regulatory proceedings, including serving as an expert witness. I am an active senior member of the IEEE Power & Energy Society, including:

- Member IEEE PES Distribution Reliability Working Group
    - Co-author of IEEE Std. 1366™ IEEE Guide for Electric Power Distribution Reliability Indices, and IEEE Std. 1782™ IEEE Guide for Collecting, Categorizing, and Utilizing Information Related to Electric Power Distribution Interruption Events
- Member IEEE PES Distribution Resiliency Working Group
- Member Smart Distribution Working Group

I am an active senior member of the IEEE Standards Association (the IEEE authority for reviewing, editing, approving, and publishing proposed IEEE Standards) and approved balloter of the recently revised IEEE Std. 1366™ and IEEE Std. 1782™

- Past Co-chair of the BESS Super Session 2019 IEEE PES General Meeting
- Past Chair IEEE PES General Meeting Steering Committee
- Past Vice-Chair IEEE PES Innovative Smart Grid Technologies North America Conference
- Technical paper reviewer for IEEE PES Distribution Subcommittee

I am also a past adjunct college engineering instructor.

Q. Please describe your work experience prior to joining LUMA.

A. I have approximately 17 years of experience in various technical, engineering, and supervisory roles with Potomac Electric Power Company (PEPCo – Washington, DC) and 13 years of experience in different supervisory and management roles with Pepco Holdings (an Exelon Company), which consists of Atlantic City Electric (New Jersey), Delmarva

Power (Delaware & Maryland) and PEPCo (Washington, DC). I have five years of Outage Management System (OMS) and Advanced Distribution Management System (ADMS) experience in a Product Management role with SPL WorldGroup (formerly CES International, now Oracle Utilities) and two years of non-destructive cable testing experience in management roles with Northern States Power (now Xcel Energy). I have one year of utility consulting experience in a Senior Director / Executive Consulting role with Quanta Technology, LLC. Lastly, I have two years of experience in a Senior Director / Engineering role at LUMA supporting Asset Management, System Operations, and Regulatory.

Q. Do you hold any professional licenses?

A. Yes. I am a Licensed Professional Engineer in Delaware, Maryland, and Washington, DC.

Q. Have you previously testified or made presentations before the Puerto Rico Energy Bureau?

A. No.

Q. On whose behalf are you testifying before the Puerto Rico Energy Bureau?

A. My testimony is on behalf of LUMA as part of the Puerto Rico Energy Bureau ("Energy Bureau"), Commonwealth of Puerto Rico Public Service Regulatory Board proceeding Case No. NEPR-AP-2020-0025, the Performance Targets for LUMA Energy ServCo, LLC.

Q. Are there any exhibits attached to your testimony?

A. No.

Q. What is the purpose of your rebuttal testimony?

A. To respond to those portions of the pre-filed testimony of Mr. Agustín Irizarry ("Mr.

Irizarry") on behalf of the Local Environmental and Civil Organizations ("LECO"), filed on November 16, 2021, in this proceeding, regarding performance metrics, his recommendations to require disclosure of raw outage data, adopt performance metrics from other jurisdictions such as Hawaii, Illinois, California, United Kingdom, and the adoption of metrics from the Long Island Power Authority's ("LIPA") contract with the Public Service Enterprise Group ("PSEG").

Q. Did you consider any documents for your rebuttal testimony?

A. Yes, I did.

Q. Which documents did you consider for your rebuttal testimony?

a. LUMA's Performance Metrics Targets Revised filing submitted on September 24, 2021, in this proceeding, Case No. NEPR-AP-2020-0025,

b. The pre-filed testimony of Mr. Agustín Irizarry of November 16, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025 and his expert report, which is an exhibit of his pre-filed testimony,

c. The responses provided by Mr. Agustín Irizarry to LUMA's First and Second Sets of Interrogatories and Requests for Production of Documents notified on January 13, 2022,

d. The responses provided by Mr. Agustín Irizarry to the Puerto Rico Energy Bureau's Requirements for Information notified on December 20, 2021,

e. The supplemental responses provided by Mr. Agustín Irizarry to LUMA's First and Second Sets of Interrogatories and Requests for Production of Documents, notified on February 4, 2022, and

f. Second Amended and Restated Operations Services Agreement between Long Island

Lighting Company d/b/a LIPA and PSEG Long Island LLC dated December 15, 2021.

Q. Did you rely on any other information for your testimony?

A. My professional experience, including my experience in connection with the Transmission and Distribution System of the Puerto Rico Electric Power Authority ("PREPA") and its operations ("T&D System").

Q. Do you have a response to Mr. Irizarry´s conclusion on page 6, lines 16-21, of his pre-filed testimony that LUMA's performance metrics, if achieved, would only result in reasonable 20th-century utility service for Puerto Rico and that additional metrics are necessary to incentivize the transformation required by Law 17, Law 120, and the Transmission and Distribution Operations & Maintenance Agreement, to achieve a 21st Century electric grid?

A. Yes, I do.

Q. Please explain your response.

A. First, given the general lack of reasonably accurate data at the Puerto Rico Electric Power Authority ("PREPA"), LUMA recommends focusing Performance Metrics on areas with adequate historical data to develop an accurate baseline against which performance improvement can be measured. In order for data measurements to be useful as Performance Metrics they should: a) utilize recorded information that indicates performance; b) be subject to improvement through actions under the control of the utility; and c) align with public policy objectives. Data that does not meet these criteria should not be considered for Performance Metrics.

Second, LUMA recommends that the following characteristics be considered when establishing Performance Metrics: a) clear, unambiguous, objective quantification; b) has

an accurate baseline; c) indicates the degree to which progress is being made; d) relative to the current state of the system; e) aligned with public policy and the customer's needs; and f) provide focus to efficiently effect change.

As such, metrics that do not reflect the current state of the Transmission & Distribution System ("T&D") and the near-term improvement activities required will not show progress, even if progress is being made. The current PREPA T&D System is fragile and unreliable. Metrics should be reflective of the activities that support foundational activities that will support sustainable improvements in reliability, resiliency, and customer service, among others. As the utility matures, the metrics will evolve to reflect the advancements made.

Further, metrics that vary significantly by exogenous factors outside those under the control of LUMA will not be responsive to the actions of LUMA and not represent the progress being made. Also, effective Performance Metrics should be achievable for the time period considered with the resources that are available and approved.

The additional performance metrics proposed by Mr. Irizarry in his testimony lack either historical data to develop an accurate baseline against which performance improvement can be measured, are not relative to the current state of the T&D System, vary significantly by exogenous factors outside those under the control of LUMA, or are not achievable with the resources that are available and approved.

Q. Do you have a response to Mr. Irizarry's recommendation to the Energy Bureau that it should require public disclosure of raw outage data so that reliability indices can be independently verified to understand the causes, locations better, and trends of transmission and distribution outages on LUMA's system, as stated on page 7, lines

20-24, and page 64, lines 4-8 of his direct pre-filed testimony?

A. Yes, I do.

Q. Please explain your response.

A. At present, the data and calculation of indices can be independently verified at any time by the Energy Bureau or the Puerto Rico Public-Private Partnerships Authority ("P3A"). Their consultants can analyze the data and trends. Alternatively, the Energy Bureau and the P3A can request LUMA for the trends to better understand the causes, locations, and trends of transmission and distribution outages. For public disclosure of raw data to not be misunderstood, the persons calculating the indices or interpreting the data must have a strong understanding of each piece of data and the Institute of Electrical and Electronics Engineers ("IEEE") standard for calculating the reliability metrics. Misunderstanding data and indices calculation can lead to misleading results and confuse or misinform the public.

Q. Do you have a response to Mr. Irizarry's recommendation on page 8, lines 18-21, of his pre-filed testimony, that the Energy Bureau should adopt metrics analogous to the "Gating Performance Metrics" and "Default Performance Metrics" from the LIPA contract with the PSEG in the performance-based mechanism to be applied to LUMA?

A. Yes, I do.

Q. Please state and explain your response.

A. According to the LIPA contract with PSEG, "Gating Performance Metrics" are those in which PSEG's failure to achieve a Gating Performance Metric in any contract year results in a percentage reduction to the Variable Compensation Pool for that contract year by the percentage specified in the Gating Performance Metric and, accordingly, reduces the

amount that may be earned across all Scope Function-Specific Performance Metrics for that contract year.

In turn, "Default Performance Metrics" mean those performance metrics which the PSEG's failure to achieve provides LIPA with the right, but not the obligation, to terminate the agreement and for which failure the PSEG has no right to cure except to the extent expressly provided in such Default Performance Metric. The LIPA contract establishes that "Default Performance Metrics" are related to Customer Satisfaction, Emergency Preparation and Response, and Cyber Security. For example, failure to achieve a third quartile survey result on either component - Residential or Business - for any two consecutive contract years provides LIPA with the right, but not the obligation, to terminate the agreement with PSEG.

As witness Terzic states in his testimony on behalf of LUMA, lines 403-419:

> Firstly, I would note that I understand the reference being made is the Second Amended and Restated Contract Operations Services Agreement between the Long Island Lighting Company d/b/a as LIPA and the PSEG Long Island LLC. Professor Irizarry does not consider in his testimony the physical condition and service performance of the LIPA predecessor company, the investor-owned Long Island Power Company and circumstances leading to the transfer of ownership of its assets to the state-created new Long Island Power Authority were significantly different than the situation in Puerto Rico with PREPA at the time that the bidding and negotiation process that led to the OMA contract took place. The Long Island Power Company (LILCo) was New York Public Service Commission (NYPSC) regulated investor-owned electric utility which faced financial collapse due to an unsuccessful investment in the Shoreham Nuclear Power Plant. Unlike the situation cited by the Puerto Rico legislature enabling the management contract with LUMA, the New York legislature did not cite conventional electric generation, transmission, or distribution service quality as the reason for the legislation to create the public owned Long Island Power Authority. Long Island Power Company (LILCO) was already a 20th century electric utility.[1]

"Gating Performance Metrics" may not be a bad concept when applied to a mature utility

[1] Rebuttal Expert Testimony of Mr. Branko Terzic dated February 16, 2022.

with years of experience operating under incentive metrics. PSEG has operated LIPA under a public-private partnership with incentives based on performance metrics since 2014, that is, for approximately eight years. In fact, "Gating Performance Metrics" and "Default Performance Metrics" were only recently adopted (in the Second Amended and Restated Operations Services Agreement between Long Island Lighting Company d/b/a LIPA and PSEG Long Island LLC dated December 15, 2021). Applying this concept to LUMA is premature. The utility LUMA inherited is far from mature, with most operations, business, and transmission & distribution system processes being built and rebuilt from the ground up. In addition, the state of the assets is yet to be determined by physical and technical inspections; therefore, it is not possible to properly identify the investment required to transform the system infrastructure into a resilient and reliable system. PREPA did not properly inspect or document the state of the assets such as the poles, transformers, cables, wire, etc.

Further, LIPA's "Default Performance Metrics" works similarly to LUMA's Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement ("T&D OMA") cancellation for non-performance. Under Section 14.1(k) of the T&D OMA, it shall constitute a default by LUMA the failure to meet "the Minimum Performance Threshold for any three (3) Key Performance Metrics during three (3) or more consecutive Contract Years and no such failure shall have been excused by a Force Majeure Event, an Outage Event or Owner Fault". The Key Performance Metrics under the T&D OMA are: OSHA Fatalities (number of work-related fatalities), OSHA Severe Injuries (number of total work-related injury cases with severity days), SAIFI (measures average outage frequency), SAIDI (measures average outage duration), Operating Budget, Capital Budget

– Federally Funded, and Capital Budget – Non-Federally Funded (the last three measure the ability to stay within budget). Therefore, the T&D OMA has envisioned a mechanism in which a default by LUMA to meet the minimum standard on specific performance metrics for consecutive years will allow for the cancellation of the contract. The remedies provided under the T&D OMA for failure to meet the Key Performance Metrics are more drastic than those in the LIPA contract. Thus, Mr. Irizarry's recommendation is redundant given the language of the T&D OMA.

Q. Do you agree with Mr. Irizarry's statement on page 19, lines 1-15, of his pre-filed testimony that the Energy Bureau should consider existing or proposed performance metrics in other jurisdictions, such as Illinois, Hawaii, the United Kingdom, and California?

A. No.

Q. Please explain your response.

A. As witness Terzic states in his testimony on behalf of LUMA, lines 506-513:

> Government owned entities such as PREPA do not have the same profit maximization goals as investor-owned utilities. The application of PIMs in the form of indicators is appropriate and the subject of these proceedings. However, it is apparent from the differences between states that each state has tailored its PIM to its own unique situation, policies and priorities. It seems to me highly unlikely that other states have the same physical, operational and/or historic issues as those in Puerto Rico. As one can see from these proceedings the universe of indicators available is quite large.[2]

To further expound on witness Terzic's testimony by way of a few examples:

- The regulated utilities in the jurisdictions cited are predominantly 20th century, if not emerging 21st century, utilities.
- In Puerto Rico, the grid and systems have been neglected for the past decade or

[2] *Id.*

more; grid assets and systems need to be improved or replaced. The current rates charged to customers do not support improving everything at once. Therefore, improvement to the grid and systems must be sequenced to make practical sense and bring the most improvement. Thus, the performance metrics selected must be the priority, and the systems to measure them must already exist.

- The jurisdictions mentioned face significantly different risks. For example: Puerto Rico has a high risk of hurricanes, those mentioned do not; California has a high risk of forest fires, Puerto Rico does not; Illinois has a high risk of heavy snow and ice, Puerto Rico does not; and the U.K. power system is of a different design than that of North America, including Puerto Rico.

Q. Do you agree with Mr. Irizarry's statement on page 19, lines 17-20, that metrics from Hawaii are important or especially relevant, as the Energy Bureau has determined that Hawaii Electric Light Company and Hawaiian Electric Company share several elements with PREPA and should be considered a useful peer utility?

A. No.

Q. Please state and explain your response.

A. LUMA's position is that PREPA's health and safety data are more appropriate for Edison Electrical Institute's ("EEI") Benchmarking data rather than Hawaiian Electric Company. The scale and scope of PREPA's transmission and distribution operations are much more in line with the large United States investor utilities represented in EEI rather than Hawaiian Electric Company which has significantly fewer customers. Also, the Puerto Rico grid and the systems compared to Hawaiian Electric Company are in a much different state than PREPA due to the utility neglect during the past decade or more. The metrics

need to reflect this.

Q. Does this complete your testimony?

A. Yes.

ATTESTATION

Affiant, Mr. Donald Hall, being first duly sworn, states the following:

The prepared Rebuttal Testimony constitutes my Rebuttal in the above-styled case before the Puerto Rico Energy Bureau. Affiant states that he would give the answers set forth in the Rebuttal Testimony if asked the questions included in the Rebuttal Testimony. Affiant further states that the facts and statements provided herein are his rebuttal testimony and are true and correct to the best of his knowledge.

Donald Hall

Acknowledged and subscribed before me by Mr. Donald Hall in his capacity as Senior Director of Engineering & Asset Management of LUMA Energy ServCo LLC, of legal age, married, and resident of Middletown, Delaware.

In Middletown, Delaware this 17th day of February 2022.

Hope L. Ball

Public Notary

HOPE L. BALL
NOTARY PUBLIC
STATE OF DELAWARE
MY COMMISSION EXPIRES
JANUARY 23, 2024

SWORN TO AND SUBSCRIBED
BEFORE ME ON THIS 17th
DAY OF February, 2022

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Rebuttal Testimony of
Mr. Don Cortez
Vice President – Utility Transformation, LUMA Energy ServCo. LLC
February 17, 2022

Q. Please state your name.

A. My name is Don Cortez.

Q. Please state your business address, title, and employer.

My business address is LUMA Energy, PO Box 363508, San Juan, Puerto Rico 00936-3508. I am the Vice President of Utility Transformation for LUMA Energy ServCo. (LUMA), LLC.

Q. On whose behalf are you testifying before the Puerto Rico Energy Bureau (the "Energy Bureau").

A. My testimony is on behalf of LUMA as part of the Commonwealth of Puerto Rico Public Service Regulatory Board, Puerto Rico Energy Bureau (Energy Bureau) proceeding NEPR-AP-2020-0025, addressing Performance Targets for LUMA.

Q. Are there any exhibits attached to your testimony?

A. Yes.

Q. Please identify and enumerate those exhibits.

A. Exhibit 1- Response by Mr. Irizarry to LUMA-LECO-IRIZARRY-ROI-01-58, LUMA's First Set of Interrogatories and Request for Production of Documents notified on January 13, 2022.

Q. What is your educational background?

A. I graduated from Texas A&M University in 1976 with a Bachelor of Science Degree in Electrical Engineering.

Q. What is your professional experience?

A. I have approximately 40 years of professional experience in the utility industry. In 2020, I joined LUMA Energy as Vice President of Utility Transformation.

Q. Please describe your work experience prior to joining the LUMA?

A. I have approximately 33 years with CenterPoint Energy and its predecessor companies. Ten of the 33 years, I spent transforming companies bought from governments in Argentina, Colombia and Brazil. In my last assignment, I was the Director of Operations in Eletropaulo (now Enel Distribuição São Paulo) responsible for all of the Transmission and Distribution operations. The company served the Sao Paulo metropolitan area and had (at that time) approximately 4.4 million customers. In my last assignment with CenterPoint Energy, I was the Vice President of Operations Technology responsible for the design of the smart grid and Advanced Metering Infrastructure. I also worked approximately 4 years with IBM in a Global Utilities Executive Business Development role. My last assignment prior to LUMA was working for Quanta Services in an Executive Business Development role.

Q. Have you previously testified or made presentations before the Puerto Rico Energy Bureau (PREB)?

A. Yes. I have presented and/or testified before the Energy Bureau in several proceedings in including the following:

a. Distribution Planning Resources Compliance Hearing, NEPR-MI-2019-0011 – February 10, 2021,

b. Initial Budgets Technical Conference, Case NEPR-MI-2021-0004 – May 3 - May 5, 2021,

c. System Operation Principles Technical Conference, NEPR-MI-2021-0001 – May 10 - May 11, 2021,

d. System Remediation Plan Technical Conference NEPR-MI-2020-0019 – May 14

and May 17, 2021, and

e. The Performance of the Puerto Rico Electric Power Authority, Case NEPR-MI-2019-0007, Technical Conference of November 4, 2021.

Q. What is the purpose of your rebuttal testimony?

A. To respond to several portions of the pre-filed testimony of Mr. Agustín Irizarry ("Mr. Irizarry"), on behalf of the Local Environmental and Civil Organizations ("LECO"), filed on November 16, 2021, in this proceeding, Case No. NEPR-AP-2020-0025 and to several portions of the pre-filed testimony of Mr. Gerardo Cosme ("Mr. Cosme"), on behalf of the Independent Consumer Protection Office ("ICPO"), filed on November 17, 2021, in this proceeding, Case No. NEPR-AP-2020-0025, as discussed below in this testimony. Finally, I also testify to further support LUMA's Performance Metrics Targets filing of September 24, 2021 ("LUMA's Performance Metrics Targets").

Q. Did you consider any documents for your rebuttal testimony?

A. Yes, I did.

Q. Which documents did you consider for your rebuttal testimony?

a. LUMA's Performance Metrics Targets Revised filing submitted on September 24, 2021, in this proceeding, Case No. NEPR-AP-2020-0025,

b. Puerto Rico's Transmission and Distribution System Operation and Maintenance Agreement ("T&D OMA"),

c. The pre-filed testimony of Mr. Agustín Irizarry of November 16, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025 and his report, which is an exhibit of his pre-filed testimony,

d. The responses provided by Mr. Agustín Irizarry to LUMA's First Set of

Interrogatories and Request for Production of Documents notified on January 13, 2022,

e. The responses provided by Mr. Agustín Irizarry to LUMA's Second Set of Interrogatories and Request for Production of Documents notified on January 13, 2022,

f. The responses provided by Mr. Agustín Irizarry in the Document entitled *LECO's Responses to Objections Raised by LUMA to Discovery Responses Provided by Agustin Irizarry,* notified on February 4, 2022,

g. The pre-filed testimony of Mr. Gerardo Cosme of November 17, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025,

h. The responses provided by Mr. Cosme to LUMA's First and Second Sets of Interrogatories and Requests for Production of Documents, which were notified on January 5, 2022, and January 13, 2022, respectively,

i. The responses provided by Mr. Cosme to the Puerto Rico Energy Bureau's Requirements for Information notified on December 27, 2021,

j. The Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement of June 22, 2020,

k. Act 120 of 2018, Act 57 of 2014 and Act 17 of 2019,

l. Partnership Committee Report, Puerto Rico Public-Private Partnership for the Electric Power Transmission and Distribution System,

m. LUMA's System Remediation Plan ("SRP"), approved in Case No. NEPR-MI-2020-0019,

n. Resolution and Order by the Puerto Rico Energy Bureau approving LUMA's SRP,

dated June 22, 2021, Case No. NEPR-MI-2020-0019,

o. LUMA's Initial Budgets filed and approved in Case No. NEPR-MI-2021-0004,

p. Resolution and Order by the Puerto Rico Energy Bureau approving LUMA's Initial Budgets, dated May 31, 2021, Case No. NEPR-MI-2021-0004,

q. LUMA Energy Quarterly Report, Second Quarter Fiscal Year 2022, October 1-December 31, 2021, February 14, 2022,

r. Resolution and Order of the Puerto Rico Energy Bureau of May 31, 2021, Case No. NEPR-MI-2021-0007, *In re Review of LUMA's Terms of Service (Liability Waiver)*,

s. LUMA's Motion Resubmitting LUMA's Comments on Performance Baselines and Metrics Based on Data Presented on January 19th, 2020 by the Energy Bureau, and Resubmitting Proposed Performance Metrics and Baselines, Case NEPR-MI-2019-0007 of February 5, 2021, and

t. Motion Submitting Quarterly Performance Metrics, Requesting Leave to Defer Reporting on Specified Metrics and Request for Clarifications, Case No. NEPR-MI-2019-0007, filed on September 20, 2021 and exhibits to same.

Q. Do you have a response to Mr. Irizarry's first conclusion, on page 6, lines 16-22 and page 63, lines 6-9 and page 47, lines 20-21 of his pre-filed testimony that LUMA's performance metrics, if achieved, would only result in reasonable 20th century utility service for Puerto Rico?

A. Yes

Q. Please explain your response.

A. Mr. Irizarry's statement does not consider that the Transmission and Distribution System ("T&D System") of the Puerto Rico Electric Power Authority ("PREPA") requires

significant investment to get to the point of a 20th century system, which is required as a platform on which to transform to a safe and reliable 21st century system. The findings of the Puerto Rico Legislature in approving both Act 120-2018 that allowed the process to select a private operator for the T&D System and laid the groundwork for the transformation of Puerto Rico's electric power system and Act 17 of 2019, establish that PREPA was not a 20th century utility. For example, in Act 120 of 2018 the Puerto Rico legislature indicated that PREPA was "no longer synonymous with services that are efficient and cost-effective for the consumer."[1] The legislature also stressed that the electric power generation system was then, twenty-eight (28) years older than the electric power industry average in the United States, that its dependence in oil rendered the system increasingly more expensive, more polluting, and less efficient and that "[p]ractically no infrastructure maintenance was performed during the past decade."[2] Importantly, the Puerto Rico legislature stated that Puerto Rico's "electric power generation and distribution systems are deficient and obsolete which results in suboptimal service with frequent interruptions and high rates that punish the consumer."[3] Additionally, in Act 17 of 2019, the legislature explained that "Electric power services in Puerto Rico are inefficient, unreliable, and provided at an unreasonable cost to residential, commercial, and industrial customers despite the existence of a vertically integrated monopolistic structure. This is mainly due to a lack of infrastructure maintenance, the inadequate distribution of generation vis-à-vis demand, the absence of the necessary modernization of the electrical system to adjust it to new technologies,

[1] Act No. 120-2018, Statement of Motives, at page 2.
[2] *Id.* at page 4.
[3] *Id.*

energy theft, and the reduction of the Electric Power Authority's personnel."[4] Additionally, Mr. Irizarry does not consider in his statement or throughout his testimony, that to achieve a modern grid, grid components such as advanced meters, new Energy Management Systems (EMS),[5] implementation of an Advanced Distribution Management System, and automated distribution switches,[6] among others, are needed.[7] Also, new systems are needed that would include new distribution management systems, microgrid control systems, and demand response control systems, among others. For that, planning and funding are needed. Because those components and systems are not available nor been approved by entities that may provide funding such as the Federal Emergency Management Agency (FEMA), the necessary conditions are not present to consider additional metrics that appear later in his testimony, which Mr. Irizarry proposes as regulatory tools to modernize the grid.

LUMA's Revised Performance Metrics Targets proposal is not for approval of a rigid, never changing set of performance metrics. Rather, LUMA is proposing an initial set of metrics that are intended to evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of

[4] Act 17-2019, Statement of Motives.

[5] "The cornerstone of LUMA's remediation proposal is the replacement of the Energy Management System that will feature ADMS capabilities and the repair/restoration of the utility telecommunications backbone.187 The visibility provided by these capabilities will enable the adequate coordination of protection schemes that could isolate faults before they become widespread outages." Puerto Rico Energy Bureau ("Energy Bureau") Resolution and Order of June 22, 2021, Case NEPR-MI-2020-0019, at page 33. https://energia.pr.gov/wp-content/uploads/sites/7/2021/06/20210622-MI20200019-Resolution-and-Order-SRP.pdf.

[6] "LUMA identifies the need to deploy distribution automation technologies to increase system reliability, these activities have been categorized as Non-System Remediation Plan." *Id.*

[7] "LUMA has identified that the Energy Control Center and its backup facilities have fallen into disrepair. New facilities are sought to house these capabilities and the upgrades proposed to the Energy Management System ("EMS"). LUMA proposes to replace the obsolete and unsupported EMS and implement an Advanced Distribution Management System ("ADMS")." *Id.*, at page 28.

improvement in the near term. LUMA is proposing performance metrics that are the foundational elements needed to transform the existing grid into a 21st century grid and operate reliably.

LUMA is committed to the transformation of Puerto Rico's grid to a modern, 21st century electric system but this cannot be achieved overnight, even if LUMA was starting with a mature, robust 20th century grid, which is not the case. Utilities that are pursuing similar transformation have plans to do so over many years as approved budgets[8] and practical resourcing permit. The customers of Puerto Rico must be provided reliable electric service as the transformation of the grid takes place. LUMA is following parallel paths to provide reliable electric service and modernizing the system.

In his testimony, Mr. Irizarry omits consideration of LUMA's approved SRP which charts LUMA's aggressive plan to remediate the T&D System.[9] In order to have a safe and reliable grid, it is imperative that the condition of the assets be determined and documented. Understanding the fundamentals, such as the condition of the assets, allows for an effective and orderly transformation of the grid.

Design decisions made in the rebuilding of the grid are made with an eye on modernization as described in Acts 57 and 17. All of the characteristics of a 21st century system cannot be achieved in the near term from a practical or affordability perspective.

Q. Do you agree with Professor Irizarry's conclusion on page 6, lines 18-22 and page 63, lines 7-9 of his pre-filed testimony, that additional metrics are necessary to

[8] "LUMA has projected $237 million of expenditures for the distribution system in FY2022.166 Seventy percent, or $166 million, of those expenditures are categorized as System Remediation Plan items and $199 million of those expenditures will be eligible for federal funding." *Id.* at page 30.

[9]" LUMA's System Remediation Plan includes a range of high priority activities and capital spending programs designed to repair and remediate the Puerto Rico power system and to reform energy business practice." *Id.* at page 15.

incentivize the transformation required by Law 17, Law 120, and the Transmission and Distribution Operations & Maintenance Agreement, to achieve a 21st Century electric grid?

A. I disagree. Mr. Irizarry does not provide any plan or details of how this could be practically funded and implemented. Mr. Irizarry's mention of a modern 21st century grid is and end state, the goal, but he does not provide a path to get there, even with adoption of additional performance metrics, nor the time required to achieve, and the financial resources required to achieve the goals set forth in the additional performance metrics he recommends to incentivize the transformation of the T&D System. If the Puerto Rico electric grid had been maintained and well planned, designed, and constructed over the recent past decades, and had not been devastated by hurricanes over the recent past, a platform (that would include the electric system, IT systems, and communication systems) on which to transform more quickly might well be available but this is simply not the case. Given the state of the existing transformation platform, application of the additional metrics suggested by the witness in his statement and throughout his testimony, is premature and would be nothing more than a distraction from that which requires laser focus in the near term, which is remediating and rebuilding the existing T&D System as a necessary component to provide efficient, safe and reliable electric power services at just and reasonable costs and paving the way to meet policy goals on the transformation to support integration of renewable energy sources and energy efficiency.

Q. Do you agree with Mr. Irizarry's second conclusion on page 6, lines 23-25 and page 7, lines 1-2 of his pre-filed testimony, that "LUMA's metrics, in contrast to

performance metrics in other jurisdictions, include no penalties for underperformance, which is particularly problematic given that service deterioration is already evident in certain areas"?

A. No.

Q. Please explain your response.

A. First, LUMA's proposed Performance Metric Targets are the product of the competitive procurement process conducted by the Government of Puerto Rico and agreed to by the parties to the T&D OMA. Thus, comparisons to other jurisdictions on the chosen framework and incentive mechanism set forth in the T&D OMA are not proper. Also, Mr. Irizarry does not consider that the T&D OMA includes the ultimate penalty of default or termination of the T&D OMA if LUMA does not meet the applicable performance standards on three Key Performance Metrics for three consecutive years, that include reliability metrics on System Average Interruption Frequency ("SAIFI") and System Average Interruption Duration Index ("SAIDI"), except for Force Majeure, Major Outage Event or Owner Fault.

Second, Mr. Irizarry's generalized comment on service deterioration as a justification for imposition of additional penalties does not consider the state of the T&D System. LUMA faces challenges in three key areas:[10] 1) Declining T&D Asset Quality, including a significant number of breakers & reclosers out of service, many breakers double-circuited due to failure of breakers, and annealed conductors due to long duration overloads leading to mechanical failure; 2) Outdated Information System with the first OMS

[10] LUMA's Presentation, Performance Metrics Technical Conference, November 4, 2021, Case NEPR-MI-2019-0007, slide 11, *t* https://energia.pr.gov/wp-content/uploads/sites/7/2021/11/Motion-Submitting-Lumas-Presentation-During-the-Technical-Conference-of-November-4-2021-NEPR-MI-2019-0007-1.pdf.

upgrade in twelve years having been executed in May (first one in 12 years), but further modifications are required. For context, a U.S. Department of Energy National Lab study concluded that "utilities that install or upgrade their OMS report higher SAIDI by nearly 14%"[11]; and 3) the many years of having an ineffective vegetation management program. The lack of vegetation management has led to a significant portion of the grid impacted by severe vegetation growth. PREPA's Vegetation Management efforts have not resulted in system control of vegetative growth impacting T&D lines. As a result, vegetation-caused outages require more line clearing to restore service & correct underlying problems. Past techniques consisted mainly of minimal work to put the service back on; therefore, customers would experience repeated outages for the same underlying cause. LUMA's service restoration technique is to fix the underlying problem that is causing the outages. LUMA's strong focus on safety and work methods can, at first, cause some delay in restoration. LUMA is identifying & repairing outage root causes as opposed to applying quick fixes that are often unsustainable and result in repeat outages. LUMA is focused on systematically improving reliability for sustainable improvement.

Furthermore, the T&D System suffers from declining asset quality & resulting reliability performance. SAIDI Distribution declined by approximately 26% of the combined T&D System by approximately 18% from FY19 – FY21. Approximately 775 malfunctioning or out-of-service grid elements were identified, and 146 distribution circuit breakers were out of service on June 1.[12] 88 have since been repaired or replaced.[13] Over a decade of

[11] L J. Eto et als, Lawrence Berkley National Laboratory, *An Examination of Temporal Trends in Electricity Reliability Based on Reports by U.S. Utilities*, 31 (2021) *available at* https://eta-publications.lbl.gov/sites/default/files/lbnl-5268e.pdf (last visited February 15, 2022).
[12] *Id.* slide 13.
[13] *Id.*

system neglect cannot be corrected in the short-term. As an example, the replacements for the distribution circuit breakers that are still out of service have been placed on order. However, it takes many months for vendors to fabricate the breakers. Therefore, the circuits that are doubled-up on the breakers continue to be overloaded on hot summer days.

Q. Do you agree with Mr. Irizarry's Recommendation 1 on page 7, lines 6-8, and page 63, lines 17-19of his pre-filed testimony, that "[t]he Bureau should consider additional metrics to incentivize the transformation to a "modern, sustainable, reliable, efficient, cost-effective, and resilient system"?

A. No.

Q. Please explain your response.

A. As stated previously in my testimony, the T&D System requires significant investment to get to the point of a 20th century system, which is required as a foundation on which to transform to a 21st century system and to reach a modern, sustainable, reliable, efficient, cost-effective, and resilient system. LUMA's Performance Metrics Targets proposal is not for approval of a rigid, never changing set of performance metrics, rather an initial set of metrics that will evolve over time as the T&D System is improved, through LUMA's efforts including implementation of LUMA's SRP that was approved by the Energy Bureau. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term to meet public policy goals and the standards and obligation set forth in the T&D OMA. In his testimony, Mr. Irizarry is proposing several metrics, but does not consider the state of the T&D System and current capabilities, nor the need for remediation and investments in T&D infrastructure before

additional metrics may be adopted to measure LUMA's performance for payment of incentives. Mr. Irizarry also did not consider that in a separate proceeding, NEPR-MI-2019-0007 on the performance of PREPA, the Energy Bureau is tracking performance on 113 T&D metrics.

Q. Do you have a response to Mr. Irizarry's Recommendation 3 on page 7, lines 17-20 and page 64, lines 2-4 of his pre-filed testimony, where he recommends independent monitoring and verification of LUMA's performance citing that LUMA itself has acknowledged the possibilities of errors and biases affecting the calculation of reliability indices?

A. Yes, I do.

Q. Please state and explain your response.

A. I do not agree with Mr. Irizarry's recommendation. First, the Energy Bureau is the independent regulator of electric power service companies and LUMA. Second, Mr. Irizarry's statement on errors and biases affecting the calculations of SAIDI and SAIFI ignores that under the supervision of the Energy Bureau in Case NEPR-MI-2019-0007 and as LUMA explained in Case NEPR-MI-2019-0007, LUMA reviewed and recalculated the reliability metrics according to IEEE Std. 1366-2012™ methodology based on information available, including recalculation of SAIFI, SAIDI & CAIDI for the periods PREPA had not already recalculated. LUMA has removed outages due to generation-related load shedding that were still being included in the calculations of SAIFI & SAIDI. Modifications to LUMA's Outage Management System (OMS) are currently underway to more clearly identify outages due to generation problems to more efficiently filter those outages from the T&D performance metrics.

Q. Do you have a response to Mr. Irizarry's Recommendation 3 on page 7, lines 20-24 and page 64, lines 4-8 of his pre-filed testimony where he recommends that "the Bureau should require public disclosure of raw outage data so that reliability indices can be independently verified and so that the Bureau and interested parties can better understand the causes, locations and trends of transmission and distribution outages on LUMA's system"?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry does not consider in his statement that the Energy Bureau, an independent regulator, receives and reviews data on reliability performance and that LUMA submits information on reliability performance metrics quarterly with the Energy Bureau in Case NEPR-MI-2019-0007. On November 9, 2021, Case NEPR-MI-2019-0007, LUMA submitted information on outage causes and SAIDI and SAIFI reporting areas.

Mr. Irizarry also fails to consider that LUMA's "MiLUMA" website provides public information about outages and load shedding and LUMA's Hosting Capacity Dashboard provides public information about locations of distribution voltage levels, DG penetration and feeder segment maximum power flow.

The information provided for outages includes:

i. An outage map showing locations and counts of outage events;

ii. A Load Shed Map showing geographical areas of load shed events;

iii. A summary table showing the number of customers out of service and the number of customers served by region

The Hosting Capacity Dashboard includes rudimentary interconnection capacity by

distribution feeder with a dropdown menu that shows the following information:

i. Substation ID;

ii. Substation Name;

iii. Feeder ID;

iv. Feeder Peak Demand;

v. Daytime Light Demand;

vi. Existing DG Capacity;

vii. DG Penetration;

viii. DG Penetration Class;

ix. Primary Voltage; and

x. Whether Feeder Requires Supplemental Study.

Th interconnection capacity maps include another layer of information entitled Power Flow-Feeder Segment Maximum PVMV that provides the following information:

i. Rudimentary interconnection capacity by distribution feeder; and

ii. A dropdown menu in the interactive maps for those zones that have been studied that includes:

a. Substation ID;

b. Substation Name

c. Feeder ID;

d. Feeder Peak demand;

e. Daytime light demand;

f. Existing DG Capacity

g. Limiting Factor;

h. Maximum Circuit Segment Hosting Capacity; and

i. Date of Study Performed.

Q. Do you have a response to Mr. Irizarry's statement on page 15, lines 16-22 of his pre-filed testimony that "A modern electric power system must be flexible, robust, agile. It must have the ability to dynamically optimize grid operations and resources, rapidly detect and mitigate disturbances, integrate diverse generation sources, on both the supply and demand sides, integrate demand response and energy-efficiency resources, enable consumers to manage their electricity use, and provide strong protection against physical and cyber risks"?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry's description of a modern electric power system is a generic, high-level description of the ultimate goal of a modern electric power system but omits consideration of the details of the characteristics that Mr. Irizarry only mentions. The definitions of the characteristics mentioned by Mr. Irizarry vary widely in the industry and there are degrees of capability for each of the characteristics stated by the Mr. Irizarry that a utility may strive to achieve. There is also a wide disparity between the capability of transmission systems and the capability of distribution systems. Achieving these characteristics in a distribution system is much more complex than in a transmission system due to the sheer volume of system components, the sensitivity of each component to very small, naturally occurring fluctuations and disturbances, such as load cycle, variable resources, and storms, as compared to transmission systems.

Importantly, Mr. Irizarry does not consider the state of the Puerto Rico T&D System that LUMA inherited nor of the Improvements Programs that the Energy Bureau approved in connection with LUMA's proposed Initial Budgets, Case NEPR-MI-2021-0004 and LUMA's SRP Programs that are necessary to endow the T&D System the capabilities that Mr. Irizarry mentions. As I explained earlier in this testimony, a new EMS is needed, among other things, to modernize the grid. The EMS will allow LUMA to proceed with the incorporation of a greater amount of renewable resources and enable Demand Response programs. LUMA also plans to install a Distributed Energy Resource Management System (DERMS) once the EMS is replaced with a new system.

Mr. Irizarry does not consider several ongoing and interrelated proceedings before this Energy Bureau on Distributed Energy Resources including the Puerto Rico Cost Test for Demand Response and Energy Efficiency, NEPR-MI-2021-0009, Demand Response, NEPR-MI-2021-0006, Deployment of Electric Vehicle Charging Infrastructure, NEPR-MI-2021-0006, Optimization Proceeding of Minigrid Transmission and Distribution Investments, NEPR-MI-2020-0016. Also, on January 21, 2022, the Energy Bureau adopted a Regulation on Energy Efficiency (EE), NEPR-MI-2021-005, that provides for the launch of a first set of programs and to launch quick start/pilot EE programs by October 1, 2022. It is premature to consider performance metrics for payments of incentives to LUMA on EE and Demand Response (DR) programs and capabilities that have not been implemented in Puerto Rico.

Q. Do you have a response to Mr. Irizarry's statement on page 20, lines 10-12 of his pre-filed testimony, that "The use of energy is considered sustainable if it meets the needs of the present without compromising the needs of future generations"?

A. Yes, I do.

Q. Please state and explain your response.

A. LUMA is currently addressing the needs of the present by initially focusing on the platforms needed for sustainable components, such as poles, wires, and systems to accept renewable energy sources at all levels, utility scale and distributed. LUMA is supportive of renewable energy but does not control the adoption of distributed generation or the procurement of utility scale renewables. These are dependent on external factors.[14]

Q. Do you have a response to Mr. Irizarry's statement on page 23, lines 5-6 of his pre-filed testimony that "Performance-based incentives are needed to realign utility business practices in favor of sustainable technologies"?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry's statement is overly broad and insufficient to establish the need for performance incentive mechanisms. LUMA's operations are aligned to meet the energy goals and policies of Puerto Rico through the Integrated Resource Plan and other proceedings before this Energy Bureau. At this time, performance metrics are not needed to align LUMA's business practices with policy principles to incorporate renewable energy and sustainable technologies.

Q. Do you agree with Mr. Irizarry's recommendation that the Energy Bureau impose a metric on system losses, and require LUMA to provide regular reports of Systems Losses and LUMA's plan to reduce system losses, as stated on page 26, lines 11-18 and page 27, lines 1-3 of his pre-filed testimony?

[14] *See* Rebuttal Testimony of Lee Wood for LUMA of February 17, 2022.

A. No. I do not agree.

Q. Please explain why you do not agree.

A. Reduction in Network Line Losses measures the progress in reducing electric losses. PREPA does not currently allocate losses to the components of the system, making this metric highly theoretical and not based on actual data that would be required to set a baseline. An adequate line loss study will be started in Year 1 to outline the approach and data requirements for line loss calculations, require at least eight months after LUMA takes control of the assets and is highly dependent on the ability to accurately update the PREPA distribution system model. Instrumentation from SCADA is not available to track circuit phase loading which is required from all circuits. The installation of circuit measurement devices, instrumentation, will be considered in the approach as a part of the study. The technology currently does not exist in the grid to accurately monitor and calculate system losses.

Q. Do you have a response to Mr. Irizarry's statement on page 27, lines 18-21 of his pre-filed testimony that "Systems operators such as LUMA can and should take controlled actions or introduce procedures to maintain a continual balance between supply and demand within a balancing area (formerly known as a control area)"?

A. Yes, I do.

Q. Please state and explain your response.

A. As Operator of the T&D System, LUMA has developed procedures to maintain a continual balance between supply and demand. These procedures are in support of LUMA's System Operation Principles, which were conditionally approved by the Energy Bureau in Case NEPR-MI-2021-0001.

Q. Do you have a response to Mr. Irizarry's statement on page 28, lines 25-26 and page 19, line 1 of his pre-filed testimony that "[s]evere voltage fluctuations, a phenomenon normally not seen while PREPA managed the electric grid, have been reported under LUMA operations in all regions in Puerto Rico," and page 33 lines 13-14 that "we have seen an increase in voltage fluctuations, thus a decrease in power quality, under LUMA's operation of the electric power system"?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry did not provide any voltage measurements or other data to support his statement concerning severe voltage fluctuations, even during discovery, rather general statements pointing to unscientific information. Therefore, I must assume this statement is nothing but speculation and hearsay. In response to discovery, Mr. Irizarry stated that this statement was supported by his personal experience as a citizen in Puerto Rico and his training as an engineer.[15] In my professional experience, to issue an opinion on the occurrence of voltage fluctuations and a decrease in power quality, one would have given precise information on the sample of the houses affected by voltage fluctuations or power quality issues, and not from a perception based on personal experience. This statement is flawed as it has inherent biases. Second, voltage fluctuations occur as part of the normal operation of every power system and determining which are normal and which are severe requires knowledge of the level and duration of the fluctuation, which requires analysis of voltage measurements at the service point to the customer(s) where suspected fluctuations occurred. These measurements can be provided by modern AMI

[15] Exhibit 1, Response by Mr. Irizarry to LUMA-LECO-IRIZARRY-ROI-01-58, LUMA's First Set of Interrogatories and Request for Production of Documents notified on January 13, 2022.

systems. Since meaningful collection of voltage data is not practical from the currently implemented customer metering system, there is no data available to determine the validity of this statement. However, severe voltage fluctuations can occur in any electric utility system and typically result in appliance damage claims if the fluctuation(s) caused a problem. LUMA examined the approximate number of appliance damage claims filed by customers under PREPA's operation of the T&D System from 2017 through May, 2021 and under LUMAs operation of the T&D System since June 1, 2021, whether proven to be valid or not. The number of claims determined to be the fault of the utility cannot be examined at this time. LUMA examined the approximate total number of appliance claims filed per year. Based on records kept by PREPA and LUMA, the approximate total number of appliance claims filed have not varied greatly from FY 2017 through FY 2021. Given the data, it is extremely likely that severe voltage fluctuations were indeed "normally seen" while PREPA managed the electric grid as under LUMA operation, indicating that the witness statement cannot be accepted as fact. Severe voltage fluctuations are those that cause appliance damage and are usually caused by localized damaged equipment.

Q. Do you have a response to Mr. Irizarry's recommendation at page 29, lines 5-8 of his pre-filed testimony that "PREB require LUMA to implement a system where customers can obtain restitution from LUMA for financial losses caused by problems with the T&D system that LUMA operates."

A. Yes, I do.

Q. Please state and explain your response.

A. The matter of a scheme for restitution to customers is beyond the scope of this

proceeding that involves LUMA's Revised Performance Metrics Targets. On May 31, 2021, the Energy Bureau approved revised terms of service for LUMA and PREPA, that include a liability waiver, Case No. NEPR-MI-2021-0007, *In re Review of LUMA's Terms of Service (Liability Waiver).*[16]

Q. Do you have a response to Mr. Irizarry's recommendation on page 30, lines 1-7, that "The Reliability Indicator Ratings and Description of the 2021 State of Reliability: An Assessment of 2020 Bulk Power System Performance, August 2021 report by NERC could be adapted to provide adequate reliability metrics to measure LUMA's performance on keeping the reliability of the bulk electric power system?

A. Yes, I do.

Q. Please state and explain your response.

A. Puerto Rico is not subject to the Federal Energy Regulatory Commission (FERC). FERC and North American Electric Reliability Corporation (NERC) requirements are generally only applicable for those lines greater than 200kV and part of the overall bulk electric system in the continental portions of North America. Although Puerto Rico is not subject to NERC standards, LUMA is currently analyzing the NERC's reliability standards for their application to an island transmission and distribution system such as Puerto Rico. However, importing those standards and implementing them as incentive metrics is still too premature due to the current state of Puerto Rico's transmission and distribution system as described above in my testimony.

Q. Do you have a response to Mr. Irizarry's statement on page 31, lines 1-10 that he strongly disagrees with LUMA's position that CAIDI is limited as a performance

[16] https://energia.pr.gov/wp-content/uploads/sites/7/2021/06/20210531-MI20210007-Resolution-and-Order-Liability-Waiver.pdf.

metric and that CAIDI "is probably the most understandable and meaningful metric to the general public of all reliability indices"?

A. Yes, I do.

Q. Please state and explain your response.

A. First, in his direct testimony, Engineer Gerardo Cosme of the Independent Consumer Protection Office, agreed with LUMA that CAIDI should be eliminated as it may be misleading, particularly for a Transmission and Distribution System that is undergoing a transformation such as the PREPA T&D System. Mr. Irizarry did not consider grid transformation in his testimony.

Second, as LUMA has explained, industry concerns that CAIDI is a limited value performance metric are still prevalent. Since CAIDI is the ratio between SAIDI and SAIFI, CAIDI can be misleading because it can remain the same even when the SAIDI and SAIFI values decrease. Regarding PREPA's T&D System, while the customer experience may improve, the CAIDI metrics could remain the same, indicating that there was no improvement. Also, valuable improvements to the T&D System such as adding automation will tend to improve SAIDI and SAIFI but could also cause CAIDI to increase because automation tends to reduce less complicated interruptions to less than five minutes. The more complicated and time-consuming interruptions are left for field personnel to repair and restore. LUMA has subject matter experts on staff who participate in IEEE proceedings, including the recently held IEEE PES Distribution Reliability Virtual Working Group Meeting on January 11 & 12, 2022, where the limited value of CAIDI continued to be discussed.

Q. Do you have a response to Mr. Irizarry's statement on page 31, lines 17-25 that the

Energy Bureau should reject LUMA's proposed SAIDI benchmarks (1, 119, 932, and 746 minutes for Years 1, 2, and 3 respectively) that would allow for significantly longer interruptions and would not provide reliability anywhere close to the U.S. average, and that PREB should keep the SAIDI benchmark of 102 minutes?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry confuses the terms targets and benchmarks. In the Revised Performance Metrics Targets, LUMA proposed targets; not benchmarks. Mr. Irizarry incorrectly references LUMA's targets of 1, 119, 932 and 746 minutes as benchmarks. In the PREPA performance proceeding, Case NEPR-MI-2019-0007, the Energy Bureau established benchmarks; not targets. In this proceeding, LUMA is not proposing changes to the benchmarks set by the Energy Bureau.

Regarding benchmarks, Mr. Irizarry does not consider that PREPA's performance is well below industry benchmarks and is subject to different characteristics and circumstances than many US utilities, including geography, recent storm and earthquake damage and years of deferred maintenance. LUMA believes benchmarking is a relevant exercise and can yield useful insights. The deteriorated conditions of the T&D grid, as mentioned above in my testimony and is memorialized in Puerto Rico Laws 120 and 17, makes it meaningless to compare to other utilities utility, unless a similarly situated utility is identified, and Mr. Irizarry has not identified such a comparable utility. In my knowledge and experience, no mainland utility has allowed its assets to become as deteriorated as PREPA or allowed their vegetation management to get this far out of control. A studied approach to methods employed must be taken to ensure a robust

analysis, particularly when benchmarking is used for setting rates and/or economic incentives to ensure that benchmarking results in benefits to customers. At this time benchmarks should be used for illustrative purposes only and not for setting performance targets.

LUMA provided relevant and important comments on benchmarks on February 5, 2021, Case No. NEPR-MI-20219-0007, stating that:

> PREPA's current performance is well below industry benchmarks in almost all the metrics measured. Further, PREPA is subject to different characteristics and circumstances than many US utilities, including geography, recent storm and earthquake damage and years of deferred maintenance. LUMA believes benchmarking is a relevant exercise and can yield useful insights. A studied approach to methods employed must be taken to ensure a robust analysis, particularly when benchmarking is used for setting rates and/or economic incentives to ensure that benchmarking results in benefits to customers. As such, similar to comments made by PREB consultants during the January 19th Technical Conference, at this time benchmarks are for illustrative purposes only.[17]

Q. Do you have a response to Mr. Irizarry's statement on page 33, lines 1-4 that the Energy Bureau should require LUMA to make public raw outage data, in addition to reliability indices to provide "public access to information about…aggregated customer energy…."?

A. Yes, I do.

Q. Please state and explain your response.

A. This a statement similar to Mr. Irizarry's Recommendation Number 3 which I already addressed in my testimony. I should add that LUMA understands that this proceeding

[17] *See* Exhibit 3 to *LUMA's Motion Resubmitting LUMA's Comments on Performance Baselines and Metrics Based on Data Presented on January 19th, 2020 by the Energy Bureau, and Resubmitting Proposed Performance Metrics and Baselines,* Case NEPR-MI-2019-0007, https://energia.pr.gov/wp-content/uploads/sites/7/2021/02/LUMA-Motion-Resubmitting-Comments-and-Exhibits-1-3-NEPR-MI-2019-0007.pdf.

does not involve consideration of requirements to publish supporting data on the reliability indices that the Energy Bureau tracks in Case No. NEPR-MI-2019-0007. The Energy Bureau has the authority to audit the reliability indices calculations and the supporting data and to issue determinations on which data should be published, preserving confidentiality concerns to protect the T&D System and the public. To the extent that Mr. Irizarry is here advocating for LUMA to publish information on available energy and consumption by customers, I note that LUMA provides customers information on consumption in the monthly bills and as part of the Quarterly Metric reporting in Case No. NEPR-MI-2019-0007. Also, LUMA has published in its website system load and generation capacity. Customers can now see the estimated peak load and estimated generation capacity for the day on the LUMA website.[18] As LUMA informed in its Quarterly Report for the Second Quarter, FY 2022, filed with this Energy Bureau, LUMA developed a web-based map that, should a load shed event occur, shows the areas affected by load shedding and the estimated times for service restoration.[19] The maps were refreshed with an update that captured all distributed generation installed until November 30th, 2021. The Mi LUMA webpage also includes maps on service interruptions and a list of clients without service.[20]

Q. Do you have a response to Mr. Irizarry's recommendation on page 37, lines 16-18 that the Energy Bureau consider a performance metric on "Total energy delivery costs" to identify the costs of delivering energy to consumers, and to be calculated

[18] LUMA Energy Quarterly Report, Second Quarter Fiscal Year 2022, October 1-December 31, 2021, February 14, 2022, Case No. NEPR-MI-2021-0004, *In Re LUMA's Initial Budgets*, page 8.
[19] *Id* https://aeepr.maps.arcgis.com/apps/dashboards/1995c773fceb468db8b7f7d34899df94.
[20] https://miluma.lumapr.com/outages/outageMap, https://miluma.lumapr.com/outages/clientsWithoutService

based on all of the T&D expenses, including administrative expenses, per kWh sold?

A. Yes, I do.

Q. Please state and explain your response.

A. As I explained above, LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding additional metrics.

A metric on total energy delivery costs is a financial metric that the Energy Bureau did not consider in the PREPA performance proceeding Case NEPR-MI-2019-0007. A benchmark has not been set, nor has the Energy Bureau considered the reliability of available data to adopt this proposed metric and set a benchmark.

Q. Do you have a response to Mr. Irizarry's recommendation on page 37, lines 18-21 that the Energy Bureau consider a performance metric on "Effective resource planning," as an indicator of efficacy, breadth, and reasonableness of resource planning process and calculated considering numerous metrics regarding the incorporation of stakeholder input, consideration of all relevant resources, use of appropriate assumptions and modeling tools?

A. Yes, I do.

Q. Please state and explain your response.

A. As I explained above, LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the

agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding other metrics for payment of the incentive set forth in the T&D OMA.

This proposed metric involves system resource planning efforts that are conducted under the supervision of the Energy Bureau in connection with the Integrated Resource Plan (IRP). A performance metric is not needed nor proper to ensure compliance by LUMA of IRP planning processes under the supervision of the Energy Bureau. Decisions on resource planning are subject to review and approval by the Energy Bureau, and so outside the control of LUMA. Also, in the PREPA performance proceeding Case NEPR-MI-2019-0007, the Energy Bureau did not consider or set a metric on effective resource planning, nor has a benchmark been set.

Q. Do you have a response to Mr. Irizarry's recommendation on page 37, lines 22-23 that the Energy Bureau consider a performance metric on "Load factor," as an indicator of improvement in system and customer load factors over time, and calculated based on the sector average load/ sector average peak load, and monthly system average load/ monthly system peak load?

A. Yes, I do.

Q. Please state and explain your response.

A. As I explained above, LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding other metrics for payment of the incentive set forth in the T&D OMA.

In the PREPA performance proceeding Case NEPR-MI-2019-0007, the Energy Bureau

did not consider or set a metric on load factor, nor has a benchmark been set. Currently, system data is not reliable to set a performance metric on system load for payment of an incentive. To obtain good data over energy losses, the energy coming into grid must be accurately measured. Today, the metering of PREPA generation is not done in several cases and precise measurement is not done in other cases. Demarcation metering must be implemented before a precise measurement of energy losses can be calculated.

Q. Do you have a response to Mr. Irizarry's recommendation on page 37, lines 24-25 that the Energy Bureau consider a performance metric on "Usage per customer", as an indication of customers' energy consumption changes over time, and to be calculated based on sector sales/ sector number of customers?

A. Yes, I do.

Q. Please state and explain your response.

A. I disagree with this proposed metrics as customer usage is a result of many factors that are under the direct control of the customer based on his / her comfort levels, choices and preferences and not a measure of LUMA's performance. LUMA could broadly educate the customer on their usage but does not have the authority to directly control or limit their total monthly usage.

Q. Do you have a response to Mr. Irizarry's recommendation on page 37, lines 25-26 that the Energy Bureau consider a performance metric on "System losses", as an indication of reductions in losses over time, and calculated based on total electricity losses/ MWh generation, excluding station use?

A. Yes, I do.

Q. Please state and explain your response.

A. As I explained above, LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding other metrics for payment of the incentive set forth in the T&D OMA.

Also, as explained above in my testimony, PREPA does not currently allocate losses to the components of the system, making this metric highly limited in accuracy and usefulness.

In the PREPA performance proceeding Case NEPR-MI-2019-0007, the Energy Bureau did not set benchmarks or baselines for performance metrics on system losses. Currently, system data is not reliable to set a performance metric on customer usage. System losses cannot be accurately calculated due to the lack of accurate metering at the legacy PREPA generation plants and for DG customers.

Q. Do you have a response to Mr. Irizarry's recommendation on page 39, lines 19-22 that the Energy Bureau consider a performance metric on "hardening existing power plants and substations against storm damage to reduce exposure to damage due to storms"?

A. Yes, I do.

Q. Please state and explain your response.

A. A performance metric on hardening power plants is not proper for LUMA. LUMA does not own or operate generation plants. Mr. Irizarry's proposal does not consider LUMA's role and duties as operator of the T&D System and should be rejected.

To the extent that Irizarry's proposal includes T&D substations, as I explained above,

LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding other metrics for payment of the incentive set forth in the T&D OMA.

In the PREPA performance proceeding Case NEPR-MI-2019-0007, the Energy Bureau did not set benchmarks or baselines for performance metrics on hardening substations. A performance metric on hardening of substations is not necessary to induce LUMA to take actions to harden the T&D System and improve system resiliency, given that LUMA is pursuing several activities pursuant to the SRP approved by the Energy Bureau to harden the T&D System, including the SRP Programs on Transmission Substation Rebuilds,[21] Distribution Substations Rebuilds,[22] Compliance and Studies,[23] and Transmission Substation T&G Demarcation,[24] Critical Energy Management System Upgrades,[25] Control Center Construction & Refurbishment,[26] Vegetation Management,[27] Distribution Line Rebuild,[28] Distribution Lines Inspection,[29] Distribution Pole & Conductor Repair,[30] Transmission Priority Pole Replacements,[31] Inspection of Transmission Lines,[32] and

[21] LUMA's System Remediation Plan, at pages 127-132, https://energia.pr.gov/wp-content/uploads/sites/7/2021/05/Motion-in-Compliance-with-Order-Submitting-Revised-Redacted-Version-of-SRP-and-Redacted-Attachments-to-Responses-to-RIs-NEPR-MI-2020-0019.pdf.
[22] *Id.* at pages 133-37.
[23] *Id.* at pages 138-149.
[24] *Id.* at pages 153-57.
[25] *Id.* at pages 166-69.
[26] *Id.* at pages 170-73.
[27] *Id.* at pages 185-189.
[28] *Id.* at pages 82-88.
[29] *Id.* at pages 94-99.
[30] *Id.* at pages 89-93.
[31] *Id.* at pages 115-119.
[32] *Id.* at pages 120-124

Transmission Substation Rebuilds[33].

Q. Do you have a response to Mr. Irizarry's recommendation on page 39, lines 22-26 that the Energy Bureau consider a performance metric on "Targeted distribution system investment," to strengthen the distribution system to allow more distributed renewable generation and to be measured based on incremental miles of distribution circuits operating at 13.2 kV., and millions of dollars invested in strengthening distribution system to achieve more distributed renewable generation?

A. Yes, I do.

Q. Please state and explain your response.

A. As I explained above, LUMA is proposing an initial set of metrics that evolve over time as the T&D System is improved. The initial set of metrics considers the current state of the T&D System and realistic measures of improvement in the near term, following the agreement by the parties set forth in the T&D OMA. At this time, LUMA opposes adding other metrics for payment of the incentive set forth in the T&D OMA.

In the PREPA performance proceeding Case NEPR-MI-2019-0007, the Energy Bureau did not set benchmarks or baselines for performance metrics on targeted distribution system investment. A performance metric on targeted distribution system investment is not necessary to induce LUMA to take invest on T&D System infrastructure to integrate renewables. LUMA is pursuing several activities and investments pursuant on T&D System infrastructure pursuant to Investment Programs approved by the Energy Bureau and the approved SRP. These include SRP Programs on Transmission Substation

[33] *Id.* at pages 127-132.

Rebuilds,[34] Distribution Substations Rebuilds,[35] Transmission Substation T&G Demarcation,[36] Critical Energy Management System Upgrades,[37] Control Center Construction & Refurbishment,[38] Distribution Streetlighting Program,[39] Standardized Metering & Meter Shop Setup,[40] Critical Energy Management & Load Generation Balancing,[41] and Investment Programs, including AMI Implementation Program,[42] Distribution Technology,[43] Renewables, Integration, Minigrids & Generation Studies,[44] and Resource Planning, Process to Improve Resource Adequacy and Cost Tacking,[45] Distribution Line Rebuild,[46] Distribution Pole & Conductor Repair,[47] Distribution Lines Inspection,[48] Transmission Line Rebuilds,[49] Transmission Priority Pole Replacements,[50] and Inspection of Transmission Lines.[51]

Finally, Mr. Irizarry's proposal does not consider that the Distribution System damaged by hurricane Maria is currently subject to plans for replacement and hardening with funding from the Federal Emergency Management Agency. Thus, a performance metric

[34] LUMA's System Remediation Plan, at pages 127-132, https://energia.pr.gov/wp-content/uploads/sites/7/2021/05/Motion-in-Compliance-with-Order-Submitting-Revised-Redacted-Version-of-SRP-and-Redacted-Attachments-to-Responses-to-RIs-NEPR-MI-2020-0019.pdf.
[35] *Id.* at pages 133-37.
[36] *Id.* at pages 153-57.
[37] *Id.* at pages 166-69.
[38] *Id.* at pages 170-73.
[39] *Id.* at pages 56-60.
[40] *Id.* at pages 69-71.
[41] *Id.* at pages 178-81.
[42] *LUMA's Initial Budgets* at pages 108-113, https://energia.pr.gov/wp-content/uploads/sites/7/2021/04/20210430-MI20210004-Motion-in-compliance-with-order-and-request-for-brief-extension.pdf
[43] *Id.* at pages 158-161.
[44] *Id.* at pages 362-66.
[45] *Id.* at pages 409-413.
[46] *Id.* at pages 82-88.
[47] *Id.* at pages 89-93.
[48] *Id.* at pages 94-99.
[49] *Id.* at pages 109-114.
[50] *Id.* at pages 115-119.
[51] *Id.* at pages 120-124

to measure millions of dollars in strengthening the distribution system is not feasible because it entails many projects that vary in scope, cost and time to construct.

Q. Do you have a response to Mr. Irizarry's statement on page 56, lines 4-8, that the time it takes to restore electric service after an interruption (CAIDI) has increased significantly in 25 out of 26 regions under LUMA.

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Irizarry states that his claim that "the time it takes to restore electric service after an interruption (CAIDI) has increased significantly 25 out of 26 regions under LUMA" is "according to SAIDI and CAIDI data filed with the Bureau in Case No. NEPR-MI-2019_0007". However, CAIDI values by region are not filed with the PREB. The only CAIDI value filed with the PREB is for the entire system and only includes distribution system related outages, it does not include transmission or substation related outages. Therefore, the CAIDI values used by Mr. Irizarry must be values calculated from the SAIFI and SAIDI values that are filed by region to the PREB. Since CAIDI = SAIDI ÷ SAIFI, a value for CAIDI can be calculated but the value may not be the same as that calculated from the raw outage data, depending on the round-off that is used on the SAIFI and SAIDI values. Filings with the PREB round both SAIFI and SAIDI to two decimal places. Also, these values only include outages related to the distribution system and do not include transmission or substation related outages.

Q. Do you have a response to Mr. Irizarry's statement on page 58 lines 22-24, that from June through August 2021, 1 out of 26 regions had SAIDI under 120 minutes and ten regions had SAIDI above 240 minutes?

A. Yes, I do.

Q. Please state and explain your response.

A. From June through August 2021, in eight regions, SAIDI T&D was less than or equal to 120 minutes. Only five regions showed average SAIDIs that were above 240 minutes from June – August 2021.[52]

Q. Do you have a response to Mr. Irizarry's statement on page 56, lines 4 through 6 that according to SAIDI and CAIDI values, reliability have deteriorated?

A. It should be noted that changing reliability indices takes time. Looking at a short period, for example, months of data, does not indicate the true reliability trend for the grid. Three months of data do not indicate a trend. When you start to look at individual months or instances where reliability values were reached, the value is arbitrary and cannot indicate a trend in performance nor the reliability of the grid. Also, as explained above in my testimony, Mr. Irizarry does not consider the current state of the T&D System, nor the challenges faced by LUMA upon service commencement as already explained. As the electrical grid is neglected for a period of time, the indices may be negatively impacted. Also, to the extent that Mr. Irizarry considered in several portions of his testimony, the months June to August, consideration should be given to the fact that they marked the start of the summer season which is known to impact the reliability indices negatively.

Q. Do you have comments on the pre-filed testimony of Mr. Gerardo Cosme of the Independent Consumer Protection Office?

A. Yes, I do.

[52] *See Motion Submitting Quarterly Performance Metrics, Requesting Leave to Defer Reporting on Specified Metrics and Request for Clarifications*, Case No. NEPR-MI-2019-0007, filed on September 20, 2021 and exhibits to same.

Q. Do you have a response to Mr. Cosme's statement on page 3, lines 92-95 of his pre-filed testimony that SAIDI and SAIFI should include all events of transmission and distribution lines and substations, as opposed to PREPA's method of only counting distribution line system events?

A. Yes, I do.

Q. Please state and explain your response.

A. Mr. Cosme's use of the word "all" is problematic as it is overinclusive. LUMA agrees that SAIDI and SAIFI should include transmission and distribution events. However, pursuant to the order issued by the Energy Bureau in Case NEPR-MI-2019-0007, that required application of IEEE Standard 1366™, LUMA is excluding generation caused outages, planned outages, and Major Event Days (MEDs) as defined in IEEE Standard 1366™. This has been industry practice for over a decade now. The idea behind excluding MEDs is to measure performance under typical operating conditions or "blue sky" days. Including MEDs in the analysis would significantly skew the results and mask performance during blue sky days. A completely different operating strategy is employed during MEDs and performance during MEDs is measured by the MOE metrics that LUMA has proposed.

Q. Do you have a response to Mr. Cosme's statement on page 3, lines 95-97 of his pre-filed testimony regarding SAIDI and SAIFI, that T&D events should be reported individually to provide useful information for improved planning?

A. Yes, I do.

Q. Please state and explain your response?

A. I disagree with Mr. Cosme. In the Quarterly Performance Metrics Reports filed with the

Energy Bureau in case NEPR-MI-2019-0007, LUMA currently reports Distribution SAIFI and SAIDI separately from Transmission and Substation SAIFI and SAIDI. The current system is not capable of automatically separating between transmission and substation caused outages. In the future, as improvements are made to the OMS, LUMA may consider making a change.

Q. Do you have a response to Mr. Cosme's statement at page 3, lines 118-121 and page 4, lines 161-162 of his pre-filed testimony that he does not agree with LUMA's proposed metrics on T&D inspections and that the Energy Bureau should not accept these metrics?

A. Yes, I do.

Q. Please state and explain your response.

A. I disagree with Mr. Cosme's position that the Energy Bureau should reject the proposed metrics on T&D Inspections. LUMA has included the alternative metrics because the results of the metrics will indicate the health of the physical field assets. This information is important for several reasons. First, it allows LUMA to identify and repair all infrastructure that may create hazards to employees or the public. LUMA would be able to repair and/or replace assets prior to failure. Second, it allows LUMA to measure the health of the system against major weather events. This will lead to better emergency restoration planning. Third, it allows LUMA to better plan for the financial resources and budgets needed to keep the assets in good condition.

The primary results of the planned inspections are to prioritize and sequence repairs and other work to reduce the risk of failure and lower the safety risk to electrical workers and the public. Achieving the inspections will also enable targeted construction programs and

allow for more effective deployment of capital funds, including federal funds. LUMA's implementation of the capital programs that target the equipment inspected and that equipment, should lead to lower risk of failure and therefore cause less outages. The assessments are an essential first step required to improve reliability, but they also support other requirements such as addressing public and employee safety, improving physical security, and creating a resilient grid.

Having data on the condition of all assets is the best approach to optimize the cost to improve the condition of the T&D assets. This is particularly important because PREPA does not have a record of the asset health condition and as such it is appropriate to incentivize this performance category.

In his testimony, Mr. Cosme does not consider these benefits and outcomes of the inspections.

Q. Do you have a response to Mr. Cosme's statement on page 4, lines 141-143 of his pre-filed testimony that "inspections alone without actions by a developed plan will not lead to any outcome"?

A. Yes, I do.

Q. Please state and explain your response.

A. I disagree with Mr. Cosme's statement that seems to suggest that inspections do not involve actions that should be independently tracked for an incentive. As I have stated, the inspections are necessary for Puerto Rico's T&D System given that PREPA does not have a record of the health of the assets of the T&D System. Thus, it is proper to track LUMA's performance on the inspections and consider LUMA's performance for payment of the incentive fee as stated in the T&D OMA. I already explained the

concrete outcomes of these metrics. I should stress as examples, that the outcome of the inspections will be used to identify equipment that is damaged and can be replaced. The outcomes will also be used to correct and update the T&D System model used by OMS which has a direct impact on data used in calculating SAIDI and SAIFI.

Q. Do you have a response to Mr. Cosme's statement on page 4, lines 162-164 of his pre-filed testimony that "Improvements to T&D Infrastructure made by concrete actions taken, not inspections or plans, will be reflected in SAIDI, SAIFI, CEMIn and MAIFI"?

A. Yes, I do.

Q. Please state and explain your response.

A. I disagree with Mr. Cosme's proposal that inspections will not have an impact on SAIDI, SAIFI, CEMIn and MAIFI. Although the outcomes of the inspections may not be immediately reflected in SAIDI, SAIFI, CEMIn and MAIFI values, inspections do include concrete actions that will have an impact on SAIDI, SAIFI, CEMIn and MAIFI. Those actions include documentation of the health of the physical assets and repair and / or replacement of the physical asset before it fails, and potential creates a safety hazard to LUMA employees and / or the general public.

Q. Does this complete your testimony?

A. Yes.

ATTESTATION

Affiant, Mr. Don Cortez, being first duly sworn, states the following:

The prepared Rebuttal Testimony constitutes my rebuttal testimony in the above-styled case before the Puerto Rico Energy Bureau. Affiant states that he would give the answers set forth in the Rebuttal Testimony if asked the questions that are included in the Rebuttal Testimony. Affiant further states that the facts and statements provided herein is her rebuttal testimony and, to the best of his knowledge, are true and correct.

Don Cortez

Affidavit Number 798

Acknowledged and subscribed before me by Mr. Don Cortez in his capacity as Vice President, Utility Transformation, LUMA Energy ServCo. LLC, who is of legal age, single, an executive and resident of San Juan, Puerto Rico, who I personally know.

In San Juan, Puerto Rico, this 17th day of February 2022.

Public Notary

Rebuttal Testimony, D. Cortez

Exhibit

Exhibit 1- Response by Mr. Irizarry to LUMA-LECO-IRIZARRY-ROI-01-58, LUMA's First Set of Interrogatories and Request for Production of Documents notified on January 13, 2022.

REQUEST #: LUMA-LECO-IRIZARRY-ROI-01-58

State the basis for your statement on page 28, lines 25-28 of your testimony that "severe voltage fluctuations" are a "phenomenon normally not seen while PREPA managed the electric grid." Please provide any data, statistics, or documents that support your statement.

RESPONDER:
Agustín Irizarry-Rivera

RESPONSE:

The basis is personal experience, being a resident in Puerto Rico without interruption since 1996, and professional training (PhD electric power systems) to recognize severe voltage fluctuations.

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Rebuttal Testimony of
Mrs. Jessica Laird
Vice President of Customer Experience, LUMA Energy ServCo LLC
February 17, 2022

Q. Please state your name.

A. My name is Jessica Laird.

Q. Please state your business mailing address, title, and employer.

A. My business mailing address is PO Box 363508 San Juan, Puerto Rico 00936-3508. I am the Vice President in the Customer Experience department for LUMA Energy.

Q. Please state your educational background.

A. I hold a Bachelor of Commerce with Distinction from the University of Alberta.

Q. Please state your professional experience.

A. I have approximately 20 years of professional experience in Customer Experience, Regulatory and Retail Services within the electric utility industry. In 2019, I joined LUMA's Customer Experience department as a Director in the Customer Experience Division.

Q. Please describe your work experience prior to joining LUMA.

A. I have worked for more than 20 years in the Canadian utility industry largely in customer service roles. I have worked in both regulated and deregulated utilities on both the utility industry's Transmission and Distribution and retail sides. Prior to joining LUMA, my most recent role at ATCO was setting up and operating ATCO Energy, ATCO's energy retail arm, as Sr. Manager, Home & Energy Operations. My experience includes operating contact centers, the voice of customer programs, back-office and billing operations, credit and collections operations, regulatory committees, self-serve customer tools, and online retail sales. I have significant experience in customer experience improvement, process development and improvement, contract governance, operational analytics, and Key Performance Indicator reporting.

Q. On whose behalf are you testifying before the Puerto Rico Energy Bureau.

A. My testimony is on behalf of LUMA as part of the Puerto Rico Energy Bureau ("Energy Bureau"), Commonwealth of Puerto Rico Public Service Regulatory Board proceeding Case No. NEPR-AP-2020-0025, the Performance Targets for LUMA Energy ServCo, LLC.

Q. Are there any exhibits attached to your testimony?

A. Yes.

Q. Please identify the exhibits to your testimony.

1. Exhibit 1- J.D. Power *At a Glance* Slides.
2. Exhibit 2- J.D. Power Residential Scoring (PREPA and LUMA).
3. Exhibit 3- J.D. Power Business Scoring (PREPA and LUMA).
4. Exhibit 4- Response by Beatriz González to LUMA's Interrogatory No. 15 of the First Set of Interrogatories.

Q. What is the purpose of your rebuttal testimony?

A. To respond to those portions of the pre-filed testimony of Ms. Beatriz González ("Ms. González"), on behalf of the Independent Consumer Protection Office ("ICPO"), filed on November 17, 2021, in this proceeding, Case No. NEPR-AP-2020-0025, regarding LUMA's proposed metrics on Residential and Commercial Customer Satisfaction and Average Speed of Answer. Further, I will respond to those portions of the pre-filed testimony of Mr. Agustín Irizarry ("Mr. Irizarry") on behalf of the Local Environmental and Civil Organizations ("LECO"), filed on November 16, 2021, in this proceeding, also regarding LUMA's proposed metric on Residential and Commercial Customer Satisfaction. Finally, I also testify to support further LUMA's Performance Metrics Targets

filing of September 24, 2021 ("LUMA's Performance Metrics Targets") on the Residential and Commercial Customer Satisfaction and Average Speed of Answer metrics.

Q. Did you consider any documents for your rebuttal testimony?

A. Yes, I did.

Q. Which documents did you consider for your rebuttal testimony?

a. LUMA's Performance Metrics Targets Revised filing submitted on September 24, 2021, in this proceeding, Case No. NEPR-AP-2020-0025,

b. The Resolutions and Order issued by the Puerto Rico Energy Bureau on April 8, 2021, May 21, 2021, and July 2, 2021, in Case NEPR-MI-2019-0007,

c. The pre-filed testimony of Mr. Agustín Irizarry of November 16, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025 and his expert report, which is an exhibit of his pre-filed testimony,

d. The responses provided by Mr. Agustín Irizarry to LUMA's First Set of Interrogatories and Request for Production of Documents notified on January 13, 2022,

e. The pre-filed testimony of Ms. Beatriz González of November 17, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025,

f. The responses provided by Ms. Beatriz González to LUMA's First and Second Sets of Interrogatories and Requests for Production of Documents, which were notified on December 15, 2021, and January 18, 2022, respectively,

g. The responses provided by Ms. Beatriz González to the Puerto Rico Energy Bureau's Requirements for Information notified on December 27, 2021,

h. The Exhibits to my testimony enumerated above,

i. The documents and sources quoted in my testimony,

j. LUMA Energy Quarterly Report, Second Quarter Fiscal Year 2022, October 1-December 31, 2021, February 14, 2022.

Q. Regarding Exhibit 1 to your pre-filed testimony, J.D. Power *At a Glance Slides,* do you recognize the document?

A. Yes, I do. It is a document that J.D. Power shared with me as Vice President, Customer Experience for LUMA, in electronic pdf format. It is an informative document that bears the J.D. Power seal. J.D. Power authorized LUMA to use the document and the information that it contains purposes related to the customer surveys commissioned by LUMA and PREPA and conducted by J.D. Power, including filing the document with the Puerto Rico Energy Bureau.

Q. Is Exhibit 1 to your pre-filed testimony, J.D. Power *At a Glance Slides,* the same document that you received in pdf format from J.D. Power?

A. Yes, it is.

Q. Please describe Exhibit 1 to your pre-filed testimony, J.D. Power At a Glance Slides.

A. It is a document with the J.D. Power seal that provides facts and information on J.D. Power, its surveys, and the industries that J.D Power serves.

Q. Regarding Exhibit 2 to your pre-filed testimony, entitled 2021 J.D. Power Residential Scoring (PREPA and LUMA), do you recognize the document?

A. Yes. It is a document with a portion of the overall scores and results of the J.D. Power customer satisfaction surveys for residential customers that J.D. Power conducted for LUMA and PREPA in 2021. It also includes the cumulative score for the year 2020. It bears the J.D. Power seal and is proprietary of J.D. Power. I obtained the document from J.D. Power in my capacity as Vice President, Customer Experience for LUMA.

Q. How did you obtain Exhibit 2?

I received it in electronic pdf format. J.D. Power authorized LUMA to use the document and the information that it contains for purposes related to the survey on customer satisfaction for residential customers, commissioned by LUMA and PREPA and conducted by J.D. Power, including filing the document with the Puerto Rico Energy Bureau.

Q. Does Exhibit 2 to your pre-filed testimony, fairly and accurately portray the relevant portions of the overall results for the customer satisfaction surveys for residential customers, that J.D. Power conducted for LUMA and PREPA?

A. Yes, it does.

Q. Please describe Exhibit 2 to your pre-filed testimony.

A. It is a document with the J.D. Power seal that shows a portion of the overall results and scores of the customer satisfaction surveys for residential customers that J.D. Power conducted for LUMA and PREPA for 2020 and 2021. The cumulative scores as well as the results per quarter, are shown in slides 4 and 5.

Q. Regarding Exhibit 3 to your pre-filed testimony, entitled 2021 J.D. Power Business Scoring (PREPA and LUMA), do you recognize the document?

A. Yes, I do. It is a document with a portion of the overall results and scores for the customer satisfaction surveys for business customers that J.D. Power conducted for LUMA and PREPA for 2021. It also includes the cumulative score for the year 2020. It bears the J.D. Power seal and is proprietary of J.D. Power. I obtained it from J.D. Power in my capacity as Vice President, Customer Experience for LUMA.

Q. How did you obtain Exhibit 3?

I received it in electronic pdf format. J.D. Power authorized LUMA to use the document

and the information that it contains for purposes related to the surveys on customer satisfaction for business customers, commissioned by LUMA and PREPA and conducted by J.D. Power, including filing the document with the Puerto Rico Energy Bureau.

Q. Does Exhibit 3 to your pre-filed testimony, fairly and accurately portray the relevant portions of the overall results for the customer satisfaction surveys for business customers, that J.D. Power conducted for LUMA and PREPA?

A. Yes, it does.

Q. Please describe Exhibit 3 to your pre-filed testimony

A. It is a document with the J.D. Power seal that shows a portion of the overall results and scores of the customer satisfaction surveys for business customers that J.D. Power conducted for LUMA and PREPA for 2020 and 2021. The cumulative scores as well as the results per quarter, are shown in slides 4 and 5.

Q. Do you agree with Ms. González's statement that the information provided by LUMA is insufficient to evaluate the effectiveness of the customer survey performed by J.D. Power, as stated on pages 11-12, lines 186-199 of her direct pre-filed testimony?

A. No.

Q. Please explain your response.

A. It is LUMA's position that the information that has been provided to the Energy Bureau and J.D. Power's industry-leading expertise and the wide acceptance in the competitive market of J.D. Power's Electric Utility Syndicated Studies, allow acceptance in the regulatory context of the studies that J.D. Power has conducted for LUMA and PREPA. Other utilities such as the Long Island Lighting Company (LIPA) and Xcel Energy in Minnesota have customer satisfaction metrics based on J.D. Power's Electric Utility

Syndicated Studies.[1]

Customer satisfaction surveys such as those performed by J.D. Power are relatively standard for utilities. In Puerto Rico, using a customer satisfaction survey by J.D. Power was a contractual requirement under the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement ("T&D OMA"). The contractual requirement is shown in Annex I (Scope of Services), Annex IX (Performance Metrics), and Annex X (Calculation of Incentive Fee) of the T&D OMA. The condition in the T&D OMA regarding the J.D. Power Survey was put into the contract directly by the Puerto Rico Public-Private Partnerships Authority ("P3"). During the negotiation of the T&D OMA, this requirement was not disputed. As a result, the initial cost of the original J.D. Power Survey in the Front-End Transition Period was submitted to the P3 as an expense. After commencement of operations, from June 1, 2021, LUMA will be paying for any customer satisfaction surveys out of its Operating and Maintenance budget as part of its contractual obligation. J.D. Power was explicitly listed as the vendor in the T&D OMA.

As shown in J.D. Power's corporate information included as Exhibit 1 to my testimony, J.D. Power is the leader in capturing customer experience and sentiment. Ninety-one percent (91%) of consumers recognize the J.D. Power Award.[2] J.D. Power has more than

[1] *See* Second Amended and Restated Operations and Services Agreement between the Long Island Lighting Company (LIPA) and PSEG Long Island LLC, at pages 10, 13, 14 *available at* https://www.lipower. org/wp-content/uploads/2021/11/2nd-AR-OSA-Nov-09-2021-1.pdf (last visited, February 14, 2022); Minnesota Public Utilities Commission, Docket No. 20-460, Xcel Energy, 2019 Annual Report and Petition Service Quality Performance and Proposed Reliability Measures, at pages 61-62,https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={605D3B71-0000-C836-B5ED-9DFEA3F5F8C0}&documentTitle=20204-161747-02 (last visited, February 14, 2022).

[2] *See* Exhibit 1, J.D Power Corporate Slides.

fifty (50) years of experience in brand recognition and consumer trust.[3] Also, J.D. Power surveys over 5,000,000 customers annually across more than one hundred seventy-five (175) annual benchmark studies in nineteen (19) countries.[4]

The benefit of using J.D. Power is its wide acceptance and use across the United States. J.D. Power has been conducting the Electric Utility Residential and Electric Utility Business Customer Satisfaction studies for large and midsize electric utility companies in four regions of the Unites States: East Midwest, South and West ("J.D. Power's Electric Utility Syndicated Studies").[5] Utility subscribers can obtain insights and take action based upon the findings within these studies. This includes valuable benchmarking against region and industry leaders and best practices.

The J.D. Power surveys conducted for the Puerto Rico Electric Power Authority (PREPA) and LUMA are reliable measures of overall customer satisfaction and are supported by J.D. Power's proven methodology for its Electric Utility Syndicated Studies to understand customer behavior through third-party evaluations that provide unbiased information that measures customer satisfaction.[6] J.D. Power's Electric Utility Syndicated Study for residential customers for 2021, published on December 15, 2021, covered 120 utilities in

[3] *Id.*, *See also* J.D. Power Press Release of December 15, 2021, *Electric Providers Can Increase Satisfaction by Supporting Local Economic Development Efforts, J.D. Power Finds*, available at https://www.jdpower.com/sites/default/files/file/2021-12/2021171%20Electric%20Utility%20Residential.pdf (last visited, February 14, 2022).

[4] *See* Exhibit 1, J.D Power Corporate Slides.

[5] J.D. Power, *Electric Utility Residential Customer Satisfaction Study*, at p. 2, *available at* https://www.jdpower.com/sites/default/files/file/2020-11/JDP_US_2020_ResidentialElectric_Brochure_FINAL_103020.pdf (last visited, February 14, 2022) and J.D. Power, *Electric Utility Business Customer Satisfaction Study*, at p. 2, *available at https://www.jdpower.com/sites/default/files/file/2020-09/JDP_US-2020_ElectricUtilityBusiness_Brochure_FINAL_092020.pdf* (last visited, February 14, 2022).

[6] *See* J.D. Power, *Electric Utility Residential Customer Satisfaction Study*, *available at* https://www.jdpower.com/business/utilities/electric-utility-business-customer-satisfaction-study (last visited, February 14, 2022).

the East, Midwest, South, and West Regions of the United States and 25 cooperatives, as published by J.D. Power on its website.[7] The business customer satisfaction study involves 86 utilities.[8]

Utilities and companies strive to get the J.D. Power seal of approval for their promotional materials on websites or other marketing materials. In the electric utility market in the United States, companies engage in customer satisfaction studies to track and improve customer satisfaction. LUMA and PREPA are following that path as agreed in the T&D OMA and which has been implemented by many United States mainland utilities.

J.D. Power's methods, accepted across markets, including the electric power utility industry and that have been endorsed in the context of performance indicators in the LIPA contract and by the Minnesota regulator, provides ample information for the Energy Bureau to accept the survey results as reliable indicators of customer satisfaction. Because the surveys are designed and conducted by an independent third party, LUMA is not in a position to influence the methodology or results, nor affect the surveys' reliability.

Q. Are you familiar with the surveys conducted by J.D. Power for LUMA and PREPA on Customer Satisfaction for Residential and Business Customers?

A. Yes, I am. In the course of my duties as Vice President of Customer Experience for LUMA, I participate in meetings with J.D. Power to discuss the suveys and survey results. In those discussions, J.D. Power provides information and explanations on the survey response rates results. I also have access to the survey results through a database included in LUMA's subscription with J.D. Power. Further, I analyze the survey results on a quarterly basis as part of LUMA's Voice of the Customer program – a program designed to implement

[7] *See supra* note 5.
[8] *See supra* note 5.

customer journey improvements based on our customers largest pinch points–. The J.D. Power results provide direct insights to the customers perception of the services provided by LUMA, in turn, we implement changes to meet the needs of the customers based directly on these insights.

Q. Please describe the Electric Utility Residential, and Electric Utility Business Customers Satisfaction Surveys that J.D. Power has conducted for PREPA and LUMA.

A. PREPA and LUMA have been conducting a Customer Satisfaction survey with J.D. Power for Electric Residential and Electric Business customers since the fourth quarter of 2020. A total of five phases or quarters of surveys have been conducted for the residential survey and three halves for the commercial survey. The survey samples are selected at random by J.D. Power from customer data that LUMA shares with J.D. Power. The survey results include a J.D. Power Overall Customer Satisfaction score that is a calculated roll-up of Factor scores that are weighted relative to the importance to overall satisfaction. For both residential and business customers, the surveys track the following six factors: Power Quality and Reliability, Price, Billing and Payment, Corporate Citizenship, Communications, and Customer Care. These are the same factors that J.D. Power applies for its Electric Utility Syndicated Studies. Thus, the surveys that J.D. Power is conducting for PREPA and LUMA closely match J.D. Power's Electric Utility Syndicated Studies, conducted for more than twenty (20) years, further supporting the reliability of J.D. Power's methods and results as a third-party surveyor of customer satisfaction.

Q. As explained in LUMA's Performance Metrics Target Requests of September 24, 2021, and the Revised Annex IX to the T&D OMA filed with the Puerto Rico Energy

Bureau, LUMA's Voice of the Customer team provides J.D. Power customer data, including e-mail addresses, are you aware of the customer data that is shared with J.D. Power?

A. Yes, I am. In the course of my duties as Vice President of Customer Experience, I participate in and oversee the sharing of customer data in the form of customer name, location, and e-mail addresses with J.D Power.

Q. For those surveys that J.D. Power has conducted up to December 2021, please describe the data is shared with J.D. Power?

A. LUMA shares information from its customer database for those customers that have authorized LUMA and PREPA to share their e-mail addresses. LUMA shares the full contents of the database of customers that have provided email addresses with J.D. Power and does not have a say in how J.D. Power chooses the samples for each of the surveys.

Q. For those surveys that J.D. Power has conducted up to December 2021, please provide an estimate of how many e-mail addresses from customers have been shared with J.D. Power?

A. For the surveys conducted from the fourth quarter of 2020 until the fourth quarter of, 2021, LUMA shared 543,682 email addresses with J.D. Power. J.D. Power then runs that data through a set of queries to achieve a unique sample size.

Q. For the customer satisfaction surveys that have been conducted to date, please describe the survey response rates.

A. PREPA had 2,009 respondents for the 2020 Electric Utility Residential Customer Satisfaction survey that J.D. Power conducted. PREPA and LUMA had 7,911 respondents for 2021 in the Electric Utility Residential Customer Satisfaction study. Furthermore,

PREPA had 163 respondents for the 2020 Electric Utility Business Customer Satisfaction study. PREPA and LUMA had 306 respondents for the 2021 Electric Utility Business Customer Satisfaction study.

J.D. Power has not apprised LUMA that there are concerns with the surveys' reliability based on the response rate, nor did J.D. Power include any type of reservation in connection with the survey results. LUMA received a high average response rate mainly attributed to PREPA and LUMA's customers' engagement and eagerness to voice their opinions and see improvement. In the 2021 syndicated study for electric utility residential customers, the number of utility customer respondents is just under seven hundred (700) on average, with the largest utilities seeing respondent numbers in the 1,500 to 1,700 range. As J.D Power has explained to LUMA, the targeted respondent counts are scaled based on the size of the utility.

Q. Please state the survey results conducted by J.D. Power for LUMA and PREPA Residential Customers, Overall Customer Satisfaction.

A. As shown in Exhibit 2 to my testimony, the overall score for Customer Satisfaction, in the Residential Customers Survey of 2021 was 432 for LUMA and 406 for PREPA. Per quarter, the results were as follows: 2021/Q1 (Jan./Feb. 2021) 400 for PREPA; 2021/Q2 (Apr./May 2021) 411 for PREPA; 2021/Q3 (July/August 2021) 456 for LUMA; and 2021-Q4 (Oct./Nov 21) 377 for LUMA. For 2020, the overall score for Customer Satisfaction in the Residential Customer Survey for PREPA was 395.

Q. Please state the survey results conducted by J.D. Power for LUMA and PREPA for Business Customers, Overall Customer Satisfaction.

A. As shown in Exhibit 3 to my testimony, the overall score for Customer Satisfaction, in the

Business Customers Survey for 2021 was 433 for LUMA and 353 for PREPA. Per each of the waves, the results were as follows: 2021/W1 (Feb./May 2021) 353 for PREPA; 2021/W2 (June/Oct. 2021) 433 for LUMA. For 2020, the overall score for Customer Satisfaction in the Business Customers Survey for PREPA was 345.

Q. Do you agree with Ms. González's statement on page 12, lines 202-218 of her pre-filed testimony that using e-mail as the exclusive contact method to perform the survey excludes a significant number of customers that do not use electronic means of communication?

A. No.

Q. Please explain your response.

A. Ms. González's statement is not supported by any data that has been offered in this proceeding. E-mail was J.D. Power's recommended use of conducting their survey and is the survey method that J.D. Power uses for its Electric Utility Syndicated Studies across North America.[9] According to my experience, digital channels (mobile device, laptop, P.C.) are the most widely used and cost-effective means to conduct these studies. In general, market research across industries is conducted via email as digital capabilities and connections have expanded around the world. Currently, LUMA has almost half of its customer base signed up on MiLUMA (sign up requires an active email address), which means that almost half of the customer base has active e-mail. LUMA can reach a strong selection across the board throughout the survey sample. The number of MiLUMA connected customers is steadily climbing month over month and we expect to reach at minimum ~900,000 customers as that was the number of customers digitally connected to

[9] *See* J.D. Power, *Electric Utility Residential Customer Satisfaction Study* and *Electric Utility Business Customer Satisfaction Study*, *supra* note 5.

PREPA's MiCuenta online account. A customer who engages with LUMA via e-mail can and will also engage with LUMA on the phone and in person. Customers are dynamic in how they interact with their utility company, and we should not assume the demographics of customers based on the media they use to communicate with LUMA. That is sufficient data to represent a customer base.

Ms. González does not explain or support her statement that a significant number of customers in Puerto Rico do not have access to e-mail. LUMA's statistics on enrollment to MiLUMA refute the statement by Ms. González. As Vice President of Customer Experience for LUMA, I have not identified any concern with using e-mail or electronic means to communicate with customers. To the contrary, customers have significantly engaged with LUMA through electronic means. As of December 31, 2021, 609,982 customers have registered an electronic MiLUMA account, and the MiLUMA app has been downloaded 451,127 times.[10] During the Second Quarter of FY 2022, LUMA responded to over 96,000 social media messages.[11] Also, available statistics on access to computers and the internet support the reliability of J.D. Power's standard method of conducting customer satisfaction surveys. Public statistics by the United States Census Bureau of July 1, 2021, show that from 2015 through 2019, 68.6% of households in Puerto Rico had a computer, and 60.4% of households had subscriptions to broadband internet.[12] The World Bank's statistics on the percentage of individuals using the internet in Puerto Rico was 77.736% in 2019, per data from the International Telecommunication Union (ITU) World

[10] LUMA Energy Quarterly Report, Second Quarter Fiscal Year 2022, October 1-December 31, 2021, February 14, 2022, Case No. NEPR-MI-2021-0004, *In Re LUMA's Initial Budgets*, at p. 13.
[11] *Id.*
[12] United States Census Bureau, *Quick Facts PR*, https://www.census.gov/quickfacts/PR (last visited, February 14, 2022).

Telecommunication/ICT Indicators Database.[13] The World Bank statistics also show that in 2020, there were 3,483,570 mobile telephone subscriptions in Puerto Rico per data from the International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database.[14] Meanwhile, in 2020, there were 711,512 fixed telephone subscriptions in Puerto Rico, as the World Bank reports using data from the International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database.[15]

Q. Do you agree with Ms. González's statement on page 12, lines 202-218 of her pre-filed testimony that interviewing customers at the commercial offices was a more trustworthy and representative method than an e-mail survey?

A. No.

Q. Please explain your response.

A. Ms. González's statement is not supported by any data that has been offered in this proceeding. Especially when considering that Ms. González has admitted that she does not have any experience designing or implementing customer satisfaction surveys in her discovery responses in this proceeding.[16] J.D. Power conducts e-mail surveys due to the high response rates received through this type of survey. Statistically, customers sampled via e-mail are standard across all utilities. The Internet is now the single most common

[13] The World Bank, *Individuals Using the Internet (% of population)-Puerto Rico*, https://data.worldbank.org/indicator/IT.NET.USER.ZS?end=2020&locations=PR&start=2001&view=chart (last visited, February 14, 2022).
[14] The World Bank, *Mobile Cellular Subscriptions-Puerto Rico*, http://data.worldbank.org/indicator/IT.CEL.SETS?end=2020&locations=PR&start=2001&view=chart (last visited, February 14, 2022).
[15] The World Bank, *Fixed Telephone Subscriptions-Puerto Rico*, http://data.worldbank.org/indicator/IT.MLT.MAIN?end=2020&locations=PR&start=2001&view=chart (last visited, February 14, 2022).
[16] Exhibit 4 to this Testimony, Response by Beatriz González to LUMA's Interrogatory No. 15 of the First Set of Interrogatories "15. Please indicate if you have any experience designing surveys on customer satisfaction."

means of collecting consumer opinion and behavior data.[17] Research conducted by the Council of American Survey Research Organizations shows that the Internet is the primary method of data-collection for more research organizations than is telephone or in-person interviewing in the market research industry.[18] It would be economically unfeasible to consider other survey options, such as printed surveys or telephone calls. Not only is there a likelihood that customers will not respond, but there are associated costs to be considered. For example, phone surveys may be less expensive than face-to-face encounters, but they require trained interviewers and a system for making the calls, both of which cost money. Telephone surveys have become more difficult and expensive to execute properly, as response rates have dwindled.[1920]

Secondly, the so called in-person surveys (in which potential respondents are intercepted, screened, and interviewed in-person) can be both time consuming and expensive. Another concern is that the in-person interviewer may influence the responses. Further, they can potentially suffer from geographic and demographic limitations on who can be interviewed and difficulties in locating low-incidence populations.[21] Also, paper mail surveys are costly as phone interviews.[22] In my experience, e-mail surveys are becoming more popular because their costs are lower. E-mail-based surveys where respondents can complete their survey on a mobile device, laptop, tablet, or desktop are standard in the industry. This type

[17] Hal Poret, *A Comparative Empirical Analysis of Online Versus Mall and Phone Methodologies for Trademark Surveys*, 100 Trademark Rep. 756, 768 (2010).
[18] *Id.*
[19] *Id*., at p. 757.
[20] Gabriel M. Gelb & Betsy D. Gelb, *Internet Surveys for Trademark Litigation: Ready or Not, Here They Come*, 97 Trademark Rep. 1073, 1073–74 (2007).
[21] Hal Poret, *supra* note 17 at p. 757.
[22] https://www.entrepreneur.com/article/55680, stating that paper mail surveys typically cost around $5,000 to $7,000 for 200 responses (last visited, February 14, 2022).

of survey is standardized across our utility studies and other verticals and is the medium used by J.D. Power. Data shows that response rates for the online surveys are as high as or higher than typical response rates for methodologies that are commonly accepted, such as telephone or in-person.[23] Online methodologies are equally, if not more, suitable for obtaining samples that were representative in terms of age, gender, geography, and category usage.[24]

In my experience, surveying in person can be challenging due to the time it takes to complete the survey and peoples' limited time when visiting a commercial office, primarily for particular purposes. Also, an in-person survey would require a pre-screening selection process to be conducted on-site before a customer is selected to respond to an in-person survey in a LUMA commercial office. Likewise, surveying via telephone does not allow the customer to complete the survey at their leisure. Usability for the survey is higher via e-mail because customers can complete the survey at their convenience. Altering the current approach to the survey is not warranted and doing so would increase time and cost without benefit.

Q. Do you agree with Ms. González's statement on page 13, lines 229-232, of her pre-filed testimony in which she disagrees with the proposed baseline of 10 minutes for the Average Speed of Answer Metric?

A. No.

Q. Please explain your response.

A. First, Ms. González's statement fails to consider that the baseline proposed by LUMA is based on data from PREPA that was available when the baseline was submitted to the

[23] Hal Poret, *supra* note 17 at 806.
[24] *Id.*

Energy Bureau on February 2021. During the Front-End Transition period, while PREPA was still operating, LUMA measured PREPA's baseline based on the data available at the time. Also, during that period, J.D. Power completed two-quarters of residential survey results and one-half of business survey results. As per Annex IX of the T&D OMA, the baseline from which LUMA needs to improve is based on the performance of the previous operator (PREPA) and not on LUMA's performance post-commencement. Based on LUMA's metrics reported post-commencement, we have worked diligently to improve the average speed of answer and have demonstrated positive results.

Second, Mrs. González objects to the baseline because of the numbers reported to the Energy Bureau in Case No. NEPR-MI-2019-0007 in July and August 2021 were lower than the baseline. However, she fails to consider that those are monthly figures. LUMA is measured on an annual average, not on a monthly average. Occurrences such as hurricanes and the hurricane season increase activity if there are outages and many outages. LUMA looks at a yearly average because we will have varying call volumes throughout the year. An annual metric enables LUMA to balance cost efficiency, resourcing, and customer demand over a more extended period. We need to consider cost efficiency in staffing and the availability of call center resources throughout the year.

Q. What opinion do you have of Ms. González's statement on page 13, lines 234-236, that it is illogical to establish a metric that LUMA can already accomplish?

A. I disagree with Ms. González's statement. Setting metrics that you can accomplish is not illogical. The point is to accelerate accomplishment, not set a metric that is impossible to achieve. There is no incentive to improve if you select a too high target. The point of any contractual metric is to show improvement and progress. LUMA should not be punished

for overachieving.

Moreover, as mentioned before, LUMA is measured on an annual average, not on a monthly average. The metrics reported to the Energy Bureau in Case No. NEPR-MI-2019-0007 are all monthly figures. Monthly metrics cannot be compared to annual metrics – two to three months of a metric do not equate to a trend. Therefore, one cannot extrapolate the numbers reached in two different months to represent the year, as Mrs. González suggests in her testimony.

Q. Do you agree with Ms. González's proposal on page 14, lines 243-245, to adopt the baseline of 8:25 minutes established by the Energy Bureau in Case No. NEPR-MI-2019-0007 for the Average Speed of Answer Metric?

A. No.

Q. Please explain your response.

A. Ms. González's proposal is based on a wrong premise. The baseline established by the Energy Bureau in Case No. NEPR-MI-2019-0007 was 8:30. Also, it is based on her understanding of LUMA's achievement of the proposed baseline in some months of 2021. However, as explained before, LUMA is measured on an annual average, not on a monthly average. LUMA looks at a yearly average because we will have varying call volumes throughout the year. Once again, the metrics that were reported to the Energy Bureau in Case No. NEPR-MI-2019-0007 are all monthly figures. Monthly metrics cannot be compared to annual metrics – two to three months of a metric do not equate to a trend.

Q. Do you agree with Mr. Irizarry's recommendation to strike the Residential and Commercial Customer Satisfaction metrics until a more thorough set of data is available using survey-taking means more inclusive than an e-mail survey, as outlined

on page 46, lines 8-19 of his testimony?

A. No.

Q. Please explain your response.

A. First, I have to clarify that J.D. Power did complete three quarters of data on customer satisfaction while PREPA was still operating. Therefore, LUMA has set the baselines with such data. While PREPA has not conducted this type of survey historically, the ability to perform three (3) surveys during the Front-End Transition period granted LUMA the opportunity to have a statistically significant baseline for customer satisfaction.

Second, as explained before regarding Ms. González's statement, statistically, customers sampled via e-mail are standard across all utilities. Usability for the survey is higher via e-mail because customers can complete the survey at their convenience. There is no technology gap issue with LUMA's customers. Currently, LUMA has almost half of the customer base signed up on MiLUMA – which means that almost half of the customer base has active e-mail. That is sufficient data to represent a customer base. Further, the survey itself inquires customers about all aspects of LUMA's customer interactions, therefore, pulling in data regarding online, in-person, and telephone customer service. LUMA believes it has sufficient inclusive data to support the Residential and Commercial Customer Satisfaction metrics.

Q. Do you agree with Mr. Irizarry's statement that the volume of customers calls has increased since LUMA took over the system, as outlined on page 55, line 23, and page 56, lines 1-2 of his testimony?

A. No.

Q. Please explain your response.

A. Mr. Irizarry's statement fails to consider PREPA's customer calls system, its limitations, and how those limitations affected the number of customer calls received. As described thoroughly in my pre-filed direct testimony, LUMA cannot compare its call data with PREPA due to the truncated lines already being addressed. As a customer service provider, LUMA no longer limits the number of calls that can be received at any given time. Under PREPA, customers were previously receiving a busy signal. In contrast, our cloud-based call center currently allows callers to remain on hold until a customer service representative can address their call. As a result, the number of calls increased compared to PREPA. We cannot compare LUMA's figures to PREPA's historical performance for those reasons. Additionally, an increase in calls would be anticipated during a transitionary period for the customer (i.e., the transition period from PREPA to LUMA). If it is considered the number of calls reported by LUMA in Case No. NEPR-MI-2019-0007, as part of the quarterly reporting on the number of customer calls, it is reflected that the number of calls at present continues to decrease month by month.

Q. Does this complete your testimony?

A. Yes.

ATTESTATION

Affiant, Mrs. Jessica B. Laird, being first duly sworn, states the following:

The prepared Rebuttal Testimony constitutes my direct testimony in the above-styled case before the Puerto Rico Energy Bureau. Affiant states that she would give the answers set forth in the Rebuttal Testimony if asked the questions that are included in the Rebuttal Testimony. Affiant further states that the facts and statements provided herein is her rebuttal testimony and, to the best of her knowledge, are true and correct.

Jessica Laird

Affidavit # 7864

Acknowledged and subscribed before me by Mrs. Jessica B. Laird in her capacity as Vice President of Customer Experience of LUMA Energy, of legal age, married, an executive, and resident of San Juan, Puerto Rico who is personally known to me.

In San Juan, Puerto Rico, this 17th day of February 2022.

Public Notary #10007

Rebuttal Testimony

Exhibit

1. J.D. Power *At a Glance* Slides.

J.D. Power at a Glance

91%

Of consumers recognize the J.D. Power Award*

54 Years

of Experience &
Brand Recognition
Consumer Trust

Consumers say they use J.D. Power reviews and ratings because they are

trustworthy, reliable, honest, clear and accurate**

More Than

5,000,000

Consumers Surveyed Annually

Featured in

HUNDREDS

of commercials receiving

BILLIONS

of impressions

175

Annual Benchmark Studies

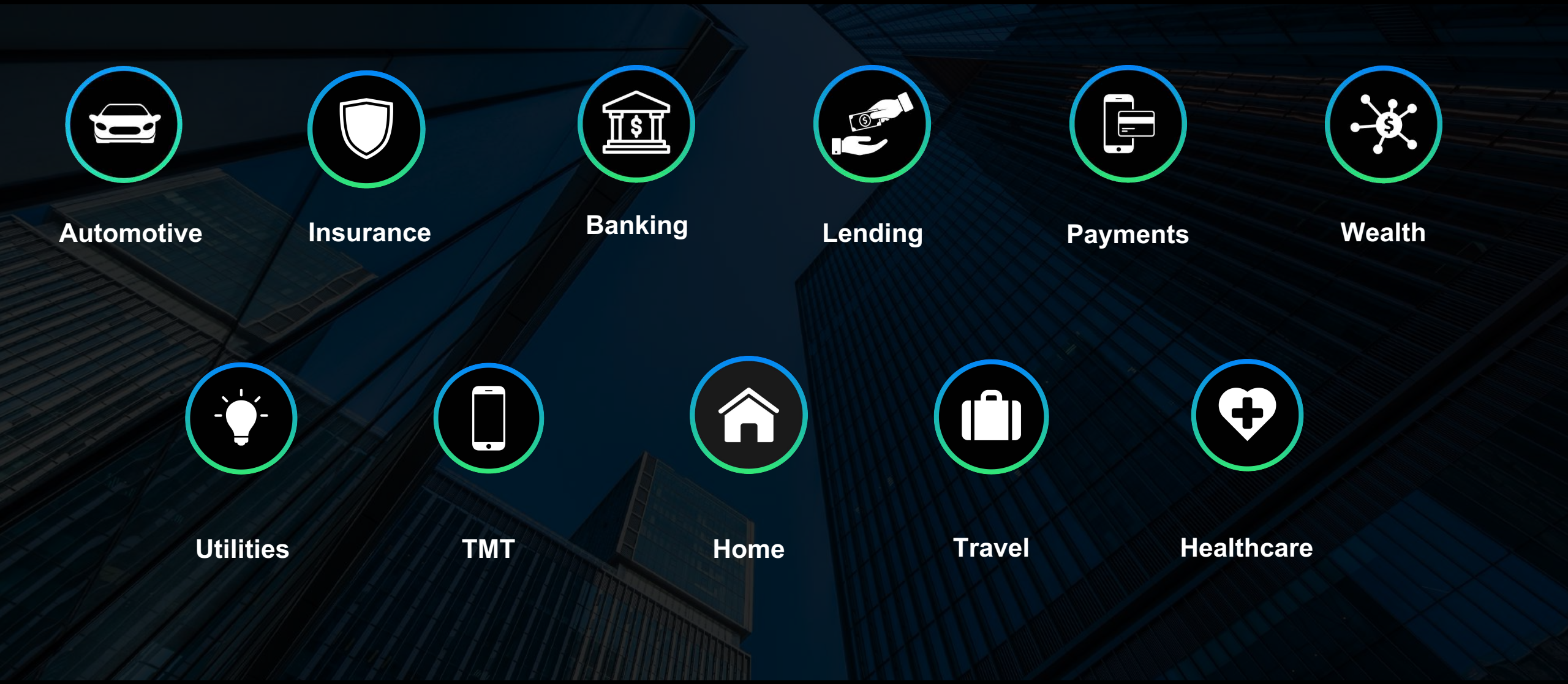
Studies Fielded & Awards Coveted in

19 Countries

*Based on J.D. Power U.S. Award Program Usage and Awareness Research conducted by Kantar in March 2020; results based on 2,000 online interviews conducted with adults 18 years+, with shared/sole responsibility in household purchase decisions.

**Based on consumer evaluations of J.D. Power as a company that provides ratings/reviews of products and services. Results based on sample representative of U.S. Census by gender, state, age and income during Jan-Mar '20, 95% confidence level utilized.

Industries We Serve



WHO WE ARE

J.D. Power is a global leader in consumer insights, data, analytics, and advisory services that helps clients drive growth and profitability. The company's industry benchmarks and reputation for independence and integrity have established it as one of the world's most well-known and trusted brands.

- J.D. Power has been the Voice of the Customer for over 50 years.
- Our independence and authority empowers our role as the "truth that transforms".
- Our team members are world-class, and our clients represent much of the Fortune 1000.
- Thought leadership plays an important role in our mission including work with NPS, Drucker Institute, regulators, research universities and the media.

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J.D. POWER

Rebuttal Testimony

Exhibit

2. Exhibit 2- J.D. Power Residential Scoring (PREPA and LUMA).

J.D. POWER

2021 J.D. Power Residential Scoring (PREPA and LUMA)

Data retrieved 2022-01-31

J.D. POWER

Overall Customer Satisfaction (OCSAT)

Data retrieved 2022-01-31

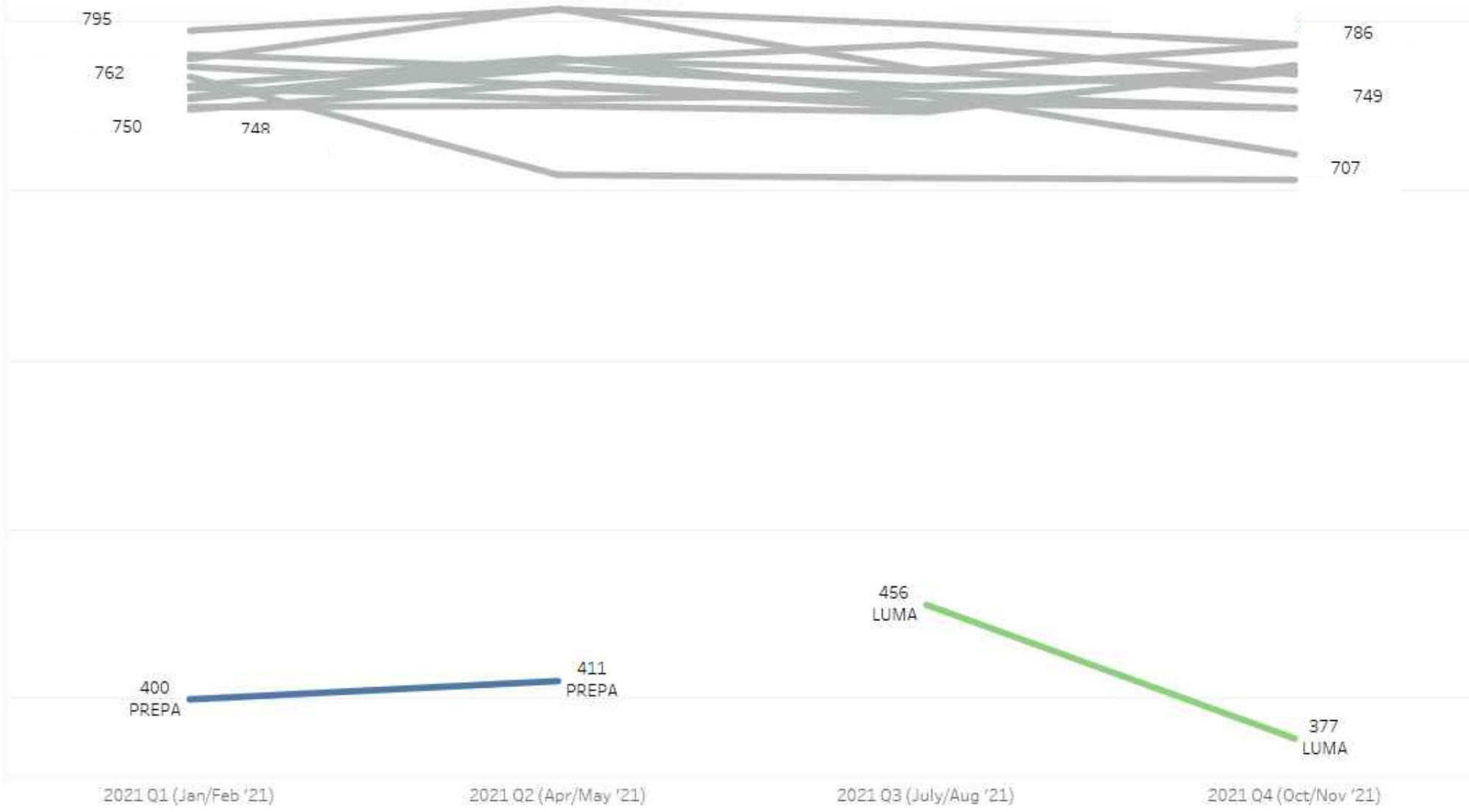
Electric Utility Residential Customer Satisfaction Study

Trendline

J.D. POWER

Voice of Customer

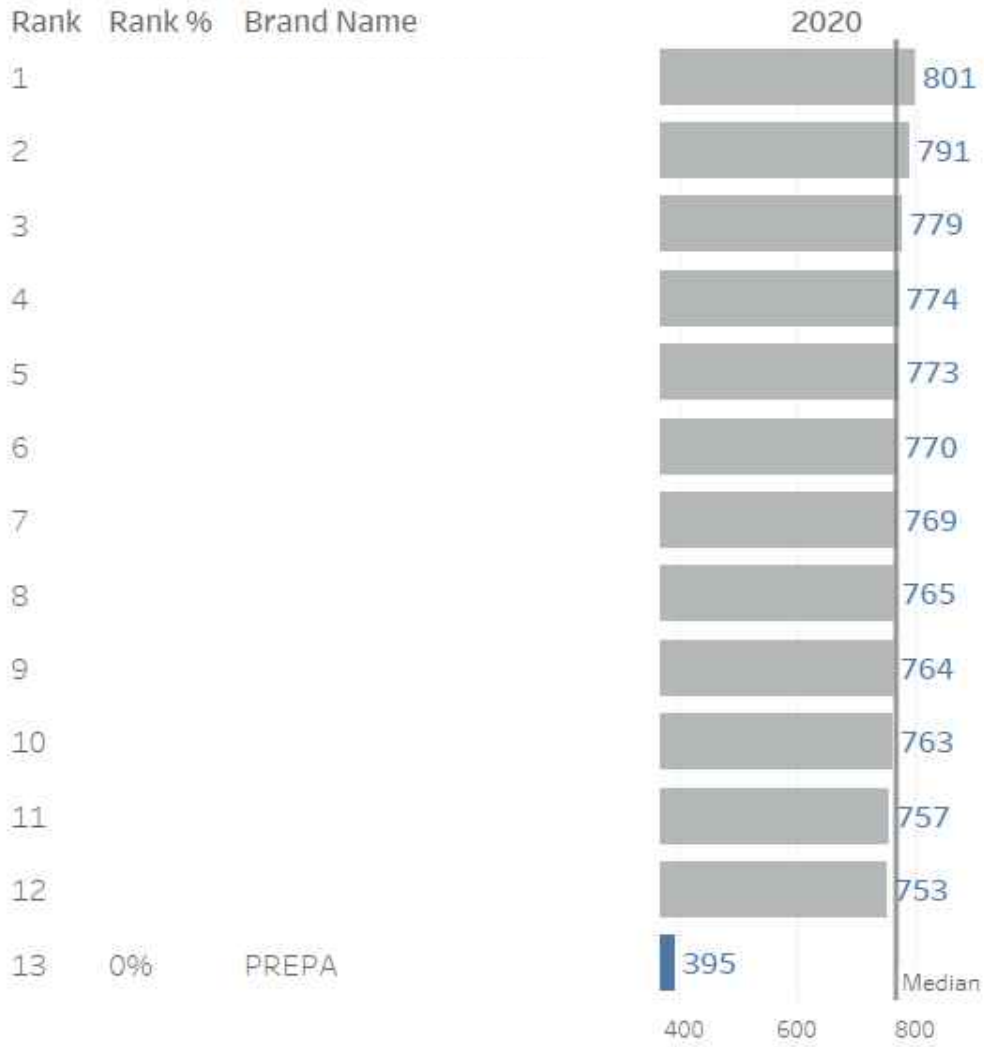
Overall Customer Satisfaction



Electric Utility Residential Customer Satisfaction Study

Rank Charts

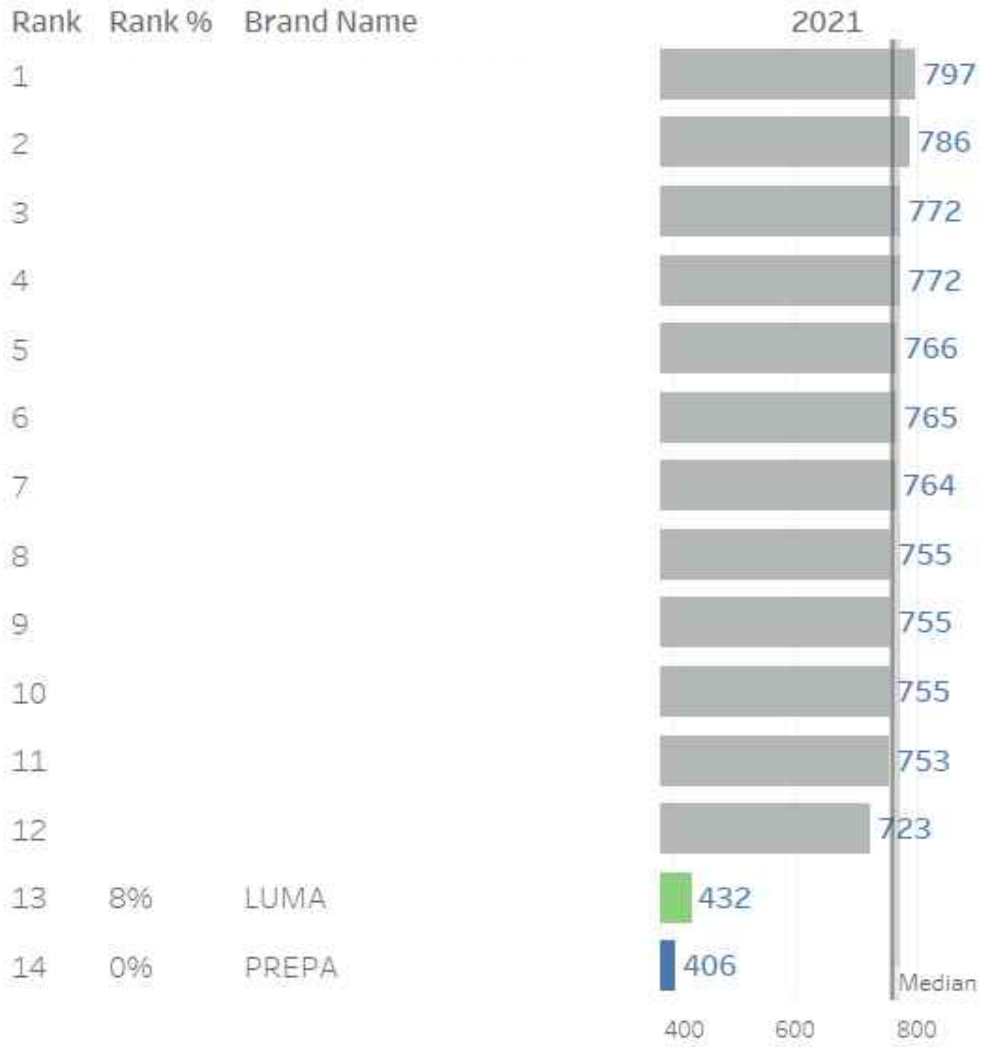
Overall Customer Satisfaction



Study Year
2020

Rank %
0 to 1

Overall Customer Satisfaction



Study Year
2021

Rank %
All values

J.D. POWER

Rebuttal Testimony

Exhibit

3. Exhibit 3- J.D. Power Business Scoring (PREPA and LUMA).

J.D. POWER

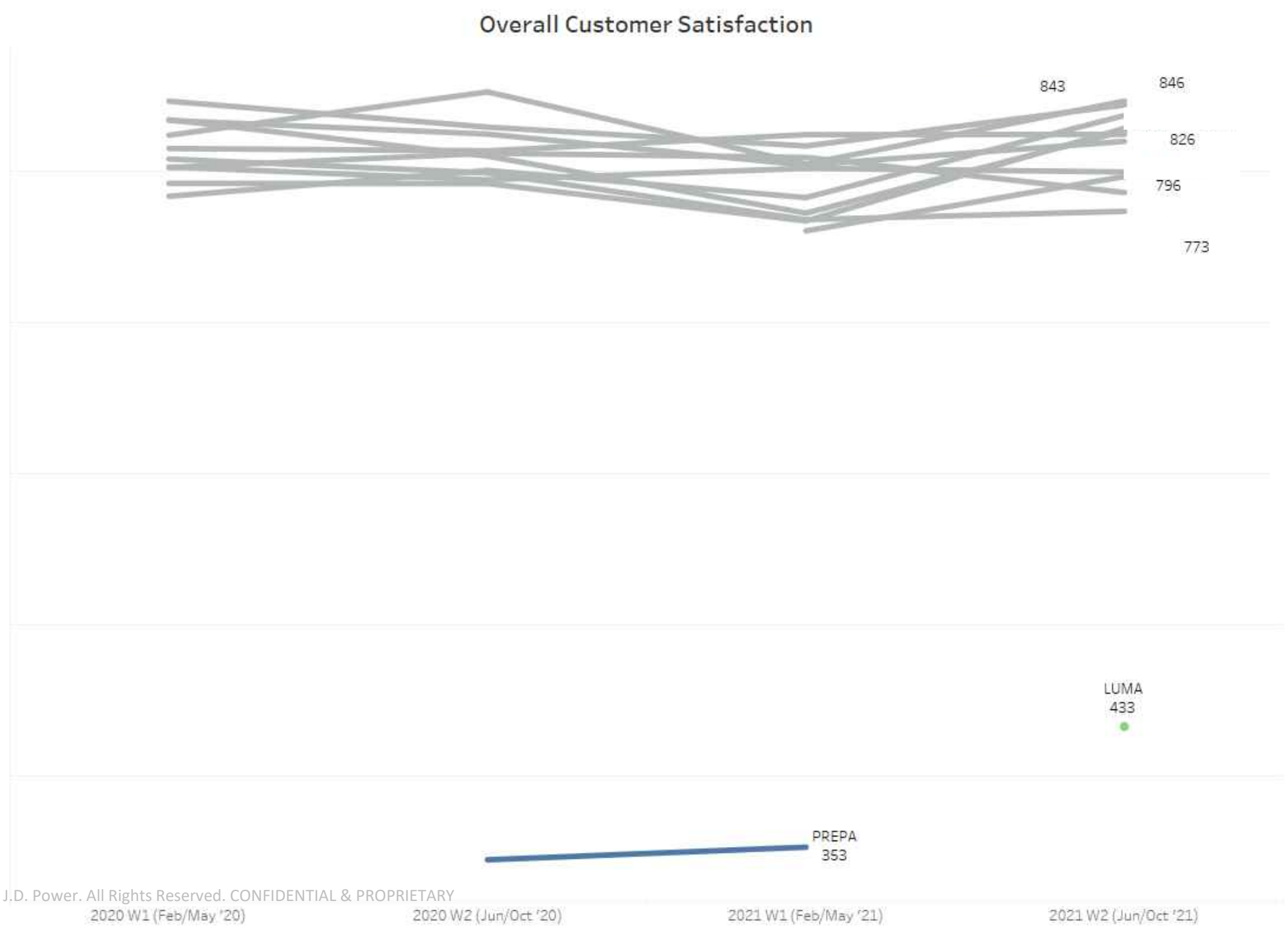
2021 J.D. Power Business Scoring (PREPA and LUMA)

Data retrieved 2022-01-31

J.D. POWER

Overall Customer Satisfaction (OCSAT)

Data retrieved 2022-01-31



Electric Utility Business Customer Satisfaction Study

Rank Charts

J.D. POWER

Voice of Customer

Overall Customer Satisfaction

Rank	Rank %	Brand Name	2020
1			838
2			837
3			829
4			822
5			814
6			807
7			803
8			798
9			792
10			792
11	0%	PREPA	345

Median

400 600 800

Study Year
2020

Rank %
0 to 1

Overall Customer Satisfaction

Rank	Rank %	Brand Name	2021
1			830
2			825
3			824
4			812
5			809
6			800
7			799
8			798
9			797
10			778
11			770
12	8%	LUMA	433
13	0%	PREPA	353

Median

400 600 800

Study Year
2021

Rank %
All values

Rebuttal Testimony

Exhibit

4. Response by Beatriz González to LUMA's Interrogatory No. 15 of the First Set of Interrogatories.

INTERROGATORIO 01-15. Please indicate if you have any experience designing surveys on customer satisfaction.

RESPUESTA: No.

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Rebuttal Testimony of
Mr. Lee Wood
Director, Business Transformation, LUMA Energy ServCo LLC
February 17, 2022

Q. Please state your name.

A. My name is Lee Wood.

Q. Please state your business mailing address, title, and employer.

A. My business mailing address is PO Box 363508 San Juan, Puerto Rico 00936-3508. I am the Director of Business Transformation for LUMA Energy ServCo LLC.

Q. Please state your educational background.

A. I hold a Bachelor of Science in Geography and Planning from Appalachian State University and a Master of Business Administration from the University of North Carolina at Chapel Hill.

Q. Please state your professional experience.

A. I have approximately 18 years of professional experience working with electric utilities and government agencies on demand-side management (DSM) and distributed energy resource programs (DER). My expertise is in the design, planning, implementation, and evaluation of utility energy efficiency and demand response programs (collectively known as demand-side management). Much of my work has involved conducting independent third-party evaluations of utility programs to verify compliance with regulatory targets such as those being discussed here.

Q. Please describe your work experience prior to joining LUMA.

A.
a. Energy Efficiency Alberta, Director of Planning (2018-2020)
b. Navigant Consulting, Managing Consultant (2014-2018), Senior Consultant (2012-2014), Consultant (2010-2012), Analyst (2008-2010)
c. Yellow Wood Associates, Associate (2006-2008)
d. Vermont Energy Investment Corporation (2005-2006)

Q. Do you hold any professional licenses?

A. No.

Q. Have you previously testified or made presentations before the Puerto Rico Energy Bureau?

A. Yes. I have testified in the following proceedings:

a. *In Re: Review of the Puerto Rico Electric Power Authority's System Remediation Plan*, Case No. NEPR-MI-2020-0019 on May 14 and 17, 2021,

b. *In Re: Review of T&D Operator's System Operation Principles*, Case No. NEPR-MI-2021-0001, on May 10, 2021,

c. *In Re: Informes de Progreso de Interconexión de la Autoridad de Energía Eléctrica de Puerto Rico*, Case No. NEPR-MI-2019-0016, on June 8, September 21, and November 23, 2021,

d. *In Re: Despliegue de Infraestructura de Cargadores para Vehículos Eléctricos*, Case No. NEPR-MI-2021-0013, on January 27, 2022,

e. *In Re: Puerto Rico Test for Demand Response and Energy Efficiency*, Case No. NEPR-MI-2021-0009, on November 18, 2021.

f. *In Re: Optimization Proceeding of Minigrid Transmission and Distribution Investments*, Case No. NEPR-MI-2020-00016, on June 23, 2021, March 23, 2021, and January 21-22, 2021.

Q. On whose behalf are you testifying before the Puerto Rico Energy Bureau (PREB)?

A. My testimony is on behalf of LUMA as part of the Puerto Rico Energy Bureau ("Energy Bureau"), Commonwealth of Puerto Rico Public Service Regulatory Board proceeding Case No. NEPR-AP-2020-0025, the Performance Targets for LUMA Energy ServCo,

LLC.

Q. Are there any exhibits attached to your testimony?

A. Yes.

Q. Please enumerate those exhibits.

A. 1. Mr. Cosme's responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents*:

- Exhibit 1- Response to Interrogatory No. 6
- Exhibit 2- Response to Interrogatory No. 8
- Exhibit 3- Response to Interrogatory No. 1
- Exhibit 4- Response to Interrogatory No. 16
- Exhibit 5- Response to Interrogatory No. 14
- Exhibit 6- Response to Interrogatory No. 15
- Exhibit 7- Response to Interrogatory No. 17
- Exhibit 8- Response to Interrogatory No. 18
- Exhibit 9- Response to Interrogatory No. 19

2. LECO's Responses to LUMA's First Set of Interrogatories and Requests for Production of Documents addressed to Agustín Irizarry

- Exhibit 10- Response to Interrogatory No. 55.

Q. What is the purpose of your rebuttal testimony?

A. To respond to those portions of the pre-filed testimony of Mr. Agustín Irizarry ("Mr. Irizarry") on behalf of the Local Environmental and Civil Organizations ("LECO"), filed on November 16, 2021, in this proceeding, regarding his proposed metrics and penalties on Distributed Generation, Energy Efficiency, Demand Response, Energy Storage, Electric

Vehicles, Information Availability, and Time-Varying Rates. Furthermore, I will respond to those portions of the pre-filed testimony of Mr. Gerardo Cosme ("Mr. Cosme") on behalf of the Independent Consumer Protection Office ("ICPO"), filed on November 17, 2021, in this proceeding, regarding his proposed metric on Distributed Renewable Energy Generation.

Q. Did you consider any documents for your rebuttal testimony?

A. Yes, I did.

Q. Which documents did you consider for your rebuttal testimony?

a. LUMA's Performance Metrics Targets Revised filing submitted on September 24, 2021, in this proceeding, Case No. NEPR-AP-2020-0025,

b. The pre-filed testimony of Mr. Agustín Irizarry of November 16, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025 and his expert report, which is an exhibit of his pre-filed testimony,

c. The responses provided by Mr. Agustín Irizarry to LUMA's First Set of Interrogatories and Request for Production of Documents notified on January 13, 2022,

d. The responses provided by Mr. Agustín Irizarry to the Puerto Rico Energy Bureau's Requirements for Information notified on December 20, 2021,

e. The supplemental responses provided by Mr. Agustín Irizarry to LUMA's First Set of Interrogatories and Request for Production of Documents, which were notified on February 4, 2022,

f. The pre-filed testimony of Mr. Gerardo Cosme of November 17, 2021, filed in this proceeding, Case No. NEPR-AP-2020-0025,

g. The responses provided by Mr. Gerardo Cosme to LUMA's Second Set of

Interrogatories and Request for Production of Documents, which were notified on January 13, 2022,

h. The responses provided by Mr. Gerardo Cosme to the Puerto Rico Energy Bureau's Requirements for Information notified on December 27, 2021, and

i. Resolution and Order dated January 21, 2022, *In Re: Regulation for Energy Efficiency*, Case No. NEPR-MI-2021-0005.

Q. Do you agree with Mr. Cosme's proposal for the Energy Bureau to adopt a metric on the total installed distributed photovoltaic capacity in terms of MW with a Fiscal Year 2020 baseline of 170.2KW of complete commissioned projects, as stated on page 7, lines 266-269 of his direct pre-filed testimony?

A. No.

Q. Please explain your response.

A. LUMA disagrees with such a proposal. First, to clarify, the figure of "total installed distributed photovoltaic capacity in terms of MW…", on page 7, line 268 of Mr. Cosme's pre-filed testimony, should be 170.2 ***MW***, not kW as is stated. Second, performance metrics should be designed to measure LUMA's performance. LUMA has little or no control over the primary drivers of this proposed metric. The primary driver of total installed distributed photovoltaic (PV) capacity is the rate at which customers purchase and install these facilities. LUMA is only responsible for managing the interconnection of these facilities, not purchasing and installing them. The rate, quantity, and capacity of customer purchase and installation will essentially depend on external factors such as price, equipment availability, contractors' marketing efforts, their ability to execute the distribution generation projects they have sold, and the economics of the distributed generation market.

LUMA does not control any of these factors, so Mr. Cosme's proposed metric does not measure LUMA's performance and progress but that of PV service providers.

Third, Mr. Cosme has acknowledged in his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents*[1] that exogenous market forces such as customer demand, supplier prices, and Net Energy Metering ("NEM") policies (which are determined by laws and regulations) could affect this proposed performance metric's rate of incoming applications. Performance metrics should generally be designed to measure LUMA's performance, not the performance of market service providers or public policies.

Moreover, Mr. Cosme acknowledged in his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents*[2] that a metric based on total installed capacity (MW) could hypothetically be met by interconnecting a few very large projects while neglecting the many thousands of small projects requesting interconnection, which comprise the majority of projects. This would be counterproductive to the intention of Act No. 114-2007 and Act No. 17-2019.

Q. Do you have a response to Mr. Cosme's proposal on page 7, lines 274-277 of his pre-filed testimony, that the number of photovoltaic distributed generation installations per year with a Fiscal Year 2020 baseline of 573 facilities should be included as an additional metric but should not be an incentive performance metric?

A. Yes, I do.

Q. Please explain your response.

[1] ICPO's Responses to LUMA's Second Set of Interrogatories and Requests for Production of Documents addressed to Gerardo Cosme, p. 7, Interrogatory No. 6. *See* **Exhibit 1.**
[2] *Id*., p. 9, Interrogatory No. 8. *See* **Exhibit 2.**

A. Mr. Cosme's proposal exceeds the extent of this proceeding. This proceeding pertains to metrics for incentive purposes. Because Mr. Cosme is proposing a metric for tracking purposes, the metric can be tracked and reviewed in the Energy Bureau's proceeding *In re: The Performance of the Puerto Rico Electric Power Authority*, Case No. NEPR-MI-2019-0007, where this particular metric is already tracked. Thus, Mr. Cosme's proposal is not aligned with the purposes and scope of this proceeding. That said, I agree with the logic of *tracking* the incremental number of installations, which provides valuable information to LUMA, the Energy Bureau, and stakeholders. However, as stated above, any increase or decrease in the rate of installations is beyond LUMA's control, regardless of what the baseline is and thus, should not be added to the proposed metrics for payment of an incentive fee.

Q. Do you agree with Mr. Cosme's statement on page 7, lines 303-306, of his pre-filed testimony regarding LUMA's Action Plan to address the backlog inherited from PREPA on interconnections applications and NEM, that an indefinite number of projects of 25 kW or less and some over 25kW may remain for an indefinite amount of time in an undetermined incomplete, or unfinished status?

A. No.

Q. Please explain your response.

A. Mr. Cosme acknowledges that LUMA has implemented new actions to comply with Act No. 17-2019 requirements as stated on page 7, line 291 of his pre-filed testimony. These actions were detailed in LUMA's Action Plan and were approved by the Energy Bureau in the proceeding *In Re: Informes de Progreso de Interconexión de la Autoridad de Energía Eléctrica de Puerto Rico*, Case No. NEPR-MI-2019-0016. Mr. Cosme's claims are not

supported by any explanations or evidence that LUMA's Action Plan, which was submitted to and has been considered by the Energy Bureau, places projects in an undetermined incomplete or unfinished status.

Q. Do you have a response to Mr. Cosme's statement on page 8, lines 311-314, of his pre-filed testimony that "if multiple customers will experience that their rooftop solar systems will not be finally approved by LUMA after a long period of time, even if it was in NEM program, defection from the grid may increase, as battery technology improves in terms of costs"?

A. Yes, I do.

Q. Please explain your response.

Mr. Cosme describes a situation where customer perception of delays related to study activities may lead to "grid defection," despite customers already having the benefits of NEM service on their bill. Upon request by LUMA during discovery, Mr. Cosme was unable to provide any evidence to suggest that, even though NEM has been activated on the customer's bill, the process of waiting for study results will somehow lead to grid defection.[3] This speculation is not a sound basis for establishing an alternative performance metric.

Additionally, customers have already purchased, installed and interconnected their distributed generation system before applying to the NEM program and having a study completed. As Mr. Cosme points out, this is an allowance granted by Acts No. 114-2007 and 17-2019 that very few, if any other jurisdictions have. Mr. Cosme seems to be suggesting that if study results show grid upgrades are required, customers will defect from

[3] *Id*., p. 2, Interrogatory No. 1. *See* **Exhibit 3.**

the grid rather than paying for them. The current law requires developers to pay for these upgrades, not customers. Additionally, LUMA follows public policy (including Act No. 114-2007 and Act No. 17-2019) with respect to grid upgrades. Therefore, a performance metric should not be set to hold LUMA responsible for unintended consequences of the design of this policy.

Finally, as reported in the Energy Bureau's proceeding *In Re: Informes de Progreso de Interconexión de la Autoridad de Energía Eléctrica de Puerto Rico*, Case No. NEPR-MI-2019-0016, since June, LUMA has activated NEM service for approximately 17,000 customers representing 90 MW of NEM distributed solar generation and are on track to complete the backlog inherited on June 1, 2021, in the third quarter of FY 2022. There is no reason to claim that an additional performance metric is required to compel LUMA's compliance, considering LUMA's performance record in the absence of a performance metric.

Q. Do you have a response to Mr. Cosme's statement on page 8, lines 323-325, of his pre-filed testimony, in which he states that the proposed metric on finished or closed projects in any scale allowed by NEM is not to incentivize Renewable Portfolio Standard compliance through Distributed Energy Resource's ("DER") but to accelerate the rate of DER's project completion?

A. Yes, I do.

Q. Please state and explain your response.

A. As stated above in my testimony, I disagree with the proposal to add a performance metric for the purposes of payment of an incentive on the number of closed or finished NEM projects. In this portion of his testimony, Mr. Cosme includes a description of the proposed

metric that revolves around the concept of the project being completed and subject to a certification by LUMA that supplemental studies are not needed or have been completed. I disagree with that description of the proposed incentive performance metric. Mr. Cosme seems to ignore that completing a DER project is dependent on many variables, most of them outside LUMA's control. The activities required to "complete" a project under this definition vary significantly in complexity and duration for each project, as acknowledged by Mr. Cosme in his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents*.[4] Many of these activities are not entirely dependent on LUMA's actions or within LUMA's control (i.e., actions performed by the customer/developer).

One of these activities, for instance, is the "supplemental study," which ensures that the grid remains safe and reliable with the addition of new distributed generations. Mr. Cosme acknowledged in his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents* that, as distributed generation penetration increases, there will be an increasing need to conduct "supplemental studies" to mitigate grid impacts on circuits that are approaching their "hosting capacity."[5] Mr. Cosme further admitted that LUMA could not be held responsible or penalized because a project requires additional studies or grid upgrades to maintain safety and reliability (per the requirements of Acts No. 114-2007 and 17-2019).[6] Mr. Cosme also acknowledged in his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents* that 1) supplemental studies can show results that may determine that grid upgrades are needed, 2) that grid upgrades may be necessary to finish or close projects, and that 3) the time it takes to perform grid

[4] *Id*., p. 17, Interrogatory No. 16. *See* **Exhibit 4.**
[5] *Id*., p. 15, Interrogatory No. 14. *See* **Exhibit 5.**
[6] *Id*., p. 16, Interrogatory No. 15. *See* **Exhibit 6.**

upgrades will necessarily extend the time to finish or close projects.[7]

For these reasons, Act No. 114-2007, as amended, requires the activation of NEM service on the customer's bill regardless of the timeline for completing technical studies. Act No. 114-2007, as amended, established this expedited process as an incentive to accelerate NEM service adoption further. It is clear from the increasing rate of incoming solar applications that this policy has the desired effect to accelerate the rate of DER project completion, despite Mr. Cosme's concerns.

Metrics like this can be valuable for monitoring program processes and identifying opportunities for improvement. However, they should not be considered for incentive payment because they measure factors that are mainly beyond LUMA's control.

Q. Do you have a response to Mr. Irizarry's statement on page 20, lines 19-22, that the Energy Bureau has recognized a sustainability objective and set metrics to achieve it- for example, the amount and percentage of customers with advanced meters and savings from energy efficiency programs?

A. Yes, I do.

Q. Please state and explain your response.

A. Many of the sustainability metrics that Mr. Irizarry mentions (e.g., energy savings, participation rates) are used to measure the performance of standard rate-payer funded demand-side management incentive programs with consistent, stable 1-3 year funding cycles. In other words, these programs have a dedicated amount of funding to allocated from customer rates to pay for these programs. However, LUMA does not have such programs. Therefore, these metrics should not be implemented for incentive purposes until

[7] *Id*., pp. 18, 19 and 20, Interrogatories Nos. 17, 18 and 19. *See* **Exhibits 7, 8, and 9.**

we have standard, consistent incentive programs.

In the Energy Efficiency and Demand Response program industry, the first step towards establishing these standard metrics for incentives programs is to conduct a "Market Baseline Study." This is an extensive study of current building conditions and equipment specifications. The data collected from this study enables the accurate calculation of energy and demand savings estimates for the measures incentivized by the program. Data from the Baseline Study is then used in an accompanying "Market Potential Study" to model the achievable, cost-effective energy savings given current market conditions and incentive budget constraints. Savings targets (and corresponding rate funded program budgets) are often established on the basis of the results of these studies. The Energy Bureau will be conducting these Baseline and Potential Studies for Puerto Rico over the coming year(s), which will provide the basis for eventual performance-based metrics for energy efficiency and demand response incentive programs.

In a recent Resolution and Order dated January 21, 2022, in the Energy Bureau's proceeding *In Re: Regulation for Energy Efficiency*, Case No. NEPR-MI-2021-0005, the Energy Bureau acknowledged LUMA's comments and similar comments provided by other stakeholders, delaying the implementation of these performance metrics for energy efficiency and demand response programs until after the Transition Period.[8]

[8] *See* Resolution and Order dated January 21, 2022, *In Re: Regulation for Energy Efficiency*, Case No. NEPR-MI-2021-0005, page 5, where the Energy Bureau stated that:

> The Final Regulation removes all requirements for cost-effectiveness screening in the Transition Period Plan. This decision reflects the Energy Bureau's determination that the primary purpose of LUMA's programs and other actions during the Transition Period Plan is to develop and launch promising programs and begin the process of developing the workforce required to conduct efficiency programs over the long term. These actions may incur start-up costs which may or may not be immediately repaid through program savings.

In conclusion, it is important to start measuring and tracking baselines from which these Energy Efficiency and Demand Response metrics could be established. However, using these metrics for performance incentives should not commence until programs are in place.

Q. Do you have a response to Mr. Irizarry's proposal for the Energy Bureau that metrics could also include steps to raise customer awareness of energy efficiency and demand response programs, perhaps by including information in the bills customers receive each month from LUMA, as stated on page 20, lines 22-24, and page 21, line 1 of his direct pre-filed testimony?

A. Yes, I do.

Q. **Please state and explain your response.**

A. Customer awareness of energy efficiency is an important objective of energy efficiency programs and will be valuable to begin monitoring. However, a customer-awareness-based performance metric would motivate the utility to primarily implement marketing programs that raise awareness but do not achieve significant, measurable energy savings (relative to incentive programs). Marketing and education programs should be an essential part of the

---

In addition, because efficiency programs are new to Puerto Rico, it is simply too early to make program decisions based on assumptions about how these programs will operate or be received by customers. During the transition period, LUMA will gather program information, and studies will be completed (most notably the Potential Study). Together, these actions will allow the first Three-Year EE plan to be grounded in better-informed cost-effectiveness analysis.

Multiple commenters expressed concern that the Energy Bureau would be establishing prospective targets or requirements on non-PREPA EE programs. This was not the Energy Bureau's intention. The Final Regulation has been revised to make clear that the Energy Bureau will first estimate the EE savings that will be achieved by expected actions from other Contributing Entities, and then use its regulatory authority to assign to PREPA the remainder of the efficiency required to meet the statutory thirty percent (30%) target. This calculation will be performed for the full period to 2040, so that PREPA can plan for long-term programs, and it will be revisited every three years during the triennial planning process. As part of the edits to implement this clarification, the Final Regulation was revised to remove the previous Section 2.02 (Allocation), included in the Proposed Regulation.

portfolio, not the entire portfolio. It is important to note that in compliance with Act No. 17-2019, LUMA's Model Bill, approved by the Energy Bureau, will include a message to customers on the benefits of net metering.[9] Thus, LUMA's Model Bill provides customers with the type of information that Mr. Irizarry suggests without the need to add an incentive performance metric.

Q. Do you agree with Mr. Irizarry's statement on page 21, lines 2-4, that rapid integration of renewable energy, particularly rooftop photovoltaic (PV) solar panels, require much less distributed infrastructure than centrally located power stations?

A. No.

Q. Please state and explain your response.

A. Mr. Irizarry's statement is rhetorical since the infrastructure of the power stations is already built. Mr. Irizarry's statement would make sense if we were starting from scratch, with no existing infrastructure on the island of Puerto Rico. In that hypothetical scenario, the architecture of the grid could likely be designed to better optimize distributed infrastructure. Unfortunately, LUMA does not have the luxury of designing a new grid from scratch. The grid we have was designed around central stations, and must be transformed to a more distributed architecture, which will actually require *additional* investment in some areas of the current grid.

Q. Do you agree with Mr. Irizarry's proposal that LUMA's efforts should be measured through a performance metric- and penalized if the backlog is not resolved in a timely fashion and a new, expedited process to manage new applications is not quickly

[9] *See* LUMA's Revised Petition for Approval of LUMA's Model Customer Bill and Submitting Revised Model Bill and Supporting Information, July 28, 2021, Case *In re Review of LUMA's Model Bill*, NEPR-MI-2021-0008; Resolution and Order of November 18, 2021, approving LUMA's Model Bill.

implemented, as stated on page 21, line 22, page 22, lines 1-3, and page 25, lines 4-6 of his direct pre-filed testimony?

A. No.

Q. Please state and explain your response.

A. The Energy Bureau has a dedicated proceeding to discuss the state of interconnections in *In Re: Informes de Progreso de Interconexión de la Autoridad de Energía Eléctrica de Puerto Rico*, Case No. NEPR-MI-2019-0016. There, LUMA has to submit quarterly reports on the progress of interconnections, which are presented in technical conferences. The backlog is a recurrent topic of discussion during technical conferences. The Energy Bureau is cognizant of LUMA's efforts to eliminate the backlog inherited from the Puerto Rico Electric Power Authority during the past months. The Energy Bureau has not imposed any fine on LUMA due to the backlog.

Moreover, the Energy Bureau has accepted LUMA's plan for resolving the backlog as a reasonable approach to solving this situation, which LUMA was not responsible for creating. Since June 1, 2021, when LUMA commenced operations, LUMA has resolved approximately 17,000 cases. This figure includes 95% of those cases in the backlog before June 1, 2021. Without the improvements that LUMA implemented, the backlog would have grown to nearly 18,000 pending cases. Given this performance record, there is no reason to suggest that a penalty is necessary to compel LUMA to address this problem, which is being taken seriously by LUMA and is being actively addressed. LUMA currently foresees a resolution of the backlog in March 2022, thus making any proposed penalty moot.

Q. Do you have a response to Mr. Irizarry's statement on page 23, lines 12-14, that integrating renewable energy, energy efficiency, demand response, public safety, and

environmental metrics is essential to achieving a sustainable electric system?

A. Yes, I do.

Q. Please state and explain your response.

A. LUMA agrees that renewable energy, energy efficiency, demand response, public safety, and the environment are essential components of a sustainable electric system. We would also note that the grid is an essential component of the electric system, therefore adequately repairing and maintaining the grid is also essential to achieving a sustainable electric system. We take all of these goals seriously in working towards the sustainable energy transition.

In his responses to *LUMA's Second Set of Interrogatories and Requests for Production of Documents*, Mr. Irizarry references the "2019 Metrics to Benchmark Electric Power Company Sustainability Performance" report published by the Electric Power Research Institute ("EPRI") for a list of utilities currently monitoring their sustainability.[10] We understand that many utilities track and monitor various sustainability metrics for different reasons. However, a disclosure from a summary of that report prepared by EPRI notes that "not every metric is appropriate for all companies within the electric power industry. The diversity of the industry is indicative of varying business structures and operational activities. For this reason, it may not be appropriate that companies utilize all the metrics identified in this report."[11]

While it is helpful to track and monitor sustainability metrics, establishing a metric alone does not create a sustainable electric system, nor is the sustainability of the grid solely

[10] LECO's Responses to LUMA's First Set of Interrogatories and Requests for Production of Documents addressed to Agustín Irizarry, p. 64, Interrogatory No. 55. *See* **Exhibit 10.**

[11] *See* https://www.epri.com/research/summary/000000003002016760 (last visited, February 16, 2022).

LUMA's responsibility. A sustainable electric system is created by policy, planning, investment, and time. We have been engaging fully in the Energy Bureau's proceedings related to Energy Efficiency, Demand Response, Puerto Rico Cost Test, Distribution Planning, Renewable Interconnection, among others. Once these policies and plans are in place and funded, only then metrics will be useful in tracking progress towards achieving them.

Q. Do you agree with Mr. Irizarry's proposal on page 24, lines 1-6, to implement Energy Efficiency and Demand Response metrics?

A. No.

Q. Please state and explain your response.

A. Mr. Irizarry has proposed conventional metrics for traditional rate-payer funded incentive programs. We do not currently have any such incentive programs. Therefore, these metrics do not provide relevant indicators of LUMA's performance. As stated in a Resolution and Order dated January 21, 2022, in the proceeding *In Re: Regulation for Energy Efficiency*, Case No. NEPR-MI-2021-0005, the Energy Bureau has delayed implementing performance metrics for Energy Efficiency and Demand Response until the 3-Year Planning period begins. LUMA is required to propose appropriate performance metrics for Energy Efficiency and Demand Response through the 3-Year Planning process. Further discussion of these metrics should be conducted during that planning process.

Moreover, LUMA cannot directly affect and measure progress towards energy reduction targets until a consistent funding source or cost-recovery mechanism is established for Energy Efficiency and Demand Response incentive and/or financing programs. The Energy Bureau's proposed Energy Efficiency /Demand Response Baseline and Potential

Study will be a crucial first step in establishing achievable energy reduction targets that reflect market conditions in Puerto Rico. Given the technical nature of establishing these programs and associated performance metrics, LUMA suggests that performance targets be determined within those ongoing proceedings.

Q. Do you agree with Mr. Irizarry's proposal on page 24, lines 7-16, and page 39, lines 16-17, to implement Distributed Generation, Energy Storage, and Electric Vehicles metrics?

A. No.

Q. Please state and explain your response.

A. Performance metrics should be designed to measure LUMA's performance. However, LUMA has little or no control over the primary drivers of these proposed metrics. The primary driver of these metrics is the rate at which customers purchase and install these products. LUMA is only responsible for managing the interconnection of these facilities, not purchasing and installing them. The rate, quantity, and capacity of customer purchases will essentially depend on external factors such as price, equipment availability, contractors' marketing efforts, their ability to execute the distribution generation projects they have sold, and the economics of the distributed generation market. LUMA does not control any of these factors, so the proposed metrics do not measure LUMA's performance and progress.

Q. Do you agree with Mr. Irizarry's proposal on page 24, lines 17-19, that an Information Availability metric should be an indicator of customers' ability to access their usage information and monitor their own consumption?

A. No.

Q. Please state and explain your response.

A. At present, the Puerto Rico electric system does not have Advanced Metering Infrastructure ("AMI"). Without AMI, LUMA does not have the technology to provide customers with hourly or sub-hourly usage information. AMI is a valuable technology that represents up to a $1 billion investment that will take multiple years to implement and is currently unfunded. Therefore, this metric is premature.

Q. Do you agree with Mr. Irizarry's proposal on page 24, line 20, for the implementation of a Time-Varying Rates metric?

A. No.

Q. Please state and explain your response.

A. The implementation of a time-varying rate metric will require AMI meters, which are currently not installed in Puerto Rico. AMI meters represent an investment of up to $1 billion that is currently unfunded. Furthermore, rate determinations are made by the Energy Bureau and not by LUMA. For these reasons, LUMA is not able to control the outcome of this metric and so the proposed metrics do not measure LUMA's performance and progress. Therefore this is not an appropriate basis for a performance incentive.

Q. Do you have a response to Mr. Irizarry's recommendation on page 39, lines 16-17, that the Energy Bureau considers a performance metric on "Distributed Storage" as an indicator of basic electric system continuity during system outages and calculated based on interconnections per year?

A. Yes, I do.

Q. Please state and explain your response.

A. Our comments on distributed generation apply equally to distributed storage, as they are most often installed together. As with distributed generation, LUMA does not have control over the rate of installation of distributed storage. LUMA is only responsible for facilitating the interconnection of these facilities, not purchasing and installing them. The rate, quantity, and capacity of customer purchases will essentially depend on external factors such as price, equipment availability, contractors' marketing efforts, their ability to execute the distribution storage projects they have sold, and the economics of the distributed storage market. LUMA does not control any of these factors, so the proposed metrics do not measure LUMA's performance and progress and therefore this is not an appropriate basis for a performance incentive.

Q. Do you have a response to Mr. Irizarry's proposal as stated on page 40, lines 19-22, of his pre-filed testimony regarding the Interconnection Approval Performance Incentive Mechanisms implemented in Hawaii to promote the reduction of total interconnection time for distributed energy resources under 100 kW in capacity?

A. Yes, I do.

Q. Please state and explain your response.

A. This structure acknowledges that only certain parts of the interconnection process are within the utilities' control; it is based on average approval times and corrects for outliers. In these ways, the metric is better designed and more appropriate than the other metrics previously suggested, such as total installed capacity. However, further review would be required to understand whether it is appropriate to apply in Puerto Rico. For instance, the appropriate threshold in Puerto Rico would likely be <25 kW to reflect local regulations. However, the DG Portal that LUMA inherited does not allow for tracking of approval times

for each step of the process, with this level of granularity. The draft Generation and Microgrid Interconnection Regulation requires this level of tracking, and LUMA is preparing to develop a new DG Portal to meet this requirement. This new DG Portal will take approximately 12 months to develop. Until then, LUMA cannot establish a reasonable baseline for this metric or begin tracking progress against it. The fact that we are proactively working to develop a new DG portal in anticipation of regulatory requirements further demonstrates that penalties and incentives are not required to compel LUMA to comply with policy requirements that are within our ability to control.

Q. Do you agree with Mr. Irizarry's recommendation on page 42, lines 23-25 of his testimony, that the Energy Bureau should open a public participation process to define the targets, penalties, and incentives that it should impose to LUMA on interconnection approval?

A. No.

Q. Please state and explain your response.

A. As stated earlier, we do not believe it is necessary to impose penalties or targets to motivate LUMA's performance, given the record of performance in the absence of them. Furthermore, it would be premature to undertake such a process until the final Generation, and Microgrid Interconnection regulation is developed, reviewed, and approved.

Q. Do you have a response to Mr. Irizarry's proposal, as stated on pages 43-45, of his pre-filed testimony regarding the low to moderate-income energy efficiency performance-based mechanism implemented by the Public Utility Commission of Hawaii?

A. Yes, I do.

Q. Please state and explain your response.

A. These are the same type of energy savings target metrics that were suggested by Mr. Irrizary's examples in Table 4, just applied specifically to the LMI sector. As stated earlier, these metrics are applicable to standard demand-side management incentive programs with consistent, stable 1-3 year funding cycles. However, LUMA does not have such programs. Therefore, these metrics should not be contemplated until there is a stable source of funding for the programs whose performance they are designed to measure. Given the technical nature of establishing these programs and associated performance metrics, LUMA suggests that performance targets be determined within those ongoing proceedings. Furthermore, the Energy Bureau's January 21, 2022 Resolution and Order delays implementation of metrics based on savings targets until after the Transition Period.

Q. Does this complete your testimony?

A. Yes.

ATTESTATION

Affiant, Mr. Lee Wood, being first duly sworn, states the following:

The prepared Rebuttal Testimony constitutes my Rebuttal in the above-styled case before the Puerto Rico Energy Bureau. Affiant states that he would give the answers set forth in the Rebuttal Testimony if asked the questions included in the Rebuttal Testimony. Affiant further states that the facts and statements provided herein are his rebuttal testimony and are true and correct to the best of his knowledge.

L. Wood

Lee Wood

Acknowledged and subscribed before me by Mr. Lee Wood in his capacity as Director of Business Transformation of LUMA Energy, of legal age, married, and resident of San Juan, Puerto Rico, who is personally known to me.

ADF #-8,455-

In San Juan, Puerto Rico, this 17th day of February 2022.

Public Notary

EDWIN E. RIVERA PÉREZ
ABOGADO-NOTARIO

Exhibit 1

LUMA'S REQUEST 01-06: Please indicate if exogenous market forces such as customer demand and supplier prices can affect the rate of incoming applications regarding your proposed performance metric on the total installed distributed photovoltaic capacity.

RESPONSE:

Yes.

Exhibit 2

LUMA'S REQUEST 01-08: Please indicate if a metric based on total installed capacity (MW) could hypothetically be met by interconnecting a few very large projects while neglecting the many thousands of small projects requesting interconnection, which comprise the majority of projects.

RESPONSE:

Hypothetically, yes. However, there are other factors to be considered.

Exhibit 3

I. ICPO'S RESPONSES TO LUMA'S REQUEST

LUMA'S REQUEST 01-01: State the basis for your suggestion that the process of waiting for study results will lead to "grid defection" even though NEM service is already activated on the customer's bill. Please provide any data, statistics, or documents you reviewed before submitting your testimony that support your statement.

RESPONSE:

The basis of this statement is my knowledge and experience. Please refer to responses to questions 51 and 52 of the First Set of Interrogatories and Request for Production of Documents submitted to me by LUMA. However, assuming this question is related to Distributed Generation of 25 kW capacity or less, I am not aware of any jurisdiction that allows net metering before approving interconnection. This is a novel situation. Therefore, no data or statistic or documents may be provided to support my statement.

Exhibit 4

LUMA'S REQUEST 01-16: Please indicate if the supplemental studies have the same duration irrespective of their complexity.

RESPONSE:

No.

Exhibit 5

LUMA'S REQUEST 01-14: Please indicate if it is true that as Distributed Generations penetration increases, there will be an increasing need to conduct supplemental studies to mitigate grid impacts on circuits that are approaching their hosting capacity.

RESPONSE:

Yes, considering our grid's actual conditions. However, as capital improvements are made to the grid's infrastructure, which includes improvements to hosting capacity, the need to conduct supplemental studies will decrease.

Exhibit 6

LUMA'S REQUEST 01-15: Please indicate if LUMA should be held responsible or be penalized for a project that requires supplemental studies or grid upgrades to maintain safety and reliability.

RESPONSE:

No.

Exhibit 7-9

LUMA'S REQUEST 01-17: Please indicate if the supplemental studies can show results that may determine that grid upgrades are needed to accommodate a new project.

RESPONSE:

Yes.

LUMA'S REQUEST 01-18: Please indicate if grid upgrades may be necessary to finish or close projects on any scale allowed for NEM.

RESPONSE:

Yes.

LUMA'S REQUEST 01-19: Please indicate if the time it takes to perform grid upgrades will necessarily extend the time to finish or close projects on any scale allowed for NEM.

RESPONSE:

Yes.

Exhibit 10

REQUEST #: LUMA-LECO-IRIZARRY-ROI-01-55

Please indicate if you were aware at any time prior to submitting your testimony of any electric utility in the United States that has implemented the same examples of what you describe as metrics to achieve a sustainable energy system in Table 4 on page 24 of your testimony. If answered in the affirmative, please provide a list of those electric utilities, the metrics implemented, and any data available on compliance with those metrics.

RESPONDER:
Agustín Irizarry-Rivera

RESPONSE:

You may refer to the "2019 Metrics to Benchmark Electric Power Company Sustainability Performance" published by EPRI (at cost) for a list of utilities currently monitoring their sustainability.

Exhibit 2

Pre-Filed Expert Witnesses' Rebuttal Testimonies

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Branko Terzic
Expert Witness for LUMA Energy LLC and LUMA Energy ServCo LLC
Rebuttal Testimony
February 16, 2022

Q. Please state your name, address and occupation?

A. My name is Branko Terzic. I am a consultant holding the position of Managing Director at Branko Terzic & Associates LLC. 1791 Brookside Lane Vienna, Virginia 22182. I am also affiliated with the Berkeley Research Group LLC at the business address of 1800 M Street N.W. Washington, DC 20036.

Q. On whose behalf are you testifying in these proceedings?

A. I am testifying on behalf of LUMA Energy LLC and LUMA Energy ServCo LLC.

Q. What is your educational background?

A. I have a B.S. in Energy Engineering (1972) and was awarded an honorary Doctor of Sciences in Engineering (2009), both from the University of Wisconsin-Milwaukee. A summary biography is provided here and a full CV is attached as Exhibit BT-1.

Q. What is your professional experience?

A. During my five -decade career in the regulated electric utility industry I have been a consultant, a state and federal regulator and the CEO of a regulated utility. I have experience in regulation of electric utilities and in regulation of public power entities such as the Puerto Rico Electric Power Authority (PREPA). In a brief summary of positions held, prior to my current position and affiliation, I was Executive Director of the Center for Energy Solutions at Deloitte. Before that, I was Chairman, President and CEO of Yankee Energy System, Inc. (1994-1999); Managing Director Arthur Andersen Economic Consulting (1993-1994); Commissioner on the Federal Energy Regulatory Commission (1990-1993); Group Vice President at AUS Consultants (1987-1990); Commissioner on the State of Wisconsin Public Service Commission (1981-1986);

Partner in Terzic & Mayer Public Utility Consultants; Vice President Associated Utility Services, Inc.; Valuation Engineer at the American Appraisal Company and Special Investigations Engineer and later Environmental Engineer for the Wisconsin Electric Power Company.

I have been a member of the National Petroleum Council and National Coal Council and I am a former Chairman of the United Nations Economic Commission for Europe (UN ECE) Ad Hoc Group of Experts on Cleaner Electricity Production (2007-2012). From 1987-1990, I was the founding Chairman of the State of Wisconsin Racing Board.

I have published articles in numerous energy and finance publications including the magazines of the EEI and AGA, as well as *Public Utilities Fortnightly*, *Oil & Gas Investor* and others. My bi-weekly column *Terzic on Strategy* was published from 1999 to 2009 in New Power Executive. I have written for *Public Utility Fortnightly* magazine and numerous other industry publications. My chapter on energy appeared in *THE WORLD CRISIS: The Way Forward After Iraq* (Constable, London 2008) edited by Robert Harvey.

I have offered speeches, been interviewed and published articles over the past forty years where I have supported the implementation of "Incentive Regulation" also called "Performance Based Regulation (PBR) for investor-owned utilities as a way of improving efficiency, safety and operations of utilities. An example of a speech is in the Public Utilities Fortnightly February 15, 1992 issue, which reported on my speech in Washington DC at a Mayflower Energy Group Conference under the headline "Terzic Stumps for Incentive Regulation." An example of an article I wrote in support of incentive ratemaking appeared in the NR&E magazine Winter 1994 edition under the

title “Incentive Regulation: Efficiency in Monopoly”. As a regulator, I have experience with incentive regulation as a Commissioner on the State of Wisconsin Public Service Commission and the U.S. Federal Regulatory Energy Commission (“U.S. FERC”).

I have appeared regularly on CNN International and have appeared as a commentator on numerous TV news programs including CNN, CNBC, Fox Business, PBS, Voice of America, and Al Jezeera.

I was elected to the Energy Efficiency Forum Hall of Fame (2009) and was honored with the “Champion Award” by The Women’s Council on Energy and Environment (2008) as well as other industry awards.

I have been a faculty member of the Washington Campus consortium of sixteen university MBA programs since 2005.

I am a founder of the Society of Depreciation Professionals. I have served on the board of the National Regulatory Research Institute (NRRI) and the research arm of the National Association of Regulatory Utility Commissioners (NARUC). I am a past chairman of the Natural Gas Roundtable. I was a registered Professional Engineer in Wisconsin from 1985 to around 2010.

I have provided training on utility regulation to utilities, regulatory agencies, academic institutions, and consultancies. I have also been a frequent speaker at industry, university and government energy and utility programs giving over 400 speeches in the past 20 years.

Q. Have you testified in past regulatory proceedings before the Puerto Rico Energy Bureau (PREB) as an expert witness?

A. Yes, I testified in Case No. NEPR-MI-2021-0007, In Re: Review of LUMA's Terms of Service (Liability Waiver).

Q. Have you testified in the past in other public utility regulatory proceedings as an expert witness?

A. Yes, I have testified before state public service commissions, in bankruptcy court and the U.S. FERC, I have also appeared before committees of the U.S. House of Representatives and Senate. A list of my previous testimonies is provided as Exhibit BT2.

Q. Please elaborate on your experience in the regulation of electric utilities?

A. In my five plus years of service as a Commissioner on the State of Wisconsin Public Service Commission (WPSC), I regulated electric utilities as well as natural gas, telephone, water and sewer utilities. The regulation of electric utilities at the WPSC was at retail and included the establishment of rates, tariffs and terms of service. In my role as Commissioner on the U.S. FERC, with respect to electricity industry, I participated in matters related to regulated wholesale electric power markets and bilateral wholesale sales at cost of service and electricity transmission tariffs.

Q. Please describe your experience in the regulation of public power entities such as the Puerto Rico Electric Power Authority (PREPA)?

A. In the State of Wisconsin, where I served as a commissioner. Wisconsin is somewhat unique among state commissions in that the state legislature granted the WPSC authority over all the "public power" systems in the State. These systems were, of course, significantly smaller than PREPA but the regulatory relationship was the same.

It is my understanding that in the U.S., Wisconsin, perhaps a few other states, and Puerto Rico have an arrangement where one government agency regulates another government agency operating electric utility. In almost all other states the municipal electric systems or federal electric system such as the Tennessee Valley Authority are self-governed.

The *public* power entities in Wisconsin are owned by municipalities but regulated by the WPSC. The Municipal Electric Utilities of Wisconsin lists 81 community-owned, locally-controlled municipal electric utilities. They distribute more than 11 percent of the state's electricity and provide service to nearly 300,000 customers in 41 of Wisconsin's 72 counties.[1] In addition, the WPSC, while I served as Commissioner, regulated over 500 municipal water utilities and over 100 wastewater utilities and all of these had terms of service as part of their tariff.

Q. Please describe your experience as a regulator with "Incentive Regulation" also called "Performance Based Regulation" (PBR).

While serving as a Commissioner on the U.S. FERC, I led a Task on Incentive Ratemaking which resulted in the U.S. FERC's issuance of a "Policy Statement on Incentive Regulation" issued on October 30, 1992. The reference is Docket No. PL92-1-000 "Incentive Ratemaking for Interstate Natural Gas Pipelines, Oil Pipelines and Electric Utilities".

I was asked to lead the FERC Task Force on Incentive Regulation by Chairman Martin L. Allday due to my experience with incentive regulation as a Commissioner on the State of

[1] www.meuw.org/aboutus (last visited February 9, 2022).

Wisconsin Public Service Commission. The issuance of the Policy Statement on Incentive Regulation was the result of my Task Force report and subsequent proceedings in that docket.

Q. What is the purpose of your testimony in this proceeding NEPR-AP-2020-0025?

A. I will address and provide comments for the consideration of this members of the PREB to the pre-filed testimonies of Professors Agustín Irizarry-Rivera and José Alameda, that were submitted in this proceeding, Case No. NEPR-AP-2020-0025. I will also address the history of Incentive Regulation/Performance Incentive Regulation and the difference between Incentive Regulation/ Performance Based Regulation (IR/PBR) and Performance Incentive Mechanisms (PMI) (or "Performance Indicators") and their applicability or inapplicability, as the case exists, to the PREPA. Finally, I will provide my opinion on the fixed fee system and performance-based incentive mechanism set forth in the Puerto Rico Transmission and Distribution System Operating and Maintenance Agreement of June 22, 2020 (OMA and/or PREPA/LUMA contract) and in LUMA's filing before this PREB titled LUMA's Revised Performance Metrics Targets Revised submitted on September 24, 2021.

Q. What documents did you review for your testimony?

A. I reviewed the pre-filed testimonies of Professor Agustín Irizarry Rivera dated November 16, 2021 and Professor José Alameda, dated November 16, 2021, both filed in this proceeding. I also reviewed the responses to discovery requests by Professor Irizarry of January 13, 2022 entitled LECO's Responses to and Objections to LUMA's First Discovery Request of Information Addressed to Agustín Irizarry and LECO's Responses to and

Objections to LUMA's Second Discovery Request of Information addressed to Agustín Irizarry Rivera, dated January 13, 2022. I reviewed the Responses to Objections Raised by LUMA to Discovery Responses Provided by Agustín Irizarry of February 4, 2022 and Responses to Objections Raised by LUMA to Discovery Responses Provided by José Alameda of February 7, 2022.

I also considered the text of the Puerto Rico Transmission and Distribution System Operation and Distribution Agreement of June 22, 2020, the Second Amended and Restated Contract Operations Services Agreement between the Long Island Lighting Company d/b/a as LIPA and the PSEG Long Island LLC, and LUMA's Revised Performance Metrics Targets Revised filing submitted on September 24, 2021in this proceeding, Case No. NEPR-AP-2020-0025. I reviewed the Resolution and Order of July 2, 2021, In RE; The Performance of the Puerto Rico Electric Power Authority, case NEPR-MI-2019-0007. I reviewed literature and articles on Incentive Regulation/ Performance Based Regulation (IR/PBR) and Performance Incentive Mechanisms (PIM), including those cited in my testimony, the Energy Bureau's Regulation for Performance Incentive Mechanisms, Regulation 9137, and relevant portions Puerto Rico Acts 120 of 2018, 57 of 2014 and 17 of 2019.

Q. Please explain the history of Incentive Regulation/ Performance Based Regulation (IR/PBR).

A. Incentive Regulation is not "new" in the 21st century as is apparent from the U.S. FERC's Policy Statement. I wrote about this long history in an article in a December 2015 Public

Utilities Fortnightly magazine titled "The Incentive Theory." [2] There, I explain that the idea of "incentive regulation" for electric utilities goes back more than one hundred years as explained in the 1918 book "Valuation and Rate-Making" by Robert Hale. Chapter V of this book is titled "On the Theory of a Fair Return on an Amount Sufficient to Secure the Service- Or the Incentive Theory." [3] Even in 1918 the author recognized that *"The methods of securing efficiency discussed above involved judgement by the commission as to best business practice."*[4] The author added "*Much experimenting remains to be done in working out details for automatic schemes for securing alertness of management."*[5] Among the methods mentioned by the author in 1918 are such incentive practices as sliding scales and profit sharing. A later analyst confirmed that *"Profit sharing or sliding scale regulation is probably the oldest regulatory incentive scheme, dating back to the 19th century in England."*[6]

The U.S. FERC revisited these issues in its 1992 Incentive order as have many state commissions regulating investor-owned utilities since then.

Q. What are you using as definitions of Performance Based Regulation (PBR) and Performance Incentive Mechanisms (PIMs)?

[2] https://www.fortnightly.com/fortnightly/2015/12-0/incentive-theory (last visited February 9, 2022).
[3] Hale, Robert, Valuation and Rate-Making, Columbia University Press, New York (1918).
[4] Ibid P. 132.
[5] Ibid P. 133.
[6] Vogelsang, Ingo "A 20 Year Perspective on Incentive Regulation for Public Utilities", Regulation and Investment Conference Australian Competition and Consumer Commission P. 5, Sydney (March 26/27, 2001). https://www.accc.gov.au/system/files/Ingo%20Vogelsang%20paper%20-%20A%2020-Year%20Perspective%20on%20Incentive%20Regulation%20for%20Public%20Utilities.pdf (last visited, February 9, 2022).

A. There are several definitions of these terms available in the professional literature. The FERC Policy Statement on Incentive Regulation provides the simple statement that *"Incentive ratemaking is an alternative regulatory mechanism that can reward utilities for efficiency and benefit customers with lower rates."*[7] The term "alternative", it is clear from the first sentence in the document, is in relation to the fact *that "The Commission has traditionally used cost of service rate regulation…"*[8]

The PREB in Regulation 9137 defines "Performance Incentive Mechanism" or PIM as any Metric, Target or Financial incentive established to induce companies to improve their performance.

Regarding PBR, I considered the report "Next-Generation Performance-Based Regulation" issued by the National Renewable Energy Laboratory May 2018, Vol. 1 , (Technical Report NREL/TP-6A20-70822-1)[9] : *"PBRs provide a regulatory framework to connect goals, targets and measures of utility performance or executive compensation. For some enterprises PBRs determine utility revenue or shareholder earnings based on specific performance metrics or other non-investment factors*." [10]

Q. What is the difference between Incentive Regulation/ Performance Based Regulation (IR/PBR) and Performance Incentive Mechanisms (PMI) (or "Performance Indicators")?

A. As stated in the report Next-Generation Performance-Based Regulation,

> PMIs are components of PBRs that adopt specific performance metrics, targets or incentives to affect desired utility performance and represent the priorities of the jurisdiction. PIMs can be specific performance

[7] FERC Policy Statement on Incentive Regulation Docket No. PL92-1-00 (October 30, 1992), page 81, 57 FR 55231-01.
[8] Ibid P. 1.
[9] https://www.nrel.gov/docs/fy18osti/70822.pdf (last visited February 9, 2022).
[10] Ibid P. 1.

metrics, targets or incentives that lead to an increment or decrement of revenues or earnings around an authorized rate of return to strengthen performance in target areas. PIMs can act as an overlay on a traditional COS regulatory framework for privately owned utilities in which a return on rate base is computed in a rate case. For state owned entities and investor-owned utilities, a PIM can take the form of manager performance reviews (on specific criteria) that are linked to manager income or promotion."[11]

In my opinion Performance-Based Ratemaking or Performance Based Regulation has to do with "ratemaking" and thus affects how the regulator adjusts rates to consumers. Separately the application of PIMs is for the purpose of requiring the utility to pay specific attention to metrics which are considered by the regulator a higher priority in the operation of the utility. The rewards and penalties in the application of PIMs affect the profitability of the utility but not necessarily the rates paid by consumers.

Q. How are those differences between PBR and PMI applicable in the case of LUMA as Operator of PREPA's T&D System?

A. In the case of the OMA, a management contract, the issue is one exclusively of PIMs in the sense of "executive compensation" and/or "manager performance" as indicated in the NREL citations. The OMA contract does not mention *"utility revenue or shareholder earnings"* as referenced in these definitions.

The OMA, which is a management contract, reflects the reality that PREPA is a state-owned entity and does not have as its goals, what Professor Irizarry cites as *"the traditional utility goal of maximizing utility owned capital investment and increasing sales."*[12]

[11] Ibid P. 2

[12] Irizarry-Rivera, pre-filed testimony, page. 11 lines 12-13.

As the PREB treats both PREPA and LUMA as jurisdictional electric utilities, I would note that LUMA does not own "capital investment" and the OMA does not consider "increasing sales" in LUMA's compensation.

The PREB has in the past collected metrics from PREPA and include 524 rows for 113 transmission and distribution performance metrics.[13] The PREB noted in its July 2, 2021 order that:

> *As noted in the May 21 Resolution, the Energy Bureau's interest in metrics is not limited to establish targets and performance metrics for LUMA as part of the proceeding under Case No. NEPR-AP-2020-0025. These metrics also help to provide a uniform understanding of the current level of PREPA's performance on every aspect of PREPA's decision-making process and operations.*[14]

Q. Do you agree with Professor Irizarry's inclusion in his testimony on page 9, lines 22-25 and page 10, line 1 of reference to the traditional utility goal of maximizing utility owned capital investment and increasing sales?

A. No, I do not in this case. Those two goals are exclusively applicable only to investor-owned utilities (IOU) which own assets and can increase profits by increasing sales. The IOU's are governmentally franchised private monopolies and the regulator balances the interests of the private investors with those of the monopolized customers.

Public owned entities such as PREPA or municipally owned electric systems in the United States of America do not have either a motivation for increased capital investment or increasing sales as goals. Public owned systems are established to provide

[13] See Resolution and Order of July 2, 2021, In RE; The Performance of the Puerto Rico Electric Power Authority, case NEPR-MI-2019-0007, PP 2 and 3.
[14] Ibid P. 4.

adequate and reliable service at the lowest cost with the fulfillment of public policy goals.

This is the case in Puerto Rico where the legislation established the PREPA[15] and specified in *"Section 6 Duties and Responsibilities"* the mission of PREPA, among others,:

(a) to provide and allow electric power to be provided in a reliable, efficient, resilient, and affordable manner…;

(b) To guarantee that universal electric power service is provided;

. . . .

(f) To ensure the continuity and reliability of the electric service;

There is no mention of any goals relating to increasing capital investment or requiring sales increases.

Q. Mr. Irizarry references a 20th century utility on page 6, lines 16-17, page 10, lines 3-8, and page 15, lines 8-10, of his pre-filed testimony, please describe the characteristics of a 20th century utility?

A. As to a definition of a 20th century utility I would offer that in the 20th century well run electric utilities:

- achieved 100% electrification in its assigned area,
- provide adequate service (has sufficient reserve capacity),
- provide reliable service (acceptable levels of outages, acceptable recovery rates and responsiveness to customer demands) and

[15] Section 6, PREPA's enabling Act 83 of May 2, 1941, as amended by Act 17 of 2019, provisions on PREPA's legal duties and responsibilities.

- offer service at "just and reasonable" rates with rate designs that meet public policy requirements.

Q. Does PREPA meet the characteristics of a 20st century utility?

A. According to the legislation in Puerto Rico Act No. 120-2018 "*An Act to create the Puerto Rico Power Systems Transformation Act,*"[16] enabling PREPA to sign a management contract, the qualities of a 20th century electric utility were not found in PREPA operating under government employed managers two decades into the 21st century. The language of the Act is quite explicit in this regard:

> Although the Electric Power Authority operates as a Government monopoly it lacks the conditions to offer efficient service at reasonable cost for residential, commercial and industrial customers. [17]

> Practically no infrastructure maintenance was performed during the past decade. . . [o]ur electric power generation and distribution systems are deficient and obsolete which results in suboptimal service with frequent interruptions and high rates that punish consumers. [18]

Q. Do you have comments in response to Professor Irizarry's Recommendation 1 on page 7, lines 6-8 and page 63, lines 17-19 of his pre-filed testimony that the PREB should consider additional metrics to incentivize the transformation to a "modern, sustainable, reliable, efficient, cost-effective, and resilient system"?

A. Yes, I do. As is clear from PREB's July 2, 2021 Order in Case NEPR-MI-2019-0007, the PREB is already collecting 113 transmission and distribution metrics from LUMA/PREPA. The OMA indicators, it should be noted, have previously been approved by the boards

[16] Act No. 120-2018 Approved June 21, 2018, Statement of Motives, P. 2.
[17] Ibid P. 2.
[18] Ibid P. 4.

of two Puerto Rican government agencies, PREPA and the Public Private Partnership Authority ("PPP") based on the analysis these institutions have as to the priorities necessary in improving PREPA'S operations and service. They are now under review by a third Puerto Rican government institution, the PREB.

The OMA includes three performance categories and 20 metrics, plus there are submitted Major Outage Event (MOE) metrics with an additional sixteen (16) indicators. Irizarry-Rivera recommends an additional seven categories with an additional 21 metrics. That would be 57 metrics to be weighed and valued against each other when it would come to impact on payments of incentives in the OMA contract.

The question for the members of the PREB is whether the initial metrics are adequate to get PREPA moving in the direction first of a viable 20th century utility before it can move to 21st century standards.

I have published on this subject as the author of Chapter 16 "A Twenty-First Century Energy Policy" in the book The World Crisis[19] published in 2008. The book was widely reviewed due to the other eminent coauthors such as Jimmy Carter, Henry Kissinger, George Shultz and others in the US and UK. The energy press also took note as for example a review in the FOSTER REPORT on October 2, 2009 in an article titled "Former FERC Commissioner Terzic Advocates Balance of Regulation and Market Discipline to Guide Power, Oil and Gas Policies in the U.S. in 21st Century."

[19] Harvey, Robert ed. The World Crisis: The Way Forward After Iraq, Constable, London (2008).

In my chapter I add that a new mission in the 21st century for electric utilities would be to add: *"An emphasis on policies that provide the right incentives to efficiency, to moderate demand and decrease emissions all along the energy value chain*."[20]

My recommendation is that as a practical matter the PREB begin with the current metrics submitted by LUMA for approval and that are based on the OMA keeping in mind the PREB also is and has been requiring LUMA/PREPA to report on several metrics. The PREB may wish to track additional or different metrics for PREPA in the future, but I believe that the right procedure would be to include those in a concurrent rate case so that the appropriate financial resources could be applied where improving metrics requires additional capital investment or operating costs.

Q. Do you have comments in response to Professor Irizarry's Recommendation 2 on page 7, lines 12-15 and page 63, lines 23-26 of his pre-filed testimony that the PREB open a "truly participative process where stakeholders determine specific, measurable, objectives and propose metrics to measure progress toward these objectives"?

A. Yes, I do. I am a supporter of full and public hearings having been on three government regulatory commissions. It is my understanding that the PREB has conducted an open and participative process in this proceeding to consider LUMA's proposal, which includes participation by intervenors, a hearing to receive evidence, public hearings, and the opportunity for the public to submit comments. I do not believe that the recommendation by Professor Irizarry that "stakeholders <u>determine</u> specific, measurable, objectives…" is compatible with the duties and responsibilities of the PREB

[20] *Id.* Chapter 16.

as the regulator legally empowered to issue the final orders based on the law and the record in the proceedings.

Q. Please explain your opinion that the recommendation by Professor Irizarry that "stakeholders determine specific, measurable, objectives…" is not compatible with the duties and responsibilities of the PREB as the regulator legally empowered to issue the final orders based on the law and the record in the proceedings.

A. As the regulator it is up to the members of the PREB to exercise their regulatory responsibilities and that those responsibilities cannot be delegated to all or any "stakeholders." The regulators must review the record in the proceedings, the testimony and exhibits, and consider and apply to relevant laws to come to a decision.

Q. Do you have comments in response to Professor Irizarry's Recommendation 3 on page 7, lines 17-19 and page 64, lines 2-4 of his pre-filed testimony that in developing metrics, it is important that there be opportunities for independent monitoring and verification of LUMA's performance?

A. Yes, I do. The call for "independent" monitoring is confusing as one must ask the question "Independent of whom"? The PREB, as an independent regulator created by and under Puerto Rico law, is in its structure and establishment "independent" of PREPA, LUMA and any other agency. That the PREB is independent is established by law: "(o) Bureau: Shall mean the Puerto Rico Energy Bureau…which is a specialized independent entity in charge of regulating, overseeing, and enforcing the public policy on energy of the Government of Puerto Rico."[21]

[21] Act No. 17 of April 11, 2019 "Puerto Rico Energy Public Policy Act", Section 1.2.

Q. Do you have comments in response to Professor Irizarry's Recommendation 4 on page 8, lines 1-3 and page 64, lines 10-12, that penalties should be included in performance metrics that would be triggered if LUMA's performance falls below a given level?

A. Yes, I do. Firstly, this recommendation calls for the addition of "penalties" which I believe already exist in the OMA. They may have been overlooked as they are in the contract section titled "Events of Default".

The first question raised by Recommendation 4 is whether additional or different penalties should be applied retroactively to the existing OMA contract.

I think any independent observer would recognize that adding additional or different penalties after a contract has been negotiated and signed and by two independent government agencies and approved by the independent regulator, the PREB, adds additional risk which were not considered by the parties in the original negotiations. Bilateral contracts which include rewards and penalties are negotiated by parties both cognizant of the balance each needs to lead to signing. After negotiating an acceptable contract LUMA has no way of accommodating this additional risk if penalties are added or changed retrospectively without other contract adjustments. There is also the possibility that the addition of certain new penalties may implicate budget changes so that adequate resources are available to meet the new evaluation criteria.

For example, the OMA metrics include such things as reliability indices (SAIFI, SAIDI, CAIDI etc). As a practical matter Lawrence J. Vogt P.E. points out that:

> General distribution system reliability can be improved and sustained by a number of capital and maintenance projects, including
>
> - Installing additional substations with shorter feeder systems

- Using primary and secondary distribution network configurations
- Placing distribution lines and facilities underground
- Automating the distribution systems
- Installing selective distributed resources
- Improving system protection and sectionalizing capabilities
- Routinely inspecting lines and replacing damaged and failing facilities
- Maintaining tree trimming cycles.[22]

I would recommend the PREB find that the penalties in the existing OMA, which include the possibility of cancellation of the OMA, are reasonable now given the unique circumstances in PREPA.

Secondly, there is no demonstration by Professor Irizarry that the addition of new or different penalties will necessarily improve management performance. Finally, Dr. Michael R. Schmidt, notes in "Performance-Based Ratemaking: Theory and Practice": "*However, we must keep in mind that in a capitalist, profit motivated economy, companies are not driven by the need to avoid penalties. They are driven by the desire to increase profits, and it is this force, this goal, that drives increases in productive efficiency and cost cutting where and if possible.*"[23]

Of course, Schmidt is here stressing that it is the positive or reward incentive which is controlling.

Q. Do you have comments in response to Professor Irizarry's Recommendation 5 on page 8, lines 6-7 and page 64, lines 15-16 of his pre-filed testimony that the PREB remove any incentive payment to LUMA for staying within its budgets?

[22] Vogt, Lawrence J., Electricity Pricing: Engineering Principles and methodologies, P. 172, CRC Press, Boca Raton, (2009).
[23] Schmidt, Michael, Performance-Based Ratemaking: Theory and Practice, Public Utility Reports, Inc Vienna VA, P. 16 (2000).

A. Yes, I do. As a former utility CEO and Chairman of the Board I can state that one of management's must difficult tasks is to stay within preapproved budgets. Firstly, because budgets are set prospectively based on estimates and assumption on what will happen in the future. The assumptions include those concerning weather, economic conditions, inflation, fuel prices, financial markets, labor issues and other issues. These are the anticipated areas of concern, but we now live in a period experiencing an unanticipated event – the COVID pandemic–. Sometimes budgets have to change in real time to reflect real developments. Staying within a budget given all the real time realities is a management skill and is not an automatic outcome of just being in management.

Q. Do you have comments with respect to Recommendation 7 by Professor Irizarry on page 8, lines 18-21 and page 65, lines 1-3 that PREB should adopt metrics analogous to the "Gating Performance Metrics" and "Default Performance Metrics" from the Long Island Power Authority's contract with PSEG in the performance-based mechanism to be applied to LUMA?

A. Yes, I do. I disagree with the suggestion that the PREB adopt an alternate scheme for performance metrics that was not negotiated by the parties to the OMA. Firstly, I would note that I understand the reference being made is the Second Amended and Restated Contract Operations Services Agreement between the Long Island Lighting Company d/b/a as LIPA and the PSEG Long Island LLC. Professor Irizarry does not consider in his testimony the physical condition and service performance of the LIPA predecessor company, the investor-owned Long Island Power Company and circumstances leading to

the transfer of ownership of its assets to the state-created new Long Island Power Authority were significantly different than the situation in Puerto Rico with PREPA at the time that the bidding and negotiation process that led to the OMA contract took place. The Long Island Power Company (LILCo) was New York Public Service Commission (NYPSC) regulated investor-owned electric utility which faced financial collapse due to an unsuccessful investment in the Shoreham Nuclear Power Plant. Unlike the situation cited by the Puerto Rico legislature enabling the management contract with LUMA, the New York legislature did not cite conventional electric generation, transmission, or distribution service quality as the reason for the legislation to create the public owned Long Island Power Authority. Long Island Power Company (LILCO) was already a 20th century electric utility. The law establishing the LIPA, Chap. 43 Article 5 Title 1-A Long Island Power Authority, section 1020-a Declaration of legislative findings and declarations, [24] stated:

> *The decision of LILCO to commence construction of Shoreham nuclear power and thereafter to continue such construction were imprudent.*
> *. . .*
> *The very substantial financial strain of the investment in Shoreham nuclear power plant has required LILCO to suspend dividends on its common and preferred stock, severely threatening the continued economic viability of LILCO.*
> *Such matters of state concern best can be dealt with by replacing such investor-owned utility with a publicly owned power authority.*

Secondly, unlike the case with PREPA, the LIPA is ultimately not regulated by the NYPSC under Section 1020-*s "Public service law generally not applicable to*

[24] Chap. 43 Article 5 Title 1-A Long Island Power Authority, Section 1020-a.

authority..."[25] This allows LIPA the flexibility of changes rates, rules, policies, and operations unilaterally to accommodate its management contract with PSEG which PREPA does not have.

The elements in the LIPA and PSEG contract reflect the unique circumstances of LILCo as the predecessor history and the condition of the utility. There is no reason to believe that the amended contract between LIPA and PSEG that added the gating performance metrics should be applied to PREPA.

Q. Do you have comments with respect to Recommendation 8 by Professor Irizarry on page 8, lines 23-26, page 9 lines 1-2, and page 65, lines 5-10 that Recommendation 8 "If LUMA consistently under performs, during a number of evaluation periods, in key metrics such as: public and labor safety, sustainability, reliability, resiliency and customer service then the performance-based mechanism should provide for a significant financial penalty in the fixed payment LUMA receives. If LUMA fails to correct these deficiencies its contract should be terminated."?

A. This is the same as Recommendation 4 with respect to retroactively adding penalties to the negotiated contract. I offer the same opinions stated in connection with Recommendation 4.

Q. Do you have comments with respect to Recommendation 9 by Professor Irizarry on page 9 lines 4-6 and page 65 lines 12-14 that performance metrics adopted by the PREB should be true performance based, where rewards and penalties are clearly defined and on page 9 lines 8-10 and page 65 lines 16-18, that a "fixed fee"

[25] *Id.,* Section 1020-s.

compensation structure is contradictory to the purpose of a rewards and penalties system, since a fixed fee structure promotes underachievement"?

A. Yes, I do. This recommendation again calls for penalties to be added which I addressed earlier. The sentence *"A 'fixed fee' compensation structure is contradictory to the purpose of rewards and penalties system, since a fixed fee structure promotes underachievement,"* ignores the reality of the OMA management contract. As the NREL report cited earlier recognized "For state owned entities…a PIM can take the form of management reviews…that are linked to manager income or promotion."[26] This is what we have in this PREPA/LUMA OMA contract.

The only other alternatives to the OMA were 1) privatization or 2) reversion to PREPA employee management (the management arrangement leading to Puerto Rico legislation enabling a management contract.). A return to PREPA employed management would create a "fixed fee" in the form of the total of annual salaries for employees including non-management, management, and executives. Anyone contracting an OMA with PREPA would face a "fixed fee" of salaries for employees. A PIM could be created linked to "management income or promotion" and it would look like the PREPA/LUMA OMA contract.

In my opinion, the fixed fee system in the OMA contract is a reasonable alternative to a return to state employee management.

Q. Please explain your opinion that the fixed fee system in the OMA contract is a reasonable alternative to a return to state employee management.

[26] *See* note 9 *supra.*

A. Professor Irizarry's objection seemed to be that the OMA contract be something other than a "fixed fee" arrangement with rewards and penalties. However, the "fixed fee" aspect would be also incurred if PREPA went back to being an entity where all of the employees were directly employed by PREPA. Thus, as LUMA has employees as well on fixed salaries it would seem an acceptable contract provision.

Q. On page 5, lines 17-19 of his pre-filed testimony, Professor Irizarry states that he was asked to assess the actual "performance metric" structure proposed by LUMA and how it compares with performance-based incentives in the electric utility business, do you have an opinion on Professor Irizarry's proposal to compare LUMA's proposed performance metrics targets included in Annex IX to the T&D OMA with performance-based incentives in other electric utilities?

A. The Performance Incentive Mechanisms (PIM) and the indicators presented differ from utility to utility as well they should. Electric utilities do not all have the same PIM indicators. This makes sense in that each utility has its own unique weather, construction, age of plant, operational conditions, financial health, state laws, regulatory history and other factors which went into the local regulator's decision to approve the selected metrics.

Q. Do you agree with Professor Irizarry's use throughout his testimony of examples of performance-based incentives that are currently implemented in other jurisdictions?

A. No. With respect to his use of Performance Based Ratemaking or Regulation (PBR) which is an alternative way to cost of service, of setting rates. It was designed to cure

problems attributed to the private ownership of a monopoly business operating under a government franchise. This fact can be found even in Irizarry's own testimony.

PBR is designed and intended to improve performance of investor-owned utilities.

In Performance-Based Regulation Ratemaking: Theory and Practice, Dr. Michael R. Schmidt states:

> Because even under regulation, the same economic principle that makes capitalism work – the profit motive- can create more efficient utilities, resulting in lower costs and prices…The primary method of adding incentives is by allowing regulated utilities to earn extra profits.[27]

Government owned entities such as PREPA do not have the same profit maximization goals as investor-owned utilities.

The application of PIMs in the form of indicators is appropriate and the subject of these proceedings. However, it is apparent from the differences between states that each state has tailored its PIM to its own unique situation, policies and priorities. It seems to me highly unlikely that other states have the same physical, operational and/or historic issues as those in Puerto Rico. As one can see from these proceedings the universe of indicators available is quite large.

In that regard Dr. Schmidt provides a warning to: *"Watch out for capricious performance indicators that require the regulator micromanage and second guess the utility."* [28]

[27] Schmidt, note 23 *supra,* P. 15.
[28] Ibid. P. 239.

Q. Do you have a response to Professor Irizarry's first conclusion, on page 6, lines 16-17 and page 63, lines 6-7 of his pre-filed testimony, that "LUMA's performance metrics, if achieved, would only result in reasonable 20th century utility service for Puerto Rico"?

A. Yes. As I have explained in my testimony elsewhere, I believe that PREPA needs first to achieve the 20th century objectives of "adequate and reliable service." The enabling legislation allowing for PREPA to sign an OMA lists the service problems facing PREPA that needed to be cured by the OMA and these are clearly 20th century issues corrected by most regulated electric utilities and municipal systems in the US during the 20th century.

Q. Do you agree with Professor Irizarry's conclusion on page 6, lines 18-21 "that additional metrics are necessary to incentivize the transformation required by Law 17, Law 120, and the Transmission and Distribution Operations & Maintenance Agreement, to achieve a 21st Century electric grid," and page 63, lines 7-9 of his pre-filed testimony, that "[a]dditional metrics are necessary to incentivize the transformation envisioned by Law 120 and to achieve a 21st Century electric grid?

A. No. LUMA and PREPA with the supervision of the PREB determine in what order to address the issues required by Law 57 and 17 and Law 120. The "transformation" requires appropriate budgeting and probably integrated resource planning which can be addressed by the PREB in separate proceedings where priorities can be set and adequate budgets approved. I do not believe it is necessary to add numerous metrics at this time to the OMA which was approved by PREPA, PPP, and LUMA and is under PREB supervision to meet PREPA's most pressing and immediate needs.

Q. Do you agree with Professor Irizarry's statement on page 9, lines 22-25 and page 10 line 1 that "performance-based regulation is a regulatory framework that recognizes that the traditional utility business model incentivizes capital investment and increased sales, which is not necessarily aligned with public policy objectives, the interests of consumers or environmental protection"?

A. I agree that PBR is appropriate for an Investor-Owned utility which has shareholders and therefore has profit maximization as a goal. That is not the case with PREPA which is a state-owned utility without private shareholders or profit maximization as a goal.

Q. Mr. Terzic, do you have any comments on the testimony of Professor José Almeda?

A. Yes. There are a number of issues where I believe the testimony is not valid for the OMA contract issue.

Professor Almeda proposes what he calls "reward penalties schemes." However, on closer inspection it appears that the cited authorities for these schemes were all designed for investor-owned utilities and not for non-profit government entities. Take for example the quote on page 11, lines 18-22 of Professor Alameda's testimony where he cites Italian Regulatory Authority experience: "Liberalization and privatization of utilities in the electricity sectors have created legitimate concerns on the effect that generalized prevalence of the profit motivation could have on the services provided…" Firstly, this is not applicable to PREPA because "liberalization" refers to the introduction of retail competition and "privatization" means the transfer of state-owned assets to private enterprise. Neither of these conditions exist in Puerto Rico. Secondly, this is not

applicable to PREPA as it is a state-owned enterprise and does not have a "profit motivation." Neither is LUMA's compensation tied to PREPA profit maximization.

The "consumer and producers surplus" argument does not apply to a state owned enterprise as there is no profit motive inherent in PREPA's organization or government directives.

Another example is Professor Alameda's argument that the OMA should have a strong penalty component, on page 15 lines 19-21, because "If penalties were absent from RPS, the financial and operational risks would shift from private shareholders onto the consumers and producers surpluses."

The proof that this argument is irrelevant in this case is in the term "private shareholders" which PREPA does not have. If PREPA produces a "surplus" of revenue that "surplus" belongs to the citizens of Puerto Rico not LUMA. Thus, penalties to keep from overearning are not necessary in any PREPA/LUMA contract.

The OMA, as indicated earlier, does include financial penalties for "Minimum Performance Threshold" default and thus meets Alameda's criteria for a "rewards penalties scheme."

Q. Mr. Terzic, could you provide a short summary of your conclusions and recommendations in these proceedings?

A. Yes.

My testimony presents arguments and facts supporting the following:

1. The issue before the PREB in this proceeding is whether to approve the Performance Incentive Mechanism or Performance Incentive Metrics (PIM) in the OMA signed between PREPA and LUMA.
2. The issue is complicated by the fact that both PREPA and LUMA are jurisdictional electric utilities under regulation by the PREB. The situation here is of one jurisdictional electric utility operating another jurisdictional electric utility.
3. In neither case can Performance Based Ratemaking or full Performance Based Regulation (PBR) be applied since PREPA is not a for profit entity and LUMA does not own assets or have revenues tied to PREPA sales growth. Those two conditions were cited by experts Irizarry and Alameda as leading to application of PBR.
4. The PREB had earlier established PIMs for LUMA/PREPA. In this proceeding PREB is asked to approve PIMs for LUMA under the OMA between PREPA and LUMA.
5. The application of PIMs for LUMA is conceptually the same as an investor-owned utility or public owned utility would have in an executive compensation package. As I have explained, in utility ratemaking for investor-owned utilities PBR system can be established with or without the determination of PIMs. A rate cap, or annual rate index system would be such an example.

   PIM indicators can also be used in a PBR system to reward shareholders for superior performance of the jurisdictional utility.

   However, in the case of the OMA, the PIMs are applied just as they would be in an executive compensation package which does not affect the utility rates.

Achieving or exceeding the PIMs results in higher payout to management while sustained failure provides not payout and includes penalties with the ultimate penalty of contract cancellation.

6. The PREB has earlier established 113 transmission and distribution indicators in a PIM order for LUMA/PREPA but not a PBR system. Opposition witnesses in these proceedings have recommended additional or alternative PIMs for the OMA. I would recommend that the PREB take these under consideration for future PREPA proceedings as they may have necessary budget implications.
7. The indicators selected for submittal to PREB are supported by reports submitted concerning the conditions of PREPA and the priorities for remediation established by the PPP and PREPA. The OMA is structured with rewards and penalties based on the selected metrics.
8. LUMA signed the OMA understanding the performance metrics. LUMA then worked with the PREPA to put the budgets in place. Those budgets were based on estimated revenues from projections of sales with application of the existing rates. Clearly in LUMA's case the PIMs were assumed achievable with the proposed budgets.
9. I recommend that the PREB give the greatest weight to the PIMs submitted for approval. Those PIM reflect the priorities identified by studies used by PREB and PPP based on those areas of PREPA operations most in need of attention to bring the PREPA closer to 20th century electric service available elsewhere.

Q. Does that conclude your testimony?

624 **A.** Yes, it does.

ATTESTATION

Affiant, Mr. Branko Terzic, having been duly sworn, states and certifies the following:

The prepared Rebuttal Testimony constitutes my rebuttal expert testimony in the above-styled case before the Puerto Rico Energy Bureau. I would give the answers set forth in the Rebuttal Testimony if asked the questions included in the Rebuttal Testimony. The facts and statements provided herein in this rebuttal testimony are true and correct to the best of my knowledge.

Branko Terzic

Acknowledged and subscribed before me by Mr. Branko Terzic of legal age, married, professional consultant, and resident of Fairfax, Virginia in his capacity as Expert Witness.

In Fairfax, Virginia, this 16th day of February 2022.

AYSEL IPEK
Notary Public
Commonwealth of Virginia
Registration No. 7815354
My Commission Expires Jul 31, 2023

2/16/22

COMMONWEALTH OF VIRGINIA

Fairfax Circuit Court

4110 Chain Bridge Road
Fairfax, Virginia 22030-4048

JOHN T. FREY
Clerk of Circuit Court

703-246-2770 TTY 711

SUZANNE E. LUBKEMAN
Chief Deputy

Document Dated: FEBRUARY 16, 2022
Re: ATTESTATION
For: MR BRANKO TERZIC

NOTARY AUTHENTICATION CERTIFICATION

Commonwealth of Virginia
County of Fairfax:

I, John T. Frey, Clerk of the Circuit Court of Fairfax, Virginia, the same being a court of probate and of record and having a seal, do hereby certify that **AYSEL IPEK** whose signature appears signed to the foregoing annexed instrument and thereon written, was at the date thereof, a notary public in and for the County of Fairfax, Commonwealth of Virginia.

Circuit Court Of Fairfax, Virginia
John T. Frey, Clerk

Date: 02/16/2022 By: _____, Deputy Clerk
DARCY L PORTILLO

EXHIBITS TO TESTIMONY OF BRANKO TERZIC

1. Exhibit 1, Curriculum Vitae, B. Terzic (BT1).
2. Exhibit 2, List of Prior Testimonies, B. Terzic (BT2).

Exhibit 1 (BT 1)

VITAE
of
Branko Terzic

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President
Branko Terzic & Associates, Inc.
Vienna, Virginia
June 1, 2014 – Present

Offering professional services in energy, resources and water infrastructure investment and regulation for management, boards and investors. Branko Terzic is an internationally recognized former CEO, U.S. state and federal regulator, management consultant and expert witness in the energy and infrastructure industries. Terzic has testified on regulation and rates for natural gas distribution in Idaho, Minnesota, North Carolina and Utah.

Distinguished Fellow, Council on Competitiveness
Senior Fellow, Atlantic Council, Global Energy Center

Member, Society of Depreciation Professionals
Member, Society of Utility Regulatory Financial Analysts
Member, Association of Energy Engineers
Member, United States Association for Energy Economics
Member, (Non-attorney) Energy Bar Association
Faculty Member, The Washington Campus (MBA Programs)

Branko Terzic
Managing Director
Berkeley Research Associates LLC
May 25, 2015-present

Berkeley Research Group, LLC (BRG) is a global consulting firm that helps leading organizations advance in three key areas: disputes and investigations, corporate finance, and performance improvement and advisory. an integrated group of experts, industry leaders, academics, data scientists, and professionals working beyond borders and disciplines.

Global & U.S. Regulatory Policy Leader in the Energy & Resources Group
Deloitte Services LP 1999- 2014

Chairman of the United Nations Economic Commission for Europe (UNECE) Ad Hoc Group of Experts on Cleaner Electricity Production from Coal and Other Fossil Fuels (Two-year term from November 26, 2007)

From 1999-2002 Terzic served as Regional Managing Partner of Resources, Energy & Infrastructure Practice Group for the Deloitte & Touche Central Europe LLP headquartered in Prague, Czech Republic. Former Commissioner Terzic currently held the following appointments and committee memberships while at Deloitte:

- Member, U.S. National Petroleum Council, Committee on Oil and Gas (Advisory body to the Secretary of Energy)
  Member, Advisory Council, North American Energy Standards Board (NAESB)
- Chairman, US Advisory Group for Carbon*Limited*, and Fellow of The Royal Society for the encouragement of Arts, Manufactures & Commerce (London, UK)
- Associate**,** The Bonbright Public Utilities Center, University of Georgia
- Faculty, The Washington Campus, (Consortium of 17 MBA Programs)
- Member, Planning Committee, The Bordeaux Energy Colloquium
- Member, Executive Council**,** The Energy Efficiency Forum
- Member (non-attorney) The Energy Bar Association (U.S.A.)

Chairman, President and Chief Executive Officer (CEO August 22, 1995)
1994 - 1998
Yankee Energy System, Inc.

Chairman, President, Chief Executive Officer and Director of Yankee Energy System, Inc.(formerly listed YES:NYSE then acquired in 1999 by Northeast Utilities now Eversource Energy) the parent of Yankee Gas Services Company, the largest gas distribution company in Connecticut and of Yankee Energy Services Company (YESCo) involved in gas-fired power development, operations, consulting, finance and HVAC services.

Managing Director
1993-1994
Arthur Andersen Economic Consulting, Washington, D.C. Economic consulting services provided to infrastructure companies. Provided consulting services for US AID for natural gas pipeline in Pakistan.

Commissioner
October 20, 1990, to May 24, 1993
Federal Energy Regulatory Commission; Washington, D.C. The FERC regulates hydro-electric facilities in the US as well as wholesale electric power, natural gas transmission, oil pipeline transport services. Nominated by President George Bush on September 20, 1990, and confirmed by the United States Senate on October 11, 1990, for a term expiring October 20, 1991. Re-nominated by President Bush on September 20, 1991, and reconfirmed by the Senate on October 17, 1991, for a term expiring June 30, 1995.

Chairman, FERC Task Force on Natural Gas Pipeline Competition
Chairman-FERC Task Force on Incentive Regulation

Group Vice President and Director
December 1, 1986, to October 19, 1990
AUS Consultants; Moorestown, New Jersey (Regional Office: Milwaukee, Wisconsin)

Responsible for developing and marketing integrated management consulting services using the resources of the Group companies with over 100 professional consultants. Provided expert consultancy to electric, gas, water and telephone utilities in regulatory policy, valuation and depreciation, acquisition and divestiture, and strategic planning for regulated public utilities and the investment community. Administrative duties included those of Publisher of subsidiary C. A. Turner Utility Reports.

Commissioner
March 18, 1981, to December 1, 1986
State of Wisconsin Public Service Commission - Madison, Wisconsin

The quasi-judicial three-member Commission is responsible for regulation of public utilities in Wisconsin including electric, gas distribution, telephone, water, and sewer. Regulation is designed to promote reliable and adequate service to the public at rates that are reasonable and just. Oversight of public utility; tariff rates, finance and mergers and acquisitions (M&A). During this period the PSC reviewed hundreds of rate cases for the fourteen IOU electric and gas utilities, 500 municipal electric, water and sewer utilities and ninety independent telephone utilities under regulation under.

Served as Chairman of the NARUC Committee on Engineering, Valuation and Depreciation.
Chairman of NARUC Committee on Finance.

Partner
1979 to 1981
Terzic & Mayer Public Utility Consultants - Milwaukee, Wisconsin

The firm, an independent professional valuation and cost engineering firm, provided services to Wisconsin municipal electric, water and sewer utilities subject to state PSC regulation. Services include M&A valuation, depreciation, engineering economics, cost of service, and utility rate design studies. This partnership was dissolved in 1981. The firm provided water and sewer rates consulting services to more than two dozen municipal owned water, sewer and electric systems in the state. The firm continued as John A. Mayer & Associates upon Terzic's appointment to the Wisconsin PSC.

Vice President
1976 to 1979
Associated Utility Services, Inc. (now AUS Consultants) - Milwaukee, Wisconsin

Engaged in valuation and depreciation assignments for M&A and other purposes involving reproduction cost, original cost, investment allocation, cost of service and rate design, and directed the development of a standardized cost index of independent telephone company construction costs. Consultant for electric, telephone, gas, and water utilities.

Staff Appraiser / Valuation Engineer
1974 to 1976 and 1969 to 1971
American Appraisal Associates, Inc.- Milwaukee, Wisconsin

Valuation, depreciation, and special studies for electric, gas distribution, gas transmission, water and telephone utilities, and other properties in North and South America. At that time it was the largest independent US valuation firm.

Special Investigations Engineer and Environmental Engineer
1972 to 1974
Wisconsin Electric Power Company - Milwaukee, Wisconsin

Assignments included valuations, engineering economics, Federal Power Commission, and Public Service Commission analysis and liaison for this combination electric and natural gas utility.

Public Service and Non-Profit Positions

Chairman (Wisconsin State official in part-time capacity)
May 27, 1988, to October 19, 1990
State of Wisconsin Racing Board; Madison, Wisconsin

Appointed to a five-year term on the first five-member board established to regulate racing and on-track pari-mutuel betting, and to promulgate rules and issue licenses. Established this regulatory agency, hired staff and managed applications and hearings process for awarding of track licenses. Result was creation, in 36 months, of a new industry with five operating greyhound tracks in Wisconsin. This entity later superseded by State of Wisconsin Racing Commission

Public Member (Non-profit research institute)
1988 to 1990
Board of the National Regulatory Research Institute at The Ohio State University

This research institute was established in 1976 by the National Association of Regulatory Utility Commissioners.

INSTRUCTOR

On topics of Regulation, Cost of Service, Rate Design, Valuation and Depreciation

US Department of State's National Foreign Affairs Training Center
Arlington, Virginia
Guest Lecturer 1996, 1997,1998 Business Council for International Understanding "Power Generation Seminar" for Foreign Service Officers
Guest Lecturer 2017,2918, 2019 Bureau of Energy "Electricity 101"

Yale University School of Management
New Haven, CT
Guest Executive Lecturer 1995, 1996, 1997 for Dean and Professor Paul MacAvoy

Society of Depreciation Professionals
Annual Training 2016, 2017, 2018, 2019, 2020

Tax Institute of America Workshop on Public Utility Valuation
(Sponsored by and held at the Wichita State University)
Lecturer 1984, 1985, 1986, 1987, 1989, 1990, 1993 in Wichita, Kansas

National Communications Forum of the National Engineering Consortium

(A nonprofit corporation affiliated with 42 major universities)
Faculty 1987, 1988, 1989, 1990 in Chicago, Illinois

Seminar on the Regulation of Natural Gas Services
(For the Ministry of Economy and Public Works and Services, Republic of Argentina)
Lecturer 1992 in Buenos Aires, Argentina

World Bank/EBRD Joint Vienna Institute
(Sponsored by The Economic Development Institute of the World Bank and the U.S. Agency for International Development and the EBRD)
Lecturer 1992 in Vienna, Austria, for Czech Republic, Poland, Hungary, and Slovak Republic
Lecturer 1993 in Vienna, Austria, for Bulgaria, Czech Republic, Romania and Slovak Republic

Utility Partnership Program: Management Seminars in Eastern Europe
(Sponsored jointly by the U.S. Agency for International Development and the United States Energy Association and in cooperation with electric utilities in the U.S. and Eastern Europe)
Lecturer 1993 in Sofia, Bulgaria, for the Bulgarian National Electric Company and the Committee on Electricity
Lecturer 1993 in Bratislava, Slovakia for Slovak Power Sector
Lecturer 1994 in Warsaw, Poland for Polish Power Sector
Lecturer 1994 in Budapest, Hungary for Hungarian Power Sector

(Central & Eastern European) **Electricity Management Development Institute**

Lecturer 2000 in Budapest, Hungary for MVM workshop
Lecturer 2000 in Bucharest, Romania for CONEL workshop

PERSONAL:

- Citizenship: United States
- Education and Academic Honors–
  The University of Wisconsin -Milwaukee
  Bachelor of Science in Engineering (1972)
  Honorary Doctor of Sciences in Engineering (2009)

MILITARY:

Honorable Discharge at rank of Captain, Field Artillery and Foreign Area Officer, Wisconsin Army Reserve National Guard and US Army Reserve

SPECIAL COURSES:

Western Michigan University Center of Depreciation Studies -
Course II, Fundamentals of Life Estimation

Lincoln Institute of Land Policy -
Course 229, Appraisal of Gas and Electric Utilities

SPEECHES

1999-2020 Branko Terzic has given almost 500 speeches in over 31 U.S. states and 18 countries. See attachment.
Numerous speeches were also given 1972-1999 in particular while serving as a Commissioner on the WPSC.

ILLUSTRATIVE PUBLICATIONS: (Numerous speeches quoted in trade publications not listed here)

Book Chapters and Contributions

GLOBAL STRATEGIC ASSESSMENT, 2009 Institute for National Strategic Studies Editor Patrick M. Cronin, National Defense University Press, Washington, DC 2009)

The World Crisis: The Way Forward After Iraq (in US by Skyhorse Publishing 2008) editor Robert Harvey chapter on energy by Branko Terzic.

White Papers

Energy independence and security; A reality check
A part of Deloitte's *Making America Stronger* series, October 2012

Regular Columns

"Terzic on Strategy" ENERGY METRO DESK monthly, continuation in 2009 of a regular bi-weekly column since 1999 in electric power and power trading bi-weekly publications New Power Executive and The Desk

"**Commentary by Branko Terzic**" regular column in **EUROPEAN ENERGY REVIEW** since 2007 www.europeanenergyreview.eu

Selected Articles published in trade publications:

"Gas Ban as Confiscation of Property"
September 2020 Public Utilities Fortnightly
"COVID-19 As Not Unique But New Generic Problem"
Horizons Spring 2020 No. 16
"Innovation Requires Capital Recovery Recognition"
August 2019 Natural Gas & Electricity (Wiley Periodicals)
"Storm, Rate, Insurance: Entire Economy Pays Price'
PUF 2.0 Mid-January 2018
"**Regulatory Strategy and Tactics"**
July 2017 Public Utilities Fortnightly
"**Innovation and Capital Recovery"**
November 2016 Public Utilities Fortnightly
"American Mergers: Doing the two-step!"
NOV/DEC 2015 WORLD GEN magazine
"The US Energy Picture in the 21st Century" with Spencer Abraham,
October 2015 HORIZONS: Journal of international Relations and Sustainable Development,
"Decoupling Coupling: The Ratemaking Dilemma"
September 22, 2015 *International Energy Investment*
"Managing under regulation: above all else"
September 20, 2015 *EnergyBiz*
"Broken Utilities, how to fix them"
September 11, 2015 Energy Post
"10 Myths"
July-August 2013 ELECTRIC PERSPECTIVES
"History repeats itself: a guide from 30 years ago"
September 2009 OIL AND GAS FINANCE JOURNAL
"The Future of Conventional Fuels"
October 2009 OIL AND GAS FINANCIAL JOURNAL
"Regulators and Risk: Deloitte's 2009 Survey of State Regulators"
May 2009 EEI ELECTRIC PERSPECTIVES
"**Regulatory Strategy and Tactics"**
July 2017 Public Utilities Fortnightly
"**Innovation and Capital Recovery"**
November 2016 Public Utilities Fortnightly
"American Mergers: Doing the two-step!"
NOV/DEC 2015 WORLD GEN magazine
"The US Energy Picture in the 21st Century" with Spencer Abraham,
October 2015 HORIZONS: Journal of international Relations and Sustainable Development,
"Decoupling Coupling: The Ratemaking Dilemma"
September 22, 2015 *International Energy Investment*

"Managing under regulation: above all else"

September 20, 2015 *EnergyBiz*

"The electricity challenge of the 21st century"
June 2007 POWER magazine

"The Economics of Climate Change: The Stern Review"
August 2007 AMERICAN GAS magazine

"100 Years of Regulation"
July 24, 2007 Milwaukee Journal Sentinel newspaper (with George Edgar)

"Global Regulation: Exporting America to the World"
February 2007 Public Utilities Fortnightly (with Gregory Aliff)

"**The ABCs of Regulation"**
February 2007 Public Utilities Fortnightly (with Gregory Aliff)

"The Russians Are Coming"
July-August 2006 Energy*Biz* (w Rebecca Ranich)

"North America: A Step in the Right Direction" in THE WORLD ENERGY BOOK
August 2006 The Petroleum Economist Ltd. London, UK

"Reinventing The Classic Business Strategy"
December 2005 Public Utilities Fortnightly (w David Fornari)

"New energy law to influence mergers"
Nov/Dec 2005 ENERGY/BIZ Magazine (with Robert Robinson)

"Lessons Learned From the L.A. Blackout"
November 2005 Public Utilities Fortnightly (w Greg Aliff)

"A Lost Art?"
November./December 2004 Electric Perspectives (w Gregory Aliff)

"European Infrastructure: Billions Needed in Investment"
February 2004, Public Utilities Fortnightly (w Thomas J. Flaherty

"Today's Electric Power Grids"
Winter 2003/2004 The National Interest (with Gregory Aliff)

"Investment in Russia: Superpower"
February 1, 2003 Public Utilities Fortnightly (w James Balaschak)

"Distribution Companies of the Future"
December 2002 IEEE Power Engineering Review

"U.S consumers less aware of energy issues"
December 2002 Electric Light & Power (w Gregory Aliff)

"Germany Taking The Lead in Electricity and Gas"
January 15, 2000 Public Utilities Fortnightly (w/ B. Wurm & Y. Dietrich)

"Restructuring Models for the Gas Industry"
March 1999, Natural Gas Magazine

"Restructuring Models for the Gas Industry"
March 1999, Natural Gas Magazine

"Restructuring, My Way" (Electric Industry Commentary)
February, 1, 1999 Public Utilities Fortnightly

"The New Energy Deal: Simplicity and Savings"
First Quarter 1999, Deregulation Watch, Quarterly Report

"Incentive Regulation: Efficiency in Monopoly"
Winter 1994, Natural Resources & Environment

"Incentive Regulation and Regulatory Forbearance: Appropriate Responses to the Ever-Competitive Market Place?"

October 1992, Incentive Regulation: The New Regulatory Compact (Proceedings and Papers 1992)
EXNET
Public Utilities Reports, Inc.
The Management Exchange

Interview: **"Commissioner Terzic Encourages Adoption of Incentive Ratemaking Techniques by Regulators"**
October 1992, In Your Interest (published by Minnesota Utility Investors, Inc.)

"The Future of Independents"
October 1992, Institutional Investor

"Gazing Into the Post-Order 636-A Natural Gas World"
August 31, 1992, The Oil Weekly

"FERC's Role Matches Changing Environment
Spring 1991, The Investors' Voice
(published by Wisconsin Utility Investors, Inc.)

"FERC's Role in Utility Mergers"
1991, Utilities Mergers & Acquisitions (Proceedings and Papers 1991)
Public Utilities Reports, Inc.
The Management Exchange

"Gas in Britain: Regulation of a Privatized Former State Monopoly"
with James McKinnon
May 26, 1988, Public Utilities Fortnightly

"Reflections on the Regulatory Process"
December 25, 1986, Public Utilities Fortnightly

Video Presentations:
Broadcast appearances as industry expert on the CNN International, Fox Business and other networks. McNeil Lehrer News Hour (US PBS), host of C.A Turner Utility Reports Video Journal, Bloomberg News Service, Jefferson Energy Foundation Video programs and others

AWARDS:

Energy Efficiency Forum inductee HALL OF FAME
June 15, 2009 Energy Efficiency Forum, National Press Club, Washington, DC

WCEE 2008 “Champion” Award
February 6, 2008 Women’s Council on Energy and Environment, Washington, DC

Natural Gas Roundtable Appreciation Award 2002
December 17, 2002 Natural Gas Roundtable, Washington DC

Distinguished University Graduate 1999
Commencement May 1999 University of Wisconsin - Milwaukee

Distinguished Service Award
October 5, 1993
James C. Bonbright Utility Center, University of Georgia

Achievement Award for Founding of the Society
November 21, 1991
Society of Depreciation Professionals

State of Wisconsin Certificate of Congratulations
November 16, 1990
Governor Tommy Thompson

Wisconsin Racing Board Resolution
November 16, 1990
Wisconsin Racing Board

Citizen of the Year 1989
May 1, 1989
Greater Milwaukee Legal Auxiliary

Resolution of Commendation
June 18, 1987
National Conference of Regulatory Utility Commission Engineers

Honorary Kentucky Colonel
April 7, 1983
Governor John Y. Brown

Branko Terzic REGULATORY AND COURT TESTIMONY

Before the State of Delaware Public Service Commission, prepared direct testimony on behalf of the Delaware Public Service Commission 1975 Subject: Depreciation rates for nuclear power plant

Before the Virgin Islands Public Service Commission, prepared direct testimony on behalf of the ITT Virgin Islands Telephone Company 1976 Subject: Depreciation rates

Before the Federal Energy Regulatory Commission, prepared testimony on behalf of the State of Wisconsin Public service Commission as a member of the Commission, 1985 Subject: FERC Rulemaking

Before the Idaho Public Service Commission, prepared direct testimony of behalf of the Intermountain Gas Company, 1990, Subject: Depreciation rates

Before the Arizona Corporation commission, prepared rebuttal testimony on behalf of the Citizens Utilities Company, PGA E-1032-93-111, 1994, Subject: regulatory policies

Before the Minnesota Public Utilities Commission, prepared direct testimony on behalf of Minnegasco (Arkla) G-008/GR-93-1090, June 1994, Subject: Affiliate regulatory policy

Before the Utah Public Service Commission, prepared rebuttal testimony for Questar Gas Company, Doc 98-057-12, April 26,1999, Subject: Pipeline gas quality

Before the Utah Public Service Commission, prepared rebuttal testimony on behalf of Questar Gas, Doc 99-057-20, May 24, 2000, Subject: CO2 removal costs and gas policy

Before the Wisconsin Public Service Commission, prepared testimony on behalf of Wisconsin Power & Light Company (Alliant Energy), CPCN No. 6680-CE-176, 2015 Subject: New powerplant options,

Before the Arizona Corporation Commission, filed written testimony on behalf f the Arizona Investment Council, APS Docket E-01345A-16-0036, December 21, 2016, Subject: Electric rates

Before the Idaho Public Utilities Commission, prepared direct testimony on behalf of Intermountain Gas Company, Case No. INT-G-16-02, August 12, 2016, Subject: Cost of service and rate design

Before the Idaho Public Utilities Commission, prepared rebuttal testimony on behalf of Intermountain Gas Company, Case No. INT-G-16-02, February 15, 2017, Subject: Cost of service and rate design

Before the Michigan Public Service Commission, prepared rebuttal testimony on behalf of the Upper Peninsula Power Company, Case No. U-18467, July 17,2018, Subject: Depreciation policy

Before the United States Bankruptcy Court for the District of Delaware, prepared testimony on behalf of Platte River Midstream LLC, DJ South Gathering LLC and Platte River Holdings and Grand Mesa Pipelines, LLC in Extraction Oil & Gas Inc. Case No. 20-11548, October 1, 2020, Subject: FERC practice in determination of the "public interest"

Before the Federal Energy Regulatory Commission, filed direct testimony of behalf of ETC Rover LLC Rover Pipeline LLC Dockets No. RP20-1233-000, October 17, 2020 Subject: Abrogation of FTSA

Before the United States Bankruptcy Court for the Southern District of Texas, Houston Division, prepared testimony on behalf of ETC Tiger Pipeline LLC in Chesapeake Energy Corporation et al Case No. 20-33233 Chapter 11, October 21, 2020 Subject: FERC practice in determination of "public interest"

Before the Federal Energy Regulatory Commission, filed rebuttal testimony of behalf of ETC Rover LLC Rover Pipeline LLC Dockets No. RP20-1233-000, October 26, 2020 Subject: Abrogation of FTSA

Before the United States Bankruptcy Court for the District of Delaware, prepared testimony on behalf of Platte River Midstream LLC, DJ South Gathering LLC and Platte River Holdings and Grand Mesa Pipelines, LLC in Extraction Oil & Gas Inc. Case No. 20-11548, October 27, 2020, Subject: FERC practice in determination of the "public interest"

LEGISLATIVE TESTIMONY

Before the United States House of Representatives, Committee on Energy and commerce, Subcommittee on Energy and Power, May 7, 1987 testified on behalf of self, Subject: Electric utility regulation

Before the United States House of Representatives, Committee on Ways and Means, testified on behalf of self, October 4, 1989 Subject: H.R. 2493 and H.R. 1150 Utility Refund Act
Before the United States Senate, Committee on Energy and Natural Resources, testified on behalf of self, September 28, 1990 Subject: Nomination to be a Member of the Federal Energy Regulatory Commission (FERC)

Before the United States Senate, Committee on Energy and Natural Resources, testified on behalf of self, October 2, 1991 Subject: Nomination to be a Member of the FERC

Before the House of Representatives,, Committee on Government Operations States, Subcommittee on Environment, Energy and Natural Resources, representing self as Commissioner FERC, January 16, 1992, Subject: Review of Ex Parte matters

Before the United States House of Representatives, Subcommittee on Energy and Natural Resources, March 3, 1993, testified as a FERC Commissioner, Subject: Electric industry issues
Before the United States Senate Committee on Labor Issues, testified o behalf of self, March 22, 1994, Subject HB 1405

Before the United States House of Representatives, Subcommittee on Energy and Mineral Resources, 2004, testified on behalf of self, Subject: Energy supply

Branko Terzic Speeches 1999-2021

1999

1. September 1, 1999 DTCE Electric Seminar, Four International Trends in Electricity, Prague, Czech Republic
2. September 9, 1999 IBM Electric Utility Seminar, Business Transformation for Electric Utilities, Karlovy Vary. Czech Republic
3. September 30, 1999 The FINANCIAL TIMES PJM Power Markets Conference, Changing Industry, Philadelphia, PA
4. October 19, 1999 Capital Area Energy Association Seminar, Reregulation of Electricity Markets, Washington, DC
5. October 28, 1999 PowerMart '99 Conference, Applying Drucker in Electric Utility competition", Houston, TX
6. November 15, 1999 EXNET Utility Directors Workshop, The Future of gas and Electric Companies: Is Convergence the Only Answer, Naples, FL
7. December 13, 1999 MPR Annual Business Planning Meeting, Engineers and Power, Washington, DC
8. December 17, 1999 University of Minnesota 1999 Symposium, Electric Choice, Minneapolis, MN

2000

9. February 3, 2000 Energy Bar Association seminar, Pipes & Wires Strategies, Washington, DC
10. February 14, 2000 Royal Society For the Encouragement of Arts, commerce & Manufacture Annual lecture Series, Energy & the Consumer: lessons from the 20th century, London, United Kingdom
11. March 3, 2000 Milwaukee Area Chamber of Commerce Energy Forum 2000, Changes and Opportunities in Electric and Gas Industries", Milwaukee, WI
12. May 3, 2000 American Gas Association and National Association of Regulatory Utility Commissioners Committee on Accounting annual meeting, Natural gas For the 21st Century, Washington, DC
13. June 6, 2000 New York Power Markets Conf., New York, NY
14. June 8, 2000 National Economists Club, Electric Restructuring , Washington DC
15. June 15, 2000 Natural Gas Roundtable, European gas Trends, Washington, DC
16. June 28, 2000 Workshop for CONEL, Competitive Markets, Bucharest Romania
17. July 10, 2000 Natural gas Summit, Roadmap to the Future, Colorado Springs, CO
18. September 8, 2000 Workshop on Privatization, Valuation of Electric Utilities, Podgoritza, Montenegro
19. September 27, 2000 National Association of Water Companies, M&A In the Water Industry, Boston, MA
20. September 28, 2000 Utility Women's leadership Conference, M&A Winners and Losers, Arlington, VA
21. October 13, 2000 18th Annual ELCON conference, Selling and Buying Gas, Washington, DC

22. October 18, 2000 National Press Conference, Deloitte Consumer Opinion Survey Press conference, Washington DC
23. October 27, 2000 Foreign Service Institute, US Dept. of State, US Liberalization of Electric Markets, Arlington, VA
24. November 14, 2000 Rockford Institute Center for International Affairs, Business prospects in New Yugoslavia, Washington, DC
25. November 16, 2000 FPL Client Seminar, Inside FERC Order 2000, Juno Beach, FL
26. November 29, 2000 National Association of Regulatory Utility Commissioners-Department Of Energy North American Summit, Vision for the Summit, Dallas, TX
27. December 7, 2000 Croatian Electric Company "HEP" Supervisory Board Presentation on the California Energy Crisis, Zagreb, Croatia
28. December 19, 2000 Global Resources Group Training program, How Deregulation Works, Prague, Czech Republic

2001

29. January 24, 2001 Briefing Kiplinger editorial Board, Energy Deregulation, Washington DC
30. February 5, 2001 Polish Power Grid Co. Supervisory Board, briefing California Energy Crisis, Warsaw, Poland
31. February 6, 2001 Polish Utility regulatory Agency briefing California Energy crisis, Warsaw, Poland
32. February 26, 2001 US Energy Association and US Agency for International Development staff, California Energy Crisis, Washington, DC
33. March 2, 2001 State Power Corporation of China and Bank of China delegations, International Restructuring, New York, NY
34. March 8, 2001 Greater Milwaukee Chamber of Commerce 2001 Energy Symposium, The World-wide Energy Picture, Milwaukee, WI
35. March 15, 2001 Duane, Morris & Public Affairs Management LLC Energy in New Administration Conference, World Utility Challenges, Washington, DC
36. March 29, 2001 Edison Electric Institute Conference and Exposition, Core Utility Business, Chicago, IL
37. April 4, 2001 ENEKON 2001 Conference, Multi-Utility Perspectives, Prague, Czech Republic
38. April 6, 2001 State Legislative Leaders Foundation Third International Leadership Issues Conference , International Investment in Electricity infrastructure, Cologne, Germany
39. April 10, 2001 USAID Electricity Management Development Institute & Polish Power Grid Company, California's Electric System Crisis, Warsaw, Poland
40. April 10, 2001 USAID EMDI State of Electricity Restructuring, Warsaw Poland
41. April 12, 2001 USAID EMDI Romanian Executives Briefing, California Crisis, Bucharest Romania
42. April 12, 20001 USAID EMDI Romanian Executive Briefing, Status of US Electric Restructuring, Bucharest Romania

43. April 20, 2001 Center for Advancement of Energy Markets, commentary at Distribution Company of the Future Forum
44. April 24, 2001 Deloitte China Staff training, Principles of Regulation, Beijing China
45. April 25, 2001 China State Council Office for Restructuring Economic Systems' International Symposium on Restructuring and Regulation of China's Electricity Industry, International Restructuring, Beijing, China
46. April 27, 2001 Yugoslav Waterworks Association Water Conference, Trends in Water, Belgrade, Yugoslavia
47. May 3, 2001 Yugoslav Regulation Seminar "Utility Operations", Belgrade, Yugoslavia
48. May 3, 2001 Yugoslav Regulation Seminar "Principles of Regulation", Belgrade Yugoslavia
49. June 11, 2001 System Integration Conference, New Network Industries, Prague, Czech
50. June 26, 2001 Capital Group Companies Board of directors, Do we have a US Energy vision or not? Washington, DC
51. August 2, 2001 American Legislative Exchange Council 28th Annual Meeting, Energy for the New Century, Washington, DC
52. August 21, 2001 Deloitte Northeast Utility conference, California Energy Crisis, President's Energy Plan, Absecon, NJ
53. September 10, 2001 Electricity Transmission Conference 2001, Streamlining Transmission Build, Arlington, VA
54. September 22, 2001 Maryland- EDC Utilities Association 77th Fall Conference, Future of deregulation, Ocean City, ND
55. September 24, 2001 North American gas Supply Symposium, The One and Only deregulation, Houston, TX
56. October 26, 2001 US Foreign Service Institute / Business Council for International Understanding (BCIU) Power Generation Training Program, Intro to the Electricity Sector, Arlington, VA
57. November 2, 2001 New England – Canada Business Council, 9th Annual US-Canada Energy Trade & technology Conference, Do Energy markets Work, Boston, NA
58. November 27, 2001 Restructuring Polish Power Conference, Value and International Energy Development, Warsaw Poland

2002

59. February 19, 2002 ENERKON 2nd Congress, Regulation and Valuation, Prague, Czech
60. April 18, 2002 New Jersey Association of Energy Engineers Annual Conference, A brief view of World Energy, Woodbridge, NJ
61. April 25, 2002 Energy Regulators Regional Association, First Investment Conference, Investment Opportunities and Barriers: The Effect of Government Policy, Budapest, Hungary
62. June 4, 2002 US Energy Association, US AID Energy Industry partnership program Executive Exchange, Restructuring in the US, Boston, MA

2003

63. January 8, 2003 NCAC International Association for Energy Economics, 2003 Power Markets, Washington, DC
64. January 14, 2003 New Jersey Resources Board Dinner, Current Issues, Trenton, NJ
65. February 5, 2003 EEI/DOE Russia Electricity Markets, Houston, TX
66. February 14, 2003 CERA Week / International Regulators Roundtable, Houston, TX
67. March 13, 2003 Energy Bar Association Chapter, New York, NY
68. March 18, 2003 New Mexico Institute of Public Utilities, Santa Fe
69. March 31, 2003 Global Power Conference, New Orleans, LA
70. April 11, 2003 MMAC 6th Annual Energy Symposium, Milwaukee WI
71. April 22, AABE, Philadelphia PA
72. May 8, 2003 ERRA Annual Energy, Budapest, Hungary
73. June 11, 2003 3rd Balkan power Conference, Sinaia, Romania
74. August 17, 2003 Deloitte Northeast Utility Conference, Absecon, NJ
75. October 5, 2003 World Forum on Energy Regulation, Rome Italy
76. June 18-20, 2003 Deloitte Energy Conference presentation D&T Survey of Investor Confidence
77. June 30, 2003 Standard & Poor's 2003 Utility & Energy seminar, Restructuring the Electric Industry, New York, NY
78. July 1, 2003 Mid-American Conference of Regulatory Utility Commissioners 8th Annual Convention, Standard Market Design, Hot Springs, WV
79. July 29, 2003 NARUC Summer Committee meetings, Ring fencing Techniques and Affiliate Abuse Issues, Denver, CO
80. July 31, 2003 Energy Summit 2003, Regulatory benchmark in gas, Rio de Janiero, Brazil
81. September 8, 2003 Society of Depreciation Professionals, 17th Annual Meeting, FERC Update, Jackson Hole, WY
82. September 16, 2003 North American Energy Standards Board 2nd Annual Meeting, Energy Market Place: Then and Now, Austin, TX
83. September 22, 2003 SEAROR, Regulatory issues, Pinehurst, NC
84. October 23, 2003 Business Council for International/ Foreign service Institute, Understanding Power Generation Training program, Regulation of US Electric Industry, Arlington, VA
85. November 16, 2003 National Association of Regulatory Utility Commissioners 115th Annual convention, Committee on International Relations, International Regulatory Trends, Atlanta, GA

2004

86. March 25, 2004 Deloitte GEM's Training Week, US Federal Energy policy, San Jose, CA
87. March 31, 2004 Electric Power 2004 Conference & Exhibition, Power Industry Trends to 2010, Baltimore, MD
88. April 2, 2004 Metropolitan Milwaukee Chamber of commerce Energy Symposium 2004, National Regulatory Goals for Electricity, Milwaukee, WI
89. April 29, 2004 Hong Kong Regulatory conference, Luncheon keynote, Hong Kong, China

90. May 25, 2004 Deloitte Energy conference, Foreign investment: The Next wave, Washington, DC
91. June 9, 2004 U.S. Russia Business Council Power Sector Seminar, What is needed to advance reform, Washington DC
92. June 15, 2004 Mid-American Conference of Regulatory Utility Commissioners Annual Meeting, Electric and Gas company Financial, Madison, WI
93. June 16, 2004 US Energy Association 15th Annual Energy efficiency Forum, Market versus Mandate, Washington DC
94. July 28, 2004 Center for the Advancement of Energy Markets 5th Anniversary Dinner, Keynote Testimonial, Washington, DC
95. August 11, 2004 Securities & Exchange Commission / Deloitte Training session, Economic Characteristics of regulation, Washington, DC
96. September 15, 2004 North American Energy Standards Board Annual meeting, Austin TX
97. September 22, 2004 SCC/ LDC Seventh Annual Conference, Natural Gas, Charlottesville, VA
98. October 27, 2004 Business Council for International Understanding / Foreign Service Institute Electricity sector Training, Regulatory Models, Arlington, VA
99. November 18, 2004National Association of Energy Supply Companies 21st Annual Conference, Global Village: Energy Intensive and Politically Volatile, Newport Beach, CA
100. November 30, 2004 Deloitte Accounting, Financial reporting & Tax Update, Industry Development, Chicago, IL
101. March 11, 2005 Federal Energy & Environmental matters Conference 2005, Energy for the 21st Century, Washington, DC
102. March 21, 2005 The Santa Fe Conference Current Issues 2005, Keeping customers satisfied-what will it take, Santa Fe, NM
103. March 31, 2005 Deloitte Energy & Resources InSIGHT Virtual Classroom, Power & Utility Industry Outlook 2005, Washington, DC
104. April 8, 3008 Metropolitan Milwaukee Chamber of Commerce Energy Symposium 2005, Back to basics, Milwaukee, WI
105. April 13, 2005 Washington Coal Club, Power Regulation, Washington DC
106. April 25, 2005 NARUC Staff Sub Committee on Accounting & Finance, The Art of The Rate Case, St. Petersburg, FL
107. April 27, 2005 International Relief and Development briefing, Electrification Vital for Developing Societies, Washington, DC
108. May 24, 2005 2005 Sempra Global Financial Teporting Conference, How regulators look at non-regulated, San Diego, CA
109. June 6, 2005 Center for Energy markets 1st Annual Convention, Washington, DC
110. June 15, 2005 US Energy Association 16th Annual Energy Efficiency Forum, Understanding the Urgency, Washington DC
111. June 30, 2005 SEE Annual Conference & Trade Show, Rate case Challenges, Baltimore, MD
112. July 26, 2005 Banc of America Securities Meet a Commissioner Day, Regulation: limiting or Enabling Strategy, Austin, TX

113. August 22, 2005 Deloitte Northeast Energy b& Utility conference, Regulator's roundtable, Absecon, NJ
114. September 28, 2005 Bordeaux Energy Colloquium, 2005 Update, Cap Ferret, France
115. October 20, 2005 University of New Haven Executive MBA leadership Forum, Energy & Strategy, West Haven, CT
116. October 25, 2005 Energy Daily/ Edison Electric Institute Conference, The FERC Agenda, Washington, DC
117. November 2, 2005 Xcel Energy executive Forum, Future Outlook for Energy Policy, Amarillo, TX
118. November 15, 2005 Xcel Energy Executive Forum II, Global Energy Outlook, Eau Claire, WI
119. November 22, 2005 Columbia University SIPA, Electric Restructuring, New York, NY
120. November 25, 2005 Deloitte Accounting, Financial Reporting & tax Update, EPA of 2005: A Decades Progress, Chicago, IL
121. December 1, 2005 Banc of America New York Credit conference, Electric Utility outlook 2006, New York, NY
122. December 8, 2005 Edison Electric Institute International Electricity Briefing Teleconference, Investor Sensitivities, Washington, DC
123. December 9, 2005 American Gas Association Rate & regulatory Issues Audio Conference, Fixed Rate Sense, Washington, DC
124. December 19, 2005 Business Council for International Understanding / Foreign Service Institute US Electric and Gas Industries, Arlington VA

2006

125. January 11, 2006 Second Carnegie Mellon Conference in Electric Power Systems, Utility Regulation Affects Pace of technology Adoption, Pittsburgh, PA
126. January 23, 2006 IEEP Advisory Committee meeting, Update on Electricity Developments, Washington, DC
127. February 9, 2006 Women's Council on Energy & Environment See The Future Conference, Future of Good Business, Washington DC
128. February 17, 2006 Johns Hopkins University SAIS Energy Club, Energy & the Consumer, Washington, DC
129. April 7, 2006 Metro Milwaukee Chamber of Commerce 2006 Energy Symposium, Rate & Cost Trends, Milwaukee, WI
130. April 24, 2006 Washington Campus Seminar Federal Regulation, Washington DC
131. May 1, 2006 Washington Campus seminar, Federal Regulation, Washington, DC
132. May 3, 2006 MidAmerican Regulatory Finance Conference, Capital Markets & Regulation, Des Moines, IA
133. May 23, 2006 The NARUC Foundation, Rethinking rate design, Columbus, OH

134. June 5, 2006 CONGRESSIONAL QUARTERLY "Summit on Energy Exploration" (Virginia Beach, VA)
135. June 14, 2006 National Energy Efficiency Forum, panel moderator and commentator (Washington DC)
136. June 22, 2006 "Sweit Energii" World of Energy seminar (Warsaw, Poland)
137. August 21, 2006 Deloitte NEUC Commissioners' Panel moderator and commentator (Absecon, NJ)
138. Sep 7, 2006 CONGRESSIONAL QUARTERLY "Summit on Energy Exploration" (Washington, DC)
139. Sep 15, 2006 Bordeaux Energy Colloquium (Bordeaux, France)
140. October 5, 2006 Bonbright Public Utilities Center Conference, Panel moderator and commentator (Atlanta, Georgia)
141. October 11, 2006 World Energy Forum, Panel moderator "Roundtable on Investment in Energy Infrastructure" (Washington, DC)
142. October 25, 2006 Electric Power Supply Association Regulatory Conference Panel Moderator and commentator
143. November 29, 2006 UN Economic Commission for Europe (UNECE), Chairman, Panel moderator and speaker Geneva Switzerland

2007

144. January 31, 2007 GOVERNING magazine speech "Expanding Energy Resources in a Warming World" National Press Club, Washington, DC
145. February 8 Columbia University lecture to the Graduate School "Principles of Utility Ratemaking" New York, NY
146. February 22, 2007 US Energy Association/ US Department of State briefing on "Role of Regulator" for Republic Tajikistan Deputy Prime Minister and delegation
147. March 5, 2007 US Energy Association/World Energy Council commentator at "Nuclear Power Europe" briefing with Andre Callie, WEC Chairman
148. March 13, 2007 Department of Energy/US Energy Association Briefing "Carbon Sequestration: The Way Forward" guest commentator on regulation, Washington DC
149. March 19, 2007 speech "Regulation and Investment" UN Economic Commission for Europe Committee on Sustainable Energy meeting of Committee of Ad Hoc Experts, Geneva Switzerland
150. March 23, 2007 briefing for World Energy Council directors on RSA's Carbon Limited carbon trading program London, UK
151. March 26, 2007 Roundtable participant for Blank Rome LLC "Climate Change and Energy Policy" Washington, DC
152. April 9 Deloitte live broadcast "DBrief" with Joseph Stanislaw on "The Impact of the New Congress on the Energy Industry" Washington, DC
153. April 26 Congressional Quarterly magazine speaker for Energy & Climate Change program Washington, DC
154. April 24, 2007 lecture on "Distribution Regulation" for CEZ client executives visiting US Washington DC

155. April 27, 2007 speech Sino-US Energy & Market Development Conference Houston, TX
156. May 9, 2007 speech Boeing Company 13th Annual Energy Resources and Conservation Conference Houston, TX
157. June 4, 2007 speech Canadian Embassy for Canada – US Relations conference "Climate Change Initiatives"
158. June 11, 2007 four lecture on 4 topics for the State Electricity Regulatory Commission of China, Beijing, China
159. June 13, 2007 summary speech at the Energy Efficiency Forum, National Press Club Washington, DC
160. June 19, 2007 speech at 3rd World Energy Council North American Regional Forum, Halifax, Nova Scotia Canada
161. June 27, 2007 dinner speech North American Energy Standards Board Austin Texas
162. July 24, 2007 speaker at the 100th Anniversary Wisconsin Public Service Commission, Madison WI
163. July 25, 2007 speaker for Canadian Electricity Association meeting on "Depreciation Primer" via teleconference
164. July 26, 2007 speech at USEA for Regional Electricity Market Study Tour Central Asia delegations: Kazakhstan, Kyrgyzstan, Tajikistan
165. August 20, 2007 panel moderator Deloitte's Northeast Utility and Energy Conference Seaview, NJ
166. September 7, 2007 speaker Deloitte regional training Las Vegas, NV
167. September 17, 2007 Keynote speech "Energy & Consumers: lessons for the 21st century" for annual convention of the International Association for Energy Economics in Houston, TX
168. September 20, 2007 lecture EEI/ AGA Beyond the Board Room "Federal Regulation"
169. October 3, 2007 speech "Homage to Professor Bonbright" at the annual conference Bonbright Utilities Center of the University of Georgia, Atlanta Georgia
170. October 4, 2007 lecture on "regulation" for Thailand Pipeline for Robert Svoboda and GE
171. October 18, 2007 lecture at Hamline University "Efficiency" Minneapolis, MN
172. October 24, 2007 briefing for PA PUC Chairman and staff on energy in Balkans Harrisburg, PA
173. November 6, 2007 Wisconsin Public Utility Institute: Decoupling Conference moderator. Madison, WI also Web broadcast
174. November 27, 2007 Opening speech at UN ECE meeting of Ad hoc Group of Experts on Clean Electricity production Geneva, Switzerland
175. November 28, 2007 Panel speech UN ECE Special Session: Investing in and Financing the Hydrocarbon Sector to Enhance Global Energy Security
176. December 12, 2007 introduction of Dr. Joseph Stanislaw at NAESB Board dinner Houston, TX

2008

177. January 9, 2008 speaker on "Clean Energy" British-American Business Association luncheon Washington DC
178. February 5, 2008 speech on "Regulatory Issues" at U.S. Department of Commerce Conference "Powering Our Low Carbon Future" Washington, DC
179. February 6, 2008 acceptance speech Women's Conference on Energy and Environment Annual Dinner "Champion" Award at the Willard Hotel Washington, DC
180. February 11, 2008 speech "The Future of Midwest Energy; Coping with Climate Change", Wisconsin Politics, Madison WI
181. February 12, 2008 "Scenarios for Green Energy in the Americas", Investment Roundtable participant sponsored by the Inter-American Development Bank, Washington, DC
182. February 17, 2008 NARUC International Committee Meeting panel on "China", Washington, DC
183. February 28, 2008 briefing Pennsylvania Public Utility Commission NARUC/USIAD Partnership program
184. March 5, 2008 RKS Seminar "Putting Energy Efficiency to Work" Dallas-Fort Worth International Airport, TX
185. March 6, 2008 Council on Competitiveness Energy Workshop (Deloite is corporate sponsor) Westfields, VA
186. March 7, 2008 Northeastern University EMBA lecture ENERGY AND REGULATION -- WHAT THE BUSINESS COMMUNITY SHOULD KNOW, Ronald Reagan International Center, Washington, DC
187. March 13, 2008 speaker Deutsche Bank Institutional Investor luncheon for Adam Sieminski, Washington, DC
188. March 20, 2008 speaker National Real Estate Investment Trust "Sustainability" panel Scottsdale, AZ
189. March 28, 2008 speaker Deloitte Canadian Power & Utilities training Webcast for Jane Allen (Toronto, CA)
190. March 31, 2008 keynote speaker Deloitte's Southeast Public Utility Accounting Workshop, Doral Miami FL
191. March 13, 2008 panelist International Energy Agency, US DOE Carbon Capture Workshop Washington, DC
192. April 10, 2008 dinner speech 40th Forum of the Society of Utility Regulatory and Financial Analysts at Georgetown University, Washington DC
193. April 16, 2008 panelist Enterprise Resource Management Symposium Chicago, IL
194. April 18, 2008 speech and press conference "NPC Hard Truths: Global Energy" , Serbian-American Center, Belgrade Serbia
195. April 21, 2008 speech for Energy Regulators Regional Association (Eastern Europe) assigned topic "How Have Current Incentives Worked for Renewable Investment" 7th ERRA Energy Investment and Regulation Conference, Budapest, Hungary
196. April 24, 2008 speech Deloitte Energy & Resources Update for Greater Washington, "Challenges and Opportunities for Power & Utilities"
197. May 1, 2008 speech for the Energy Bar Association's Annual Meeting, Ronald Reagan International Center, Washington DC

198. May 14, 2008 panel moderator International Energy Agency, Carbon Capture Regulators workshop Paris, France
199. May 19, 2008 Deloitte 2008 Energy Conference, Survey Press Conference Washington, DC
200. May 20, 2008 panel moderator "Regulation" Deloitte Energy Conference
201. June 3-4, 2008 Competitiveness Council III, "Discover Demand Drivers for Sustainable Energy Solutions-Suppliers" Airlie, VA
202. June 5, 2008 panelist/ speaker Ontario Electric Policy Workshop, Toronto, Canada
203. June 5, 2008 dinner remarks Deloitte Canada energy dinner
204. June 11, 2008 speaker Energy Efficiency Forum, Washington, DC
205. July 24, 2008 speech NARUC "*The Implications of Climate Change Policy for State Regulators: A Practical Guide"* Portland OR
206. August 7, 2008 speaker Interstate Natural Gas Pipeline Association of America (INGAA) Rockport, Maine
207. August 11, 2008 panel on "The 2008 Political Landscape" Deloitte Northeast Utility & Energy Conference, Seaview, NJ
208. August 12, 2008 moderate panel "Regulator's Roundtable: A Focus on Renewable Energy" NEUC Seaview, NJ
209. September 11-15, panelist Bordeaux Energy Colloquium Cap Ferrat, France
210. September 19, 2008 luncheon speaker "IT and Energy" Information Technology Industry Council luncheon Washington, DC
211. September 29, 2008 training for Pipelines Denver, CO
212. September 30- October 1, 2008 lecturer for University of Wisconsin Executive Education for CMS Corp, South Haven. MI
213. October 3, 2008 speaker "Challenges of a Dynamic Energy Economy" National Council of Minorities in Energy Washington, DC
214. October 22, 2008 briefing for Deloitte new global energy partners New York, NY
215. October 23, 2008 remarks at CRO dinner Deloitte clients and prospects Houston, TX
216. October 28, 2008 lecture Edison Electric Institute "Beyond the Boardroom" briefing for corporate directors, Washington, DC
217. October 30-31, 2008 speaker at Council on Competitiveness Workshop: Risk Intelligence and Resilience, DuPont Hotel Wilmington, Delaware
218. November 10, 2008 presenter for McDermott Will & Emery Energy & derivatives web broadcast on "FERC and CFTC" Washington, DC
219. November 12, 2008 speech Ontario Energy Association, Toronto, Canada
220. November 17-18, 2008 opening remarks speaker/Chairman UN ECE Ad Hoc Group of Experts on Cleaner Electricity production from Coal and Other Fossil Fuels Meeting in Geneva, Switzerland
221. December 1, 2008 speech at US Energy Association "Combined Heat & Power" seminar Washington, DC
222. December 4, 2008 comments at Deloitte Energy & Resources event National Press Club

223. December 5, 2008 speaker Wisconsin Public Utility Institute, Madison, WI
224. December 9, 2008 speaker Toronto Forum for Global Cities topic of "Energy a Key Component of a City's Competitiveness" Toronto, Ontario Canada
225. December 10, 2008 panel moderator Deloitte Oil & Gas Conference Houston, TX
226. December 19, 2008 speech Edison Electric Institute International Committee Meeting in Washington, DC

2009

227. January 23, 2009 training lecture Deloitte Consulting utilities 101
228. February 15, 2009 speaker National Association of Regulatory Utility Commissioners Winter Meeting International Committee, Washington, DC
229. February 16, 2009 panel speaker Edison Electric Institute luncheon at NARUC Winter Meetings, Washington DC
230. March 27, 2009 speaker Columbia University Energy Symposium New York, NY
231. March 20, 2009 video conference Deloitte's "Books with Branko", McLean, VA
232. April 1, 2009 speaker Deloitte's Northeast E&R learning Summit, New York, NY
233. April 3, 2009 speaker Women in International Trade (WIT) and Women's Council on Energy & Environment Sustainability Committee, USEA Washington DC
234. April 7, 2009 speaker panel Carbon Trade-Ex America Washington, DC
235. April 10, 2009 lecturer WCEE "101" Lecture on Understanding the Public Utility Washington, DC
236. April 20, 2009 Commissioner Survey Press conference, Washington DC
237. April 27, 2009 panel member EEI E-Forum on "Cost of Capital" Internet based
238. April 28, 2009 speaker EEI International Committee German Feed-In Tariff, Washington DC
239. April 30, 2009 speaker Illinois State University Energy Conference Springfield, Il
240. May 14, 2009 opening comments UN ECE AHGE Geneva, Switzerland
241. May 16, 2009 acceptance speech Chancellor's Reception UW-M Milwaukee, WI
242. May 17, 2009 Commencement speech #1 University of Wisconsin Milwaukee Commencement Milwaukee, WI
243. May 17, 2009 Commencement speech #2 University of Wisconsin Milwaukee
244. May 19, 2009 panelist 1:00 PM Customer Services Week/UtilitPoint Conference
245. May 19, 2009 speaker 3:45 PM Customer Services Week/UtiliPoint Conference Washington DC

246. May 27, 2009 speech AGA Foundation for gas CEO's in Washington DC June 10. 2009 Washington Campus
247. June 10, 2009 EEI FORUM Rate School web lecture on "Performance Based Ratemaking" Washington, DC
248. June 16, 2009 lecture Maxwell School of Syracuse University on "Obama Administration Energy Policy"
249. August 11, 2009 keynote The 2009 Green Building Summit, Richmond VA co-sponsored by Virginia Tech
250. August 11, 2009 moderate panel on Policy 2009 Green Building Summit
251. August 17, 2009 IQPC speech IQPC Conference Smart Grid, Washington DC
252. August 18, 2009 Deloitte NEUC panel moderator Jersey City, NJ
253. August 19, 2009 speech and panel moderator Smart Grid Implementation Summit McLean, VA
254. August 31, 2009 keynote speech World Energy Forum/ United Nations New York, NY
255. September 3-7, 2009 panel at Bordeaux Energy Colloquium, Cap Ferret, France (on planning committee)

256. September 10, 2009 panelist CLEAN TECH conference Boston, MA
257. September 13, 2009 speech American Gas Foundation Board meeting, Williamsburg, VA
258. September 18, 2009 panelist NARUC International Program Serbian Regulators Luncheon, Washington DC
259. September 28, 2009 lecture on Revenue Requirement for Johns Hopkins University SAIS and Amer. Assoc. Energy Economists
260. September 28, 2009 speech update WORLD CRISIS at Washington Campus book event National Press Club, Washington, DC
261. October 5, 2009 commentator CERA Fueling America's Future Workshop Washington, DC
262. October 6, 2009 lecture to executive MBA program Hunan University, Washington, DC
263. October 6, 2009 welcome remarks to Washington Energy Diplomats luncheon, USEA Washington, DC
264. October 18-21, 2009 panel moderator World Forum on Energy Regulation, Athens Greece (on planning committee)
265. October 26-27, 2009 speaker AGS/EEI Beyond The Boardroom program Washington, DC
266. October 30, 2009 speaker Rural Utilities Administration / Cooperative Finance Corporation executive seminar Herndon, VA
267. November 4, 2009 moderator Deloitte/ Ballard & Spahr FERC compliance webinar, webcast
268. November 6, 2009 speaker University of Michigan- Global Operations Conference, Ann Arbor Michigan
269. November 9, 2009 panelist Eisenhower Strategy Forum, Washington DC
270. November 13, 2009 speaker Deloitte P&U Trends and Developments web cast

271. November 18, 2009 opening remarks UN ECE Ad Hoc Committee Geneva, Switzerland
272. November 19, 2009 report to UN ECE Committee on Sustainable Energy, Geneva, Switzerland
273. November 30, 2009 lecture Johns Hopkins University, School of Advanced and International Studies – "COS and Rate design"
274. December 1, 2009 speaker Empower Ideas Top 10 (Deloitte Canada) webcast
275. December 2, 2009 panel Energy Advisory Council of the NEW AMERICA FOUNDATION Washington DC
276. December 8, 2009 facilitator and discussion leader Deloitte Oil and Gas Institute - The Woodlands, Texas
277. December 9, 2009 panel moderator, Deloitte Oil & Gas Conference The Woodlands, TX
278. December 9, 2009 press conference Deloitte Oil & Gas Conference

2010

279. January 11, 2010 speaker INFOCAST Projects & Money Conference New Orleans, LA
280. January 14, 2010 Eisenhower Forum, Lotos Club, New York NY
281. February 10, 2010 Charlotte, NC
282. March 4, 2010 speech National Association of Manufacturers Board of Directors meeting, California
283. March 22, 2010 Deloitte speech SEPAUW Orlando, FL
284. March 23, 2010 moderator for panel Natural Gas Roundtable Washington, DC
285. April 22, 2010 speech for Cooperative Finance Corporation CEO Roundtable New York, NY
286. June 7-8, 2010 Deloitte Energy Conference
287. June 7-8, 2010 Deloitte Energy Conference
288. June 10, 2010 speech annual convention Cooperative Finance Corporation Forum Philadelphia, PA
289. June 16, 2010 speech The Atlantic Council Prague, Czech
290. June 20, 2010 speech International policy Group Brussels, Belgium
291. June 29, 2010speech Syracuse University Graduate School, Washington, DC
292. August 1, 2010 speech Alliant Corp. Board of Directors meeting
293. August 10, 2010 speech Green Buildings, Richmond VA
294. August 11, 2010 briefing Deloitte Chiefs of Staff meeting, Washington DC
295. August 13, 2010 speech Valve Manufacturers Assoc., San Francisco, CA
296. September 8. 2010 speech US DOE CHP conference
297. September 11, 2010 speech Georgetown University Energy conference
298. September 14, 2010 moderator UNECE AHGE & E8 World Energy Conference Montreal Canada
299. September 20, 2010 TV interview POLITIKA Belgrade, Serbia
300. September 23, 2010 panel moderator Deloitte Northeast Utility & Energy Conference Jersey City, NJ

301. September 27, 2010 keynote speaker Society of Depreciation Professionals Saint Louis, MO
302. September 27, 2010 workshop leader SDP training St. Louis, MO
303. September 30, 2010 moderator Deloitte Alternative Energy conference Dallas, TX
304. October 5, 2010 training PSEG CFO, Newark, NJ
305. October 7, 2010 Books with Branko, Washington DC
306. October 12, 2010 speech Carnegie Endowment "Natural Gas" Washington, DC
307. October 13, 2010 summary report US Department of Energy / US Energy association CHP Dialogue San Francisco, CA
308. October 20, 2010 speaker DBRIEF on Smart Grid Washington DC
309. November 17, 2010 summary report US Department of Energy / US Energy association CHP Dialogue Houston, TX
310. November 21-23, 2010 opening speech UN ECE Ad Hoc Group of Experts, Geneva, Switzerland
311. November 24, 2010 report to the UN ECE Committee on Sustainable Energy
312. November 30, 2010 keynote Deloitte Fall Accounting, Financial reporting and Tax Update seminar Chicago,
313. December 10, 2010 Books with Branko interview with Lord Lawson "A Call to Reason: A Cool look at Global warming."

2011

314. January 13-16, 2011 Le Cercle panelist international policy meeting New York, NY
315. January 27, 2011 speech Argus Crude Summit, Houston, Dallas, TX
316. February 13, 2011 speech NARUC International Committee, Washington, DC
317. March 8, 2011 ICER International Gas Union Workshop Washington, DC
318. March 10, 2010 speech Petrobras Investor Conference, Philadelphia, PA
319. March 10, 2011 welcome remarks Petrobras regional supplier conference, Philadelphia, PA
320. March 17, 2011 moderator Deloitte Energy Book Club "Books with Branko", Washington, DC
321. March 28-29, 2011 Intro presentation UN ECE Geneva, Switzerland
322. March 30, 2011 moderator DOE/USEA Combined Heat and Power Conference Washington, DC
323. April 4, 2011 speech Deloitte Canada Knowledge East, Toronto, Canada
324. April 4, 3011 Ontario Power Generation briefing Toronto
325. April 5, 2011 Ontario Energy Board speech Toronto, Canada
326. April 5, 2011 speech Women in Energy, Toronto, Canada
327. April 7, 2011 panelist Smart Grid conference University of Texas, Austin, TX
328. April 28-29. 2011 Deloitte Oil & Gas College global speech, Houston, TX
329. May 10, 2011 speech CFC Auditors Conference , Reston, VA
330. May 12, 2011 opening remarks UN ECE meeting Geneva, Switzerland
331. May 19, 2011 moderator Deloitte Energy conference, Washington, DC

332. June 2, 2011 e8 / UN Global Summit, UN New York
333. June 6, 2011 Deloitte Canada Summit, Toronto, CA
334. June 7, 2011 SNL Energy Power Policy Forum, keynote speaker New York, NY
335. June 15, 2011 Deloitte Books with Branko broadcast Washington, DC
336. June 23, 2011 Syracuse University Graduate program guest lecture, Washington DC campus
337. July 25, 2011 Women in Nuclear Conference, speech St. Louis, MO
338. July 27, 2012 CMS Energy Training, lecture, Lansing, MI
339. September 2, 2011 Georgetown University Energy Conference Washington, DC
340. September 11, 2011 Northeast Independent Power Producers, speech Union, Washington
341. September 16, 2011 Ontario Energy Association annual convention speaker, Niagara Falls, Canada
342. September 21, 2011 Deloitte Alternative and Renewable Energy Seminar, Scottsdale, AZ
343. September 22, 2011 Speech PG&E Forum San Francisco, CA
344. September 23, 2011 Deloitte Books with Branko Broadcast
345. September 26, 2011 Johns Hopkins University School of Advanced and International Studies (SAIS) lecture I Public Utility Revenue Requirement, Washington DC
346. September 27, 2011 Women in Nuclear - DC Chapter, Washington, DC
347. October 3, 2011 Johns Hopkins University SAIS lecture Cost of Service and Rate Design II, Washington DC
348. October 4, 2011 Deloitte Books with Branko Washington, DC
349. October 5, 2011 Hunan University & Chamber of Commerce Delegation (China) Washington Campus Washington, DC
350. October 13, 2011 BP Executive Dinner and Roundtable Discussion, Washington DC
351. October 19, 2011 University of Texas Energy Poll release, introduced as advisor Washington, DC
352. October 25, 2011 AGA-EEI Beyond the Boardroom lecture for new Directors, Washington, DC
353. October 30, 2011 World Energy Council Houston Business Forum, Houston Texas
354. November 14, 2011 UN ECE Ad Hoc Committee, speech, Geneva, Switzerland
355. November 18, 2011 Croatian Energy Association 20th Forum Zagreb, Croatia
356. November 22, 2012 International Press Freedom Dinner, Argus Media, Guest New York, NY
357. December 9, 2011 Deloitte Books with Branko Broadcast
358. December 19, 2011 International Association for Energy Economics-National Capitol Chapter, speech, Washington, DC

2012

359. January 7, 2012 Awakening, Energy speech, Charleston, SC

360. January 12, 2012 Washington Campus, lecture, University of Texas and Emory University, Washington, DC
361. January 25, 2012 Energy Central Webcast - EnergyBiz Leadership Series Washington, DC
362. February 2, 2012 University of Texas Energy Forum, "National Energy Policy – The Search Continues" opening comments and panel, Austin TX
363. February 3, 2012 "Friday Caucus" An interview conference call on "Current Issues in Regulation" with State PSC Commissioners, Washington, DC
364. February 24, 2012 "Energy 101" lecture for Deloitte Consulting, McLean, VA
365. March 15, 2012 Washington Campus, Washington, DC
366. April 11, 2012 New York Times "Energy for Tomorrow: Fueling a Global Economy", panel member, The Times Center, New York, NY
367. April 26, 2012 National Environmental Balancing Bureau Annual Conference "Building a Bridge to The Future" Anaheim, CA
368. May 3, 2012, Washington Campus, Washington DC
369. May 11, 2012 National Grid – lecture and training New York, NY
370. May 22, 2012 Deloitte Energy Conference panel moderator, Washington DC
371.
372. June 13, 2012 AGA/ Georgetown Law School Executive Leadership Development Program lecturer, Washington, DC
373. June 14, 2012 Energy Efficiency Forum, Wrap-Up Speech, Washington DC
374. July 13, 2012 Books with Branko author interview Ken Green
375. July 18, 2012 Deloitte Briefing Integrated Generation, moderator, Washington DC
376. July 25, 2012 The Atlantic Council roundtable comments Washington, DC
377. August 7, 2012 Energi, Inc. Moderator on Webcast, Washington, DC
378. August 15, 2012 Energy Collective, webcast, Washington, DC
379. September 6, 2012 Energy Collective comments on webcast Washington, DC
380. September 7, 2012 Deloitte AERS E&R lunch and learn Houston, TX
381. September 10, 2012 Deloitte Northeast Energy & Utility conference, Panel Moderator, Newark, NJ
382. September 11, 2012 Webinar "Energy Risk and End of Coal"
383. September 19, 2012 Deloitte Alternative Energy Conf, Panel Moderator, Phoenix, AZ
384. October 18, 2012 Consulting Engineer magazine Chicago, IL
385. October 31, 2012 Georgia Tech University, "Energy Independence" panel, Atlanta, GA
386. November 8, 2012 George Washington University "Clean Tech" Class lecture, Washington DC
387. November 11, 2012 NARUC Subcommittee on Electricity – Energy Independence and Security – speech Baltimore, MD

388. November 13, 2012 Deloitte Oil & Gas Conference, Panel Moderator Houston, TX
389. November 14, 2012 The Atlantic magazine and The National Journal joint Energy Roundtable, Newseum, Washington, DC
390. November 28, 2012 Council on Foreign Relations Luncheon Moderator with EIA Administrator Adam Sieminski, Washington, DC

2013

391. January 10, 2013 lecture, Washington Campus, Washington DC
392. January 11, 2013 lecture, Washington Campus, Washington DC
393. January 21, 2013 Lecture, Webster University Geneva, Switzerland
394. January 22. 2013 Chairman and Presiding officer, UN Economic Commission for Europe Natural Gas Roundtable, Geneva Switzerland
395. January 31, 2013 Deloitte Japan Nuclear Forum, Tokyo Japan
396. February 8, 2013 lecture, Milwaukee School of Engineering Energy Engineers Chapter, Milwaukee, WI
397. February 8, 2013 lecture University of Wisconsin – Milwaukee College of Engineering, Milwaukee, WI
398. February 27, 2013 Presentation US Energy policy, visiting Romanian Delegation, Washington DC
399. March 12, 2013 Lecture, MBA class Purdue University, Washington Campus, Washington DC
400. March 13, 2013 BP Roundtable Discussion and Dinner, Washington, DC
401. March 27, 2013 presentation Books with Branko, Washington, DC
402. April 19, 2013panelist Society of Utility Regulatory Financial Analysts annual convention, Indianapolis, IN
403. May 2, 2013 National Environmental Balancing Bureau Annual Convention, keynote speech, Montreal, Quebec Canada
404. May 7-8, 2013 Canadian Association of Members of Public Utility Tribunals Annual Convention CAMPUT Keynote speech, Niagara Falls, Ontario, Canada
405. May 10, 2013 University of Michigan Carson Scholars lecture Washington Campus, Washington DC
406. May 15, 2013 speech for National Rural Utilities Cooperative Finance Corp., Dulles, VA (attest client)
407. May 16, 2013 Washington Campus, Washington DC
408. May 21-23 Deloitte Energy Conference Washington, DC
409. June 4,2013 panel on Natural Gas Power Sector, Center for Climate and Energy Solutions Natural Gas Report Launch, Washington, DC
410. June 12-13, 2013 Energy Efficiency Forum, summary speaker, Washington DC
411. July 28, 2013 US Association for Energy Economics Annual Convention, Anchorage AL
412. September 19-20, 2013 Deloitte Alternative & Renewable Energy conference, panel moderator, Phoenix, AZ
413. October 3, 2013 American Gas Association, Energy market Regulation Conference , Princeton Club, New York, NY

414. October 21, 2013 The International Conference on Thermal Treatment Technologies & Hazardous Waste Combustors (IT3/HWC) KEYNOTE speech San Antonio, TX
415. June 4,2013 panel on "Leveraging Natural Gas to Reduce Greenhouse Gas Emissions", Center for Climate Change and Energy Solutions, Washington, DC
416. June 13, 2013 Energy Efficiency Forum, summary speaker "Energy Efficiency in New Energy Economy", Washington DC
417. June 14, 2014 Deloitte Power & Utilities Simulation, Dallas TX
418. July 10, 2013 WCEE Opower Co. event introduction, Washington DC
419. July 28, 2013 US Association for Energy Economics Annual Convention, Anchorage AL
420. August 7, 2013 Webinar, Distributed Generation, Center for Climate and Energy Solutions, Washington, DC
421. September 11, 2013 Ontario Energy Association Energy Conference 2013, Panel Speaker, Toronto, CA
422. September 12, 2013 George Washington University School of Business "Intro to the Electric Utility Industry" Washington, DC
423. September 19-20, 2013 Deloitte Alternative & Renewable Energy conference, panel moderator, Phoenix, AZ
424. September 25, 2014 Washington Campus, China MBA's, Washington, DC
425. October 3, 2013 American Gas Association, Energy Market Regulation Conference, "Natural Gas Regulation", Princeton Club, New York, NY
426. October 8, 2913 Brookings Global Electricity and Technology Roundtable, panelist, Washington DC
427. October 21, 2013 The International Conference on Thermal Treatment Technologies & Hazardous Waste Combustors (IT3/HWC) keynote speech "Energy Independence and Security" San Antonio, TX
428. November 5, 2013 North Carolina Sustainable Energy Association annual conference keynote "Energy and Security" Raleigh, NC
429. November 12, 2013 UN ECE / Global Sustainable Electricity Partnership High-Level Dialogue on Strengthening Public Private Partnerships for Sustainable Energy and Energy Efficiency, Belgrade, Serbia
430. November 20, 2013 "Energy Independence and Security" Houston Chapter of the U.S. Association for Energy Economics, Houston TX

2014

431. January 9, 2014 Washington Campus, "Energy Policy" MBA students, Washington, DC
432. January 10, 2014 Washington Campus, "Energy Policy" MBA students, Washington DC
433. February 28, 2014 Greater Philadelphia Chamber of Commerce program "Energizing Our Region" panel Philadelphia, PA\
434. March 6, 2014 Grand Valley State University, Indiana University, Northeastern University, University of Michigan, University of Maine,

University of Texas at Austin, The Washington Campus MBA program "Energy Policy" Washington DC

435. March 13, 2014 The Washington Campus MBA program "Energy Policy" Washington DC
436. March 14, 2014 The Washington Campus MBA program "Energy Policy" Washington DC
437. March 18, 2014 National Association of Energy Service Companies, keynote Federal Market Workshop, Washington DC
438. March 26, 2014 Singapore Economic Development Board briefing, Washington, DC
439. March 26, 2014 Dept. of Defense 2014 Peace and Stability Operations Training and Education Workshop, "Importance of Regulation" George Mason University, Fairfax, VA
440. March 31-April 1, 2014 Deloitte SEPUAW Conference, Keynote Speech, Orlando, FL
441. April 24, 2014 Society of Utility Regulatory Financial Analysts annual convention, plenary panel "The Regulatory Compact Revisited", Indianapolis, IN
442. April 25, 2014 Society of Utility Regulatory Financial Analysts convention panel "Distributed Energy Resources - Impact on the Regulatory Compact", Indianapolis, IN
443. April 29, 2014 Brookings Global Electricity and Technology Roundtable, Washington, DC
444. May 13, 2014 Deloitte Energy Conference panel, Washington DC
445. January 5, 2015 National Rural Electric Cooperative Association, Legal Department Briefing "Electric Issues" Arlington, VA
446. January 27, 2015 New York University School of Law, Natural Gas Symposium, speech "The Future of LNG", New York, NY
447. February 18, 2015 Natural Gas Supply Association (NGSA) Annual Member, San Antonio, TX
448. March 6, 2015 The Energy Council, speech "LNG Impact", Washington, DC
449. April 30, 2015 Brookings Institution Global Electricity and Technology Roundtable, Member, Washington, DC
450. May 5, 2015 EEI Economics Policy Advisory Group. Speech, "Redefining the Regulatory Compact" Washington, DC
451. May 22, 2015 NARUC EIPSC Webinar "What's Happening to Baseload?" Panelist, Washington, DC
452. June 2, 2015 The Atlantic Council Energy Task Force, comments on "Electricity: Policy Options for the US and Abroad, Financing, Grid Modernization and Renewables Integration", Washington, DC
453. June 11, 2015 NRECA Rural Summit "Physical Infrastructure, Energy and Environment" Comments as Expert Observer, Washington, DC
454. July 15, 2015 National Rural Utilities' Cooperative Finance Corporation (CFC) , speech "The 21st Century Energy Customer", Dulles, VA
455. September 20, 2015 Society of Depreciation Professionals, Training Workshop, lecturer "Rate Regulation", Austin, TX

456. October 21, 2016 Atlantic Council – Washington, DC Panelist on program on the launch of AC report titled "*Transforming the Power Sector in Developing Countries"*
457. October 27, 2016 George Washington University – Class lecture Washington DC
458. April 12, 2017 The FERC's Anti-Market Manipulation Rule: Trends and Developments, Speech, Washington, DC
459. June 6, 2017 NRU CFC Forum Regulatory Panel, Washington, DC
460. July 10, 2017 U.S. Department of State - Electricity 101, lecture, Washington, DC
461. July 11, 2017 NRU Cooperative Finance Corporation, Annual Accounting Conference, Dulles, VA
462. August 14, 2017 U.S. Department of State - Morocco Clean Energy - International Visitor leadership Program, Lecture, Washington, DC
463. September 11, 2017 SDP Annual Conference, speaker, San Diego, CA
464. October 31, 2017 Bilateral Chamber – Turkish Delegation "Gas Hubs" lecture, Washington, DC
465. December 5, 2017 SNL 2017 Utility Regulation Conference, Panelist, Washington, DC
466. January 23, 2018 Harvard Energy Policy Group 89th Plenary Session, panelist, Palm Beach, FL
467. February 14, 2018 Wisconsin Electric Power Cooperative Association Legislative event, speech Madison, WI
468. March 5, 2018 National Labor and Management Public Affairs Committee LAMPAC, speech, Washington DC
469. April 19, 2018 SURFA 50th Financial Forum, panel, New Orleans, LA
470. June 26, 2018 World Gas Conference Panel "The Forces Driving Regulatory Change in Natural Gas Markets" Washington, DC
471. September 2018, CYBER Conference, speech, Belgrade Serbia
472. April 2, 2019 Atlantic Council-Emirates Global Aluminum Energy briefing, Washington, DC
473. April 11, 2019 Center for Climate and Energy Solutions (C2ES), Business Environmental Leadership Council (BELC) Speech, Washington DC
474. April 16, 2019 S&P Utility Regulation Conference, Speaker, Washington, DC
475. May 9, 2019 National Governors' Association Bootcamp for New Energy Policy Advisors, Lecture, Arlington, VA
476. July 22, 2019 Dept. of State FSO Power lecture, Washington, DC
477. September 17, 2019 Society of Depreciation Professionals, Annual Conference speech, Philadelphia
478. October 22, 2019 AGA EEI Beyond-the-Boardroom lecture, Washington, DC
479. October 24, 2019 Energy Risk Summit, Speech, Houston, TX
480. December 11, 2019 NAESB, Annual meeting dinner speech, Houston, TX
481. February 12, 2020 S&P Federal Power Roundtable, Panelist New York, NY
482. March 11, 2020 Empower Energy, FERC 101, Bethesda, MD

483. July 21, 2020 AGA 43th Legal Forum, (Virtual) Panel, Washington, DC
484. July 22, 2020 SDP Open Mic Solar & Battery Storage, lecture, (virtual), Washington, DC
485. August 5, 2020 SDP Open Mic Witness training, (Virtual), Washington, DC
486. August 19, 2020 SDP Open Mic Stranded Investment (Virtual) Washington, DC
487. September 15, 2020 SDP Short Couse Depreciation and Regulation, (virtual), Washington, DC
488. September 15, 2020 SDP Training Testifying Techniques, Panel (Virtual) Washington, DC
489. September 17, 2020 SDP Short Course, Depreciation and Ratemaking, (virtual) Washington, DC
490. September 17, 2020 SDP Short Course, Depreciation Assets in Transition, (virtual) Washington,
491. September 17, 220 SDP Short Course, Current Issues Forum, (Virtual) Washington, DC
492. October 28, 2020 SDP Training Elective Evolution of Depreciation (Virtual) Washington, DC
493. October 28, 2020 S&P Annual Financing US Power Virtual Conferences Talking Politics and Presidential Election, Panel, Washington, DC

Branko Terzic Testimony

Regulatory and Court

As of January 2022

Before the State of Delaware Public Service Commission, prepared direct testimony on behalf of the Delaware Public Service Commission 1975 Subject: Depreciation rates for nuclear power plant

Before the Virgin Islands Public Service Commission, prepared direct testimony on behalf of the ITT Virgin Islands Telephone Company 1976 Subject: Depreciation rates

Before the Federal Energy Regulatory Commission, prepared testimony on behalf of the State of Wisconsin Public service Commission as a member of the Commission, 1985 Subject: FERC Rulemaking

Before the Idaho Public Service Commission, prepared direct testimony of behalf of the Intermountain Gas Company, 1990, Subject: Depreciation rates

Before the Arizona Corporation commission, prepared rebuttal testimony on behalf of the Citizens Utilities Company, PGA E-1032-93-111, 1994, Subject: regulatory policies

Before the Minnesota Public Utilities Commission, prepared direct testimony on behalf of Minnegasco (subsidiary of Arkla) G-008/GR-93-1090, June 1994, Subject: Affiliate regulatory policy

Before the Utah Public Service Commission, prepared rebuttal testimony for Questar Gas Company, Doc 98-057-12, April 26,1999, Subject: Pipeline gas quality

Before the Utah Public Service Commission, prepared rebuttal testimony on behalf of Questar Gas, Doc 99-057-20, May 24, 2000, Subject: CO2 removal costs and gas policy

Before the Wisconsin Public Service Commission, prepared testimony on behalf of Wisconsin Power & Light Company (Alliant Energy), CPCN No. 6680-CE-176, 2015 Subject: New powerplant options,

Before the Arizona Corporation Commission, filed written testimony on behalf f the Arizona Investment Council, APS Docket E-01345A-16-0036, December 21, 2016, Subject: Electric rates

Before the Idaho Public Utilities Commission, prepared direct testimony on behalf of Intermountain Gas Company, Case No. INT-G-16-02, August 12, 2016, Subject: Cost of service and rate design

Before the Idaho Public Utilities Commission, prepared rebuttal testimony on behalf of Intermountain Gas Company, Case No. INT-G-16-02, February 15, 2017, Subject: Cost of service and rate design

Before the Michigan Public Service Commission, prepared rebuttal testimony on behalf of the Upper Peninsula Power Company, Case No. U-18467, July 17,2018, Subject: Depreciation policy

Before the United States Bankruptcy Court for the District of Delaware, prepared testimony on behalf of Platte River Midstream LLC, DJ South Gathering LLC and Platte River Holdings and Grand Mesa Pipelines, LLC in Extraction Oil & Gas Inc. Case No. 20-11548, October 1, 2020, Subject: FERC practice in determination of the "public interest"

Before the Federal Energy Regulatory Commission, filed direct testimony of behalf of ETC Rover LLC Rover Pipeline LLC Dockets No. RP20-1233-000, October 17, 2020 Subject: Abrogation of FTSA

Before the United States Bankruptcy Court for the Southern District of Texas, Houston Division, prepared testimony on behalf of ETC Tiger Pipeline LLC in Chesapeake Energy Corporation et al Case No. 20-33233 Chapter 11, October 21, 2020 Subject: FERC practice in determination of "public interest"

Before the Federal Energy Regulatory Commission, filed rebuttal testimony of behalf of ETC Rover LLC Rover Pipeline LLC Dockets No. RP20-1233-000, October 26, 2020 Subject: Abrogation of FTSA

Before the United States Bankruptcy Court for the District of Delaware, prepared testimony on behalf of Platte River Midstream LLC, DJ South Gathering LLC and Platte River Holdings and Grand Mesa Pipelines, LLC in Extraction Oil & Gas Inc. Case No. 20-11548, October 27, 2020, Subject: FERC practice in determination of the "public interest"

Before the Puerto Rico Energy Bureau direct testimony on behalf of Luma Energy in Case No. NEPR-MI-2021-0007, May 18, 2021 Subject: Terms of Service and Limits of Liability

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

IN RE:	**CASE NO.:** NEPR-AP-2020-0025
PERFORMANCE TARGETS FOR LUMA ENERGY SERVCO, LLC	

Rebuttal Testimony of
Mr. Juan Lara
Expert Witness
February 16, 2022

Q: Please state your name, position, and business address.

A: My name is Juan Lara. I am an economist and professor of Economics at the University of Puerto Rico and a partner at Advantage Business Consulting, a firm dedicated to economic and financial consulting. My business address is 1519 Ave. Ponce de León, Suite 1001, San Juan, P.R. 00909.

Q: On whose behalf are you testifying in this proceeding?

A: I am testifying on behalf of LUMA Energy, LLC.

Q. Please provide your educational background.

A. I have a Ph.D. degree in Economics from the State University of New York at Stony Brook.

Q: Please summarize your professional experience.

A: I am Professor of Economics at the University of Puerto Rico, Río Piedras Campus, and a partner at Advantage Business Consulting, a consulting firm in economics and finance. I have been active in academia and consulting for over 30 years.

As a consultant, I have carried out numerous studies for clients in the private and public sectors in Puerto Rico. Around the years 2010 through 2013, I produced bi-annual economic forecasts for PREPA's economics and planning staff, providing analysis and projections for key variables in Puerto Rico's economy. To the best of my recollection, this is the only consulting engagement I have had in the island's electric power industry. In my consulting practice, I have also served as an expert witness on a variety of subjects, including, but not limited to, the evaluation of monetary losses and damages in various contexts.

More details of my professional experience as an economist and as an expert witness in economics are in my curriculum vitae, a copy of which is being supplied as Exhibit 1 to this testimony.

Q: Did you review any documents for your testimony?

A. The Expert Testimony of Mr. José Alameda Lozada, his Responses to Interrogatories and literature cited by him.

Q. Please summarize your testimony and key findings.

A: I was retained by LUMA to evaluate the testimony submitted in these proceedings by economist José Alameda Lozada. I reviewed the testimony of witness Alameda and the supporting references that he cited.

My key findings and conclusions are as follows:

1. Witness Alameda does not provide a sound theoretical basis to support his claim that a scheme involving both rewards and penalties is needed to ensure that LUMA performs in the manner desired by the Regulator in the context of Puerto Rico's public policy for the energy sector
2. Witness Alameda does not provide empirical evidence to support the claim referred to in point #1 above.
3. Witness Alameda ignores warnings in the same literature he cites, pointing out that penalties may produce perverse incentive effects.
4. Witness Alameda does not acknowledge, mention or evaluate the penalties and incentives in the T&D OMA but assumes that these are somehow inappropriate.
5. Witness Alameda presents only illustrative examples of possible reward-penalty schemes but does not provide any specific guidance to the Regulator on the subject.

6. Witness Alameda does not answer the question of what is an appropriate incentives scheme for Puerto Rico's electric utility.
7. Witness Alameda does not provide guidance or evidence to help the Regulator determine the magnitudes required in the calibration of a specific reward-penalty scheme for LUMA's regulation.
8. Witness Alameda cites literature that does not apply to Puerto Rico's regulatory regime and fails to establish its relevance to PREPA and LUMA.
9. Witness Alameda uses theoretical concepts in economics such as consumer's surplus and the Coase Theorem that are not relevant to the subject matter in these proceedings, and witness Alameda fails to establish their relevancy.
10. Witness Alameda does not address important questions regarding the subject matter in the proceedings, such as the benefit-cost balance of possible reward-penalty schemes in addition to or in place of existing incentives in the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement of June 22, 2022 ("T&D OMA").

Q: Please elaborate on your evaluation of witness Alameda's testimony.

A: For ease and clarity of exposition, in what follows, I shall comment witness Alameda's testimony addressing each of the questions and in the same order as presented in such testimony.

Q: Please state your response to Witness Alameda's Question 1"Please state your name, position and business address:"

A: NO COMMENT.

Q: Please state your response to Witness Alameda's Question 2 "On whose behalf are you testifying in this proceeding?"

A: NO COMMENT.

Q: Please state your response to Witness Alameda's Question 3 "Please summarize your qualifications and work experience."

A: NO COMMENT.

Q: Please state your response to Witness Alameda's Question 4 "Please summarize your testimony and key findings."

A: In his answer, Witness Alameda states: "There are, at least, two schemes to pursue better standards of performance: (1) Reward-Penalty Scheme and (2) Outage compensation to consumers."[1] (Emphasis added). While he asserts that there are at least two schemes, he makes no mention of any other schemes in addition to the two cited, nor explains why he chose to focus on these two in preference to other possibilities.

In his answer, Witness Alameda also states: "My analysis considers a model for compensation to consumers as well. The model is followed by five states in the United States. I conclude and recommend that PREB develop a Reward-Penalty Scheme and an Outage Compensation Mechanism the damages that this company may cause."[2] His assertion is that the "model" for compensation which he proposes is followed by five states in the United States, but later in his detailed testimony, he shows no evidence that such five states actually follow the same mechanism he proposes (which is, itself, not clearly defined); in fact, the states he later cites use different mechanisms to compensate consumers for power outages, not one single model. Moreover, in his detailed testimony, witness Alameda does not present any evidence of the results and consequences of the

[1] Expert Testimony of José Alameda Lozada, p. 5, lines 8-10.
[2] *Id.*, p. 5, lines 14-18.

practices for outage compensation in the states he cites or of the applicability of those experiences to Puerto Rico's T&D system.

Q: Please state your response to Witness Alameda's Question 5 "What is a Reward-Penalty Scheme (RPS)?"

A: In his answer, witness Alameda states: "A scheme that applies both rewards **and** penalties is appropriate to energy utility transmission and distribution systems because both rewards and penalties will encourage a better performance of these mechanisms."[3] (Emphasis in the original). Witness Alameda provides no basis, theoretical or empirical, for the unqualified claim that "both rewards and penalties will encourage a better performance...".[4] In fact, witness Alameda does not acknowledge warnings in some of the literature he cites in his testimony that penalties may have perverse effects and are certainly not guaranteed to encourage better performance (See Utility Performance Incentive Mechanisms – A Handbook, Melissa Withed, Tim Wool, and Alice Napoleon, Synapse Energy Economics, Inc., p. 55; cited below as "Handbook"). Both in theory and practice, it is quite possible for penalties to encourage undesirable behavior, such as excessive risk-avoidance or disproportionate attention to some metrics to the neglect of others.

In his answer, witness Alameda further states: "The RPS should provide defined standards of performance and penalizes the utility when it underperforms. An important consequence of restructuring in the power industry is the emergence of service quality regulation in the distribution network—which allow for more precise metrics, rewards, and penalties to be applied to distribution system operators."[5] (Emphasis added). Witness

[3] *Id.*, p. 6, lines 4-7.
[4] *Id.*, p. 6, lines 5-6.
[5] *Id.*, p. 6, lines 13-17, and p. 7, line 1.

Alameda provides no explanation of what is meant by "more precise metrics" and makes no reference to metrics set forth in the T&D OMA. He does not evaluate the metrics in the T&D OMA, does not show that they are lacking in precision, nor does he propose any alternative set of metrics.

Q: Please state your response to Witness Alameda's Question 6 "How could the RPS be balanced between rewards and penalties?"

A: In his answer, witness Alameda states: "Regulators have used these mechanisms for many years to address traditional performance areas: reliability, safety, and energy efficiency."[6] The statement is not directed to answer the question, which is about balancing rewards and penalties. In addition, witness Alameda does not provide any evidence to support the statement nor indicates which regulators, in what countries or states, under what type of regulatory regime, have "used these mechanisms for many years,"[7] as he asserts, or to what effect. The fact that a particular scheme may have been used in other jurisdictions is not enough to justify its application to Puerto Rico's regulated power utility, which is a publicly-owned, not-for-profit entity subject to rate regulation and other regulation, not a profit-maximizing, investor-owned, private utility, as are many in the US and other jurisdictions.

In his answer, witness Alameda also describes a formula for a possible RPS and states: "The formula with a deadband of 0.5 standard deviations, measures how much performance varies from the side of the target. After 0.5 standard deviations, penalties and rewards increase in a linear fashion up to a maximum of $5 million."[8] Witness Alameda takes this formula from one of the documents he cites in his testimony (See

[6] *Id.*, p. 7, lines 6-8.
[7] *Id.*, p. 7, lines 6-7.
[8] *Id.*, p. 7, lines 19-20, and p. 8, lines 1-2.

Handbook, already cited above). He does not provide any guidance as to how this formula could be applied to metrics in the Puerto Rico T&D System; in particular, he says nothing of what the critical numbers and parameters of the formula should be in the specific case of Puerto Rico's T&D System. He does not measure or analyze the effects of a specific application of this formula to LUMA's operations, including benefits and costs to LUMA and the Regulator. Moreover, there is no acknowledgment or warning of possible perverse effects of penalties, much less guidance on how to avoid such effects in the calibration of a formula like the one cited, a matter that goes to the heart of the question posed regarding the balancing of rewards and penalties.

In his answer, witness Alameda also makes reference to a quadratic formula taken from the same source in the literature he cites. The same comments in the paragraph above regarding his discussion of the linear formula apply to witness Alameda's description of the hypothetical quadratic formula for an RPS scheme.

As already mentioned above, witness Alameda makes unqualified statements about rewards and penalties without heeding a clear warning in one of the references on which he relies most heavily. On page 55 of the Handbook (already cited above), there is a box about the possible drawbacks of excessive regulatory burden resulting from a penalty scheme. The text in the box reads as follows: "Reducing Regulatory Burden in New York. In 2012, the New York Public Service Commission issued an order that abolished the penalty portion of energy efficiency incentives. The Commission's experience was that the threat of penalties "created an adversarial approach to setting targets and budgets, undue aversion to risk, and short-term allocation of resources that may not serve the long-term interests of a balanced program." In addition, consideration of mitigating

circumstances presented a substantial drain on staff and utility resources that could have been better spent on administering programs."

In his answer, witness Alameda cites the two hypothetical formulas mentioned above and does not comment on the symmetry of rewards and penalties embedded in both formulas. Since the question he is addressing in this section is precisely about balancing rewards and penalties, it is noteworthy that he assumes symmetry as a desirable feature of such balancing without providing a theoretical or empirical basis for the belief. If management dreads losses more than it values bonuses, a symmetrical RPS could induce the sort of undue avoidance of risk and disproportionate attention to some metrics that moved the New York regulator to eliminate penalties, as reported in the quote above.

In his answer to this particular question, and in his entire testimony, witness Alameda fails to analyze or even mention the penalties or the threat of penalties already embedded in the T&D OMA. In particular, he does not analyze the incentive effect of the threat of termination of contract and payment of a termination fee if LUMA were to incur a "Minimum Performance Metrics Threshold". More on this subject will be said below in connection with another section of witness Alameda's testimony.

In his answer, witness Alameda does not discuss or acknowledge the possibility of penalties resulting in an excessive regulatory burden, a matter directly relevant to the balancing of rewards and penalties. In his reference to the two hypothetical formulas mentioned above, he makes no reference to or attempt to measure the costs of compliance to the regulated entity nor the costs of oversight and enforcement to the Regulator and society at large. Such warnings are present in the literature cited by witness Alameda.

Q: Please state your response to Witness Alameda's Question 7 "Is an electric utility's performance relevant to the Social Wellbeing?"

A: In his answer, witness Alameda states: "There are many definitions of Social Wellbeing, according to the social science field."[9] As an economist providing expert testimony, Alameda fails in not providing a definition from Economics, which would be grounded on the theory of Welfare Economics, a field in the Economics discipline. Instead, he provides a general definition: "...social wellbeing is the pursuit of happiness throughout a well-socially designed society, in which the economy must exist to serve society, not to be served by society."[10] Without judging the proposed definition on its merits, I note that as it stands, it falls outside the realm of the professional expertise of an economist.

In his answer, witness Alameda does not address the part of the question about the relevance of an electric utility's performance to the concept of Social Wellbeing.

Q: Please state your response to Witness Alameda's Question 8 "Are energy utility performance metrics relevant for a society and Social Well-Being?"

A: In his answer, witness Alameda states: "The employment of an RPS in transmission & distribution systems could provide incentives/penalties to improve operating efficiency and sustainability, empower customers, **and reduce relative electricity prices**. However, if the RPS mechanisms were not properly designed, or failed to include adequate penalties, the enforcement of the RPS may have a negative effect on the system and then, to the wellbeing of society."[11] (Emphasis added).

Witness Alameda asserts that "the employment of an RPS" could "provide incentives/penalties" to, among other things, "reduce relative electricity prices". He does not explain the connection between the incentives and penalties and "relative electricity prices", a key issue given that rates for PREPA customers are set by the Regulator; the

[9] *Id.*, p. 9, lines 12-13.
[10] *Id.*, p. 9, lines 13-15.
[11] *Id.*, p. 10, lines 15-21.

same Regulator that would design and enforce any RPS for the PREPA utility. Given that the Regulator has direct authority in rate-setting, why would it aim at reducing rates indirectly through an incentives scheme?

Witness Alameda further states: "On the other hand, empirical studies clearly indicate that a strong RPS has led utility firms to invest in service quality."[12] (Emphasis added). He provides no explanation of what is a strong RPS and no data or arguments as to how such a strong RPS compares to incentives and penalties in the T&D OMA. Witness Alameda cites a study about regulation in Italy but does not provide details of the Italian RPS scheme nor any evidence of why the Italian experience might apply to Puerto Rico's electric utility. The paper cited by witness Alameda in connection with the Italian experience indicates that "...the liberalization and privatization of utilities in the electricity sectors have created legitimate concerns on the effect that a generalized prevalence of the profit motivation could have on the quality of the services provided...".[13] (Emphasis added). The Puerto Rico electric utility regime cannot be described as driven by "a generalized prevalence of the profit motivation". As mentioned earlier, Puerto Rico's state-owned, not-for-profit utility is not the same as investor-owned regulated private utilities in other jurisdictions. The same paper also states that "...the introduction of specific incentives for quality appears as a necessary measure to contrast the cost-reducing incentives implied in price-cap mechanisms and privatization".[14] (Emphasis added). Puerto Rico's regulatory regime is not one of price-cap mechanisms, which makes the Italian reference doubtful as guidance for the Puerto Rico Regulator.

[12] *Id.*, p. 11, lines 1-2.
[13] *Id.*, p. 11, lines 18-22.
[14] *Id.*, p. 11, lines22-23, and p. 12, lines 1-3.

An additional quote cited in Alameda's testimony, from a theoretical paper by De Fraja and A. Aiozzi, states: "The authors demonstrates that a regulator, who is well informed about consumers' marginal valuations of quality, can modify regulatory mechanisms to induce a regulated monopoly to set welfare-maximizing prices and quality levels."[15]. Again, witness Alameda is citing literature not relevant to Puerto Rico's regulatory regime since the quote refers to a regime in which the regulated firm is free to establish prices and quality levels within mandatory guidelines set by regulators. Such is not the case in Puerto Rico's regulated electric utility. Moreover, the authors state the requirement that a regulator must be "well informed about consumers' marginal valuations of quality". This is easy for a theorist to suggest but nearly impossible for a real-life regulator to accomplish. The burden of ascertaining consumer's marginal valuations of quality on the various areas of service may be formidable and too costly for society to bear, notwithstanding whether it falls on the regulated entity or on the regulator. In any case, it adds a dimension of complexity and uncertainty to any RPS that may tax the regulator's resources to an unreasonable extent.

In his answer, witness Alameda also cites the following quote from the same source in the literature (De Fraja and A. Aiozzi): "The author finds that a regulated firm's incentives to invest in service quality increase with the level of the price cap, the application of profit-share penalties, the regulated firm's participation in complementary competitive markets, and with information dissemination concerning compliance with service benchmarks."[16] Once again, witness Alameda uses a reference focused on price-cap regimes, which is not relevant to Puerto Rico's regulatory regime. In addition, profit-

[15] *Id.*, p. 12, lines 13-17.
[16] *Id.*, p. 13, lines 3-9.

share penalties, in the context of a price-cap regime, is listed as only one of various elements. The concept of the regulated firm's participation in complementary competitive markets is also irrelevant to Puerto Rico's electric utility. Finally, the dissemination of information concerning compliance with service benchmarks is certainly relevant to the T&D OMA, and consistent with its provisions for the award of an Incentive Fee. One might expect the media in Puerto Rico to show interest in the dissemination of such information, as well as the Regulator.

Q: Please state your response to Witness Alameda's Question 9 "Do you think energy is a human right?"

A: This is not a question for an expert opinion based on economic theory or analysis. In his answer, witness Alameda expresses a personal opinion, not an expert's assessment of human rights. Moreover, witness Alameda does not make any connection between the notion of energy as a human right and the RPS schemes he proposes.

Q: Please state your response to Witness Alameda's Question 10 "Can you please explain the concept of Consumers' and Producers' Surpluses?"

A: In his answer, witness Alameda states: "A well-known concept in Microeconomics Theory is the Consumer's Surplus. It is also applied to Producers. The Surplus measures of well-being rely on the difference between what a person, household, or business is willing to pay for energy and what actually has to be paid. The theory holds that an optimal incentive scheme specifying performance standards, rewards and penalties is the proper means to measure the utility's performance and also reflect consumer valuations of the quality of the energy inputs."[17] (Emphasis added). Witness Alameda fails to

[17] *Id.*, p. 14, lines 18-23, and p. 15, lines 1-2.

establish the relevance of the concept of consumer's surplus to the design of incentives for Puerto Rico's regulated utility. He explains, correctly, that the concept pertains to the difference between what buyers are willing to pay and what they actually have to pay for a particular good or service (not just energy), but changes in consumer's surplus arise from changes in prices, and the regulated entity, in this case, is not free to change prices. If, in a particular setting, PREPA and LUMA were to request a rate increase, and if such request were to be granted by the Regulator, there would, indeed, be a loss of consumer's surplus, but as a result of the Regulator's decision (presumably justified by appropriate data) and not because of a failure of incentives applying to PREPA or LUMA.

Witness Alameda does not explicitly propose that the Regulator use the concept of consumer's surplus in the design of an incentives program, which raises the question of why he brings up the concept in the first place. Measuring consumer's surplus is not impossible, but certainly not easy, and it would increase the burden on the Regulator's resources. But such measurement is superfluous in an incentives regime in which rate changes that would cause changes in consumer's surplus can only happen with the Regulator's approval and with proper justification.

In his answer, witness Alameda cites the use of the concept of consumer's surplus by the World Bank in studies of electrification projects in developing countries. This is a good example of the applicability of the concept as a tool in project evaluation, since consumer's surplus is a measure of the value of a project to impacted consumers and communities. However, the use of the concept by the World Bank in that particular context is not relevant to the setting of incentives for the T&D System in Puerto Rico's rate-regulated utility.

Q: Please state your response to Witness Alameda's Question 11 "What is the social importance of the Reward-Penalty Scheme?"

A: In his answer, witness Alameda states: "Rewards and penalties are financial tools that motivate better performance."[18] Once more, as in his answers to earlier questions, witness Alameda makes an unqualified statement about the effects of rewards and penalties without considering the possible perverse effects of such measures, ignoring the warnings to that effect in the literature he himself cites. He also fails to consider or even mention the possibility that rewards and penalties may produce results that are not worth the cost of implementing them to the regulated and the regulator (and, through the regulator, to society at large). That rewards and penalties motivate better performance is not a result to be assumed, but rather to be demonstrated with analysis and evidence. Witness Alameda provides no such analysis or evidence.

In his answer, witness Alameda also states: "Rewards and penalties are market-driven mechanisms, but within a regulator's framework."[19] This is a confusing statement. Is witness Alameda proposing that rewards and penalties be set by the market, as opposed to the Regulator? Is he proposing that the Regulator limit its role to setting a framework for incentives which are to be determined by the market? Witness Alameda does not explain how the "market-driven" rewards and penalties he mentions in his answer fit in Puerto Rico's utility regulatory regime, in which rates are set by the Regulator, and there is little scope for independent corporate action other than to meet market demand with adequate levels of quality and reliability.

[18] *Id.*, p. 15, lines 10-11.
[19] *Id.*, p. 15, lines 13-15.

In his answer, witness Alameda further states: "Better performance means better quality of energy services. Better quality means a better off position for society and, finally surpluses of wellbeing to consumers and producers."[20] The answer rests on assumptions rather than on analysis or evidence. As argued above, there is no unqualified guarantee that a reward and penalty scheme will automatically generate better performance. However, even if such better performance were to result from a reward and penalty scheme, it would still be required to evaluate how much benefit is actually created for consumers and how that benefit compares to the costs of complying with and enforcing the scheme; in other words, to show that the end result would not be an unfavorable benefit-cost balance. The benefit-cost balance is the relevant outcome to consider regarding the social importance of the reward-penalty scheme, which is the gist of the question.

Q: **Please state your response to Witness Alameda's Question 12 "Why is it important for the Reward-Penalty Scheme to include a strong penalty component?"**

A: In his answer, witness Alameda states: "If penalties to utility firms were absent in the RPS, the financial and operational risks would be shifted from private shareholders onto the consumers and producer's surpluses."[21] First, note that witness Alameda omits the adjective "strong" in his answer, while this is a critical word in the question. He does not explain what is a strong penalty, and does not address the question of why a strong penalty component is important for the reward-penalty scheme.

As mentioned above in connection with an earlier question, witness Alameda does not consider or mention the penalties embedded in the T&D OMA, including the threat of

[20] *Id.*, p. 15, lines 11-13.
[21] *Id.*, p. 15, lines 19-21.

termination of contract and the payment of a termination fee, which could be as much as $20 million. Witness Alameda does not analyze how a strong penalty component in an RPS compares to the penalties already embedded in the T&D OMA or explain why any strong penalties in addition to those in the T&D OMA would be necessary or more effective than those in the T&D OMA.

A point also made above in connection with an earlier question is worth repeating at this point. Witness Alameda does not take into account the risk that penalties may have perverse effects, even though this risk is clearly pointed out in some of the literature he cites. Recall that authors Whited, Woolf, and Napoleon, who are cited repeatedly by witness Alameda, warn that the New York Public Service Commission abolished penalties in its energy efficiency incentives because the threat of penalties "created and adversarial approach to setting targets and budgets, undue aversion to risk, and short-term allocation of resources that may not serve the long-term interests of a balanced program." [Handbook, page 55.]

In his answer, witness Alameda states that in the absence of penalties, "financial and operational risks would be shifted from private shareholders onto the consumers and producers' surpluses."[22] The concept of consumer's surplus was addressed in connection with an earlier question above. It is worth repeating that for changes in consumer's surplus to happen, there have to be changes in the price of the service, which neither PREPA or LUMA are free to set in Puerto Rico's regulatory regime. Thus, it is not correct to state that lack of penalties would lead to PREPA or LUMA shifting financial

[22] *Id.*, p. 15, lines 19-21.

and operational risks to consumer's surplus, because only the Regulator can cause such shifting to happen, as it is the Regulator who exercises the rate-setting authority.

Q: **Please state your response to Witness Alameda's Question 13 "Please describe the concept of outage compensation".**

A: In his answer, witness Alameda states: "The well-known Coase Theorem from Nobel-Prize Ronald Coase (1991), postulated that liability should fall on those parties who can eliminate or mitigate the problem most cheaply. A desirable outcome is an efficient allocation of risk."[23] Witness Alameda does not explain the relevance of the Coase Theorem to a system "where consumers can obtain restitution from LUMA for financial losses caused by problems with the T&D system that LUMA operates"[24], as he proposes. His answer includes the statement that "a desirable outcome is an efficient allocation of risk", but he presents no evidence or theoretical basis to support the claim that an outage compensation scheme such as the one he describes impacts the efficient allocation of risk. On page 75 of the answer to interrogatories to witness Alameda, which supplements his testimony, he expounds more on the Coase Theorem and states: "The Coase Theorem provides a framework for incentive-driven regulatory systems. The Coase Theorem allows for a solution that benefits both the consumers and companies when market inefficiencies arise. The Coase Theorem seeks to save both the consumers and companies money. PREB should further study the theorem and consider applying it to LUMA. While it may not have been –to my knowledge—applied to electric utilities, the PREB has a unique opportunity to implement this theorem."[25]

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[23] *Id.*, p. 16, lines 17-20.
[24] *Id.*, p. 18, lines 3-5.
[25] LECO's Responses and Objections to LUMA's First Set of Interrogatories and Request for Production of Documents Addressed to Economist José Alameda, p. 75, Request: LUMA-LECO-ALAMEDA-ROI-01-60, included as Exhibit 2 to this testimony.

In his answer to interrogatories, witness Alameda fails again to make a clear connection between the Coase Theorem and the desirability or usefulness of an outage compensation scheme, although he recommends that the Regulator consider applying the theorem to LUMA. Note that witness Alameda admits that he has no knowledge of this theorem being applied to electric utilities.

Witness Alameda provides only a general description of an outage compensation scheme and does not propose any specific such scheme for Puerto Rico. His proposal is lacking in concreteness and amounts to little more than advising the regulator to consider the concept as a possible component of the Puerto Rico regulatory regime.

Q: Please state your response to Witness Alameda's Question 14 "What is the reliability triangle?"

A: In his answer, witness Alameda includes a diagram showing three connected triangles embedded in a larger triangle, each of which bears the name of an index of service reliability, which are SAIFI, SAIDI and CAIDI. The picture is not explained, nor is there any explanation of its relevance to the RPS schemes that witness Alameda proposes in his testimony.

Q: Please state your response to Witness Alameda's Question 15 "Please describe an appropriate system of rewards and penalties related to Reliability".

A: In his answer, witness Alameda presents two formulas, one for SAIDI Reward (Penalty) and another for SAIFI Reward (Penalty). Witness Alameda states: "The following formulas and tables are RPS models, and constitute only examples to be assessed by PREB."[26] (Emphasis added).

[26] Expert Testimony of José Alameda Lozada, p. 19, lines 9-10.

Witness Alameda admits that these are not specific schemes he proposes to the Regulator, but "only examples to be assessed by PREB." In addition to not providing a concrete or specific proposal for an RPS, witness Alameda does not provide any evidence or analysis of the probable effectiveness of the incentives he describes in the two formulas presented. The issue of expected effectiveness is critical to the design of an appropriate system, which is the gist of the question posed to witness Alameda, but it is not addressed in the answer.

The first formula presented in witness Alameda's answer is as follows:

SAIDI Reward (Penalty) = [(Target – Performance) * (Cost per KWh) * (Customers)][27]

This formula is not like any of the examples presented in the Handbook by Withed, Woolf, and Napoleon, which witness Alameda uses as a reference. It does not include a deadband, and it does not normalize the difference between the SAIDI target and performance by the standard deviation of the SAIDI as does the formula in the Handbook. The formula presented is a simpler formula than the one in the Handbook, and does not include a maximum reward or penalty as does the example in the Handbook. Witness Alameda provides no explanation and no theoretical or empirical basis for these differences with the formula he presented earlier in his reference to the illustrative RPS models in the Handbook. Most important, witness Alameda provides no guidance on how to calibrate the parameter in the formula he presents (the charge per KWh) to convert it into an applicable, concrete example of an RPS for PREPA and/or LUMA. There is also

[27] *Id.*, p. 19, lines 20-21.

no evaluation of whether the formula results in an effective incentive scheme or under what conditions it would result in excessive or insufficient incentives.

The second formula presented in witness Alameda's answer is as follows:

SAIFI Reward (Penalty) = [(Target – Performance)/Standard deviation of performance across customer body] * (Reward/Penalty multiplier) * (Reward/Penalty value)[28]

This formula does not include a deadband. It is a linear formula that reduces to the difference between the target and performance values of the index, divided by the standard deviation of the index, times a constant (the product of a "multiplier" and a "maximum penalty/reward value"). The "reward/penalty multiplier" is superfluous in the formula, since the effect of that parameter can be captured by adjusting the maximum "reward/penalty value" without need of a multiplier.

In the numerical example presented by witness Alameda in his answer, the formula reduces to:

(Target – Performance) x $1,250,000

As mentioned above, witness Alameda presents this formula, as well as the previous one, as "only an example" for the Regulator to consider. There is no discussion of its alleged value as an appropriate RPS, there is no guidance on how to turn it into a concrete, specific RPS applicable to PREPA and/or LUMA, and there is no evaluation of its incentive value in terms of expected effectiveness in inducing desired outcomes.

Witness Alameda presents only simple linear functions, without deadbands, in his answer to the question, and does not address the question of why these simple linear forms

[28] *Id.*, p. 21, lines 6-9.

without a deadband are appropriate in contrast to, for example, the quadratic formula suggested in the Handbook.

Q: Please state your response to Witness Alameda's Question 16 "What concerns do you have about LUMA, LUMA's contract, and LUMA's performance to date?"

A: As an economist providing expert testimony, I cannot comment on parts of witness Alameda's answer to this question which fall outside my area of professional competence. These include allegations that "the public-private partnership (PPP) between LUMA and the Commonwealth Government is not only full of pitfalls but also is bound by a one-sided contract, that only provides advantages to one of the parties"[29], allegations that "LUMA has consistently disagreed to a full disclosure of documents, information, and process..."[30], allegations that "the PPP between LUMA and PREPA-Commonwealth Government allows pass-through expenditures which do not provide adequate limits on many of LUMA's operational expenditures,"[31] and allegations that "the PPP contract called for eliminating many labor protections, including existing labor union, that protect wages and benefits and pensions."[32] These are matters of fact or of legal interpretation which lie outside my domain of professional expertise.

In part of his answer, witness Alameda states: "The partnership must include a Reward-Penalty Scheme in order to ensure that the private entity is accountable to the public, and practices financial and technical responsibility."[33] Witness Alameda does not acknowledge that the T&D OMA details incentives and penalties, and he makes no attempt to evaluate such incentives and penalties. In particular, he does not provide any

[29] *Id.*, p. 21, lines 25-26, and p. 22, lines 1-2.
[30] *Id.*, p. 22, lines 5-7.
[31] *Id.*, p. 22, lines 12-14.
[32] *Id.*, p. 23, lines 1-4.
[33] *Id.*, p. 22, lines 8-10.

analysis or evidence to argue that incentives and penalties in the T&D OMA are not enough "to produce accountability and [the practice of] financial and technical responsibility."

The T&D OMA includes a strong penalty in the form of a threat of termination of the contract under certain circumstances. For example, the contract could be terminated in the event of failure to meet the minimum performance threshold for any three key performance metrics during three or more consecutive contract years, leading also to the payment of a termination fee to the owner that could amount to $20 million in 2020 dollars. Key performance metrics are average speed of answer, abandonment rate, OSHA fatalities, OSHA severity rate, SAIFI, SAIDI, distribution line inspections and targeted corrections, operating budget, and capital budget (federally and non-federally funded).

Witness Alameda makes no attempt in his analysis to evaluate this penalty scheme or to present any evidence to support his assumption that additional penalties are required to guarantee the quality of service to PREPA's and LUMA's customers.

Q: Please state your response to Witness Alameda's Question 17 "What are your conclusions and recommendations?"

A: No additional comments. I rely on my testimony above on RPS and OCM.

Q: Please state your response to Witness Alameda's Question 18 "Does this conclude your testimony?"

A: No additional comments. I will amend or supplement my testimony in as much as witness Alameda is allowed to modify or clarify his testimony.

Q: Please state your response to Witness Alameda's Question 19 "Are exhibits attached to your testimony?"

A: NO COMMENT.

Q. Can you provide a summary of your opinions and conclusions for this proceeding?

A. I repeat the summary of my opinions and conclusions as stated above.

1. Witness Alameda does not provide a sound theoretical basis to support his claim that a scheme involving both rewards and penalties is needed to ensure that LUMA performs in the manner desired by the Regulator in the context of Puerto Rico's public policy for the energy sector.
2. Witness Alameda does not provide empirical evidence to support the claim referred in point #1 above.
3. Witness Alameda ignores warnings in the same literature he cites, pointing out that penalties may produce perverse incentive effects.
4. Witness Alameda does not acknowledge, mention or evaluate the penalties and incentives in the T&D OMA, but assumes that these are somehow inappropriate.
5. Witness Alameda presents only illustrative examples of possible reward-penalty schemes, but does not provide any specific guidance to the Regulator on the subject.
6. Witness Alameda does not answer the question of what is an appropriate incentives scheme for Puerto Rico's electric utility.
7. Witness Alameda does not provide guidance or evidence to help the Regulator determine the magnitudes required in the calibration of a specific reward-penalty scheme for LUMA's regulation.
8. Witness Alameda cites literature that does not apply to Puerto Rico's regulatory regime and fails to establish its relevance to PREPA and LUMA.

9. Witness Alameda uses theoretical concepts in economics such as consumer's surplus and the Coase Theorem that are not relevant to the subject matter in these proceedings, and witness Alameda fails to establish their relevancy.

10. Witness Alameda does not address important questions regarding the subject matter in the proceedings, such as the benefit-cost balance of possible reward-penalty schemes in addition to or in place of existing incentives in the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement of June 22, 2022 ("T&D OMA").

Q: Does this conclude your testimony?

A: Yes.

ATTESTATION

Affiant, Mr. Juan Lara, being first duly sworn, states the following:

The prepared Rebuttal Testimony constitutes my rebuttal testimony in the above-styled case before the Puerto Rico Energy Bureau. I would give the answers set forth in the Rebuttal Testimony if asked the questions included in the Rebuttal Testimony. The facts and statements provided herein in this rebuttal testimony are true and correct to the best of my knowledge.

Juan Lara

Asf. 797 Acknowledged and subscribed before me by Mr. Juan Lara, of legal age, married, economist, and resident of San Juan, Puerto Rico in his capacity as Expert Witness, who is personally known to me.

In San Juan, Puerto Rico, this 16 day of February 2022.

Public Notary

Exhibit 1
Curriculum Vitae

JUAN LARA, PhD.

EXPERIENCE

Dr. Juan Lara has more than 28 years of experience working in economic consulting in Puerto Rico and the U.S. Before joining **Advantage Business Consulting** (Present), he was chief economist at **Estudios Técnicos, Inc**. (1987-2006). He is also a full professor of Economics at the **University of Puerto Rico**, where he has taught for the past 30 years.

Partner and Chief Economist at Advantage Business Consulting; San Juan, Puerto Rico. February 2006 - Present.

- Directed studies on external trade, industrial promotion policies, employment data gathering and financial markets regulation; including a strategic government agency plan for external trade, an assessment of the impact of financial liberalization and a review of the methodology to set fair market rents.
- In the private sector, he has consulted on a regular basis for the Puerto Rico Bankers Association, the Puerto Rico Manufacturers Association and some of the Island's major banks; also carried out numerous studies for various clients.
- As an ongoing project, Dr. Lara produces quarterly analyses of economic trends in Puerto Rico and a short-term economic outlook report. He speaks regularly at major events and contributes frequently to local newspapers and magazines on economic issues.

Director, Latin American Economic Service.
Wharton Econometric Forecasting Associates, Inc., Philadelphia, PA. May 1985 - December 1986

Senior Economist and Assistant Director, Mexican Service.
Wharton Econometric Forecasting Associates, Inc., Philadelphia, PA. August 1981 - April 1985

Had senior responsibility for production of economic forecasts and written reports for nine Latin American economies, where he directed and supervised a staff of professional economists and consultants in monitoring economic policies and developments and in production forecasts using computer-based econometric models. Edited and directed the DIEMEX-Wharton Mexican Letter, a bi-weekly newsletter analyzing economic developments in Mexico, which included regular business trips to that country.

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EXPERTISE

Business management
Financial and strategic planning
Write regular columns in local and international papers
Loss litigation

EDUCATION

Ph.D. in Economics, State University of New York at Stony Brook, Stony Brook, N.Y., August 1981.

M.A. in Economics, State University of New York at Stony Brook, Stony Brook, N.Y., December 1976.

B.A in Economics, University of Puerto Rico, July 1971.

ADVANTAGE BUSINESS CONSULTING

JUAN LARA, PhD.

POSITIONS HELD

2006-Present	Advantage Business Consulting, Inc.
1989-Present	University of Puerto Rico, Río Piedras - Professor
1987-1989	University of Puerto Rico – Mayagüez Campus- Professor
1987-2006	Estudios Técnicos, Inc.
1985-1986	Wharton Econometric Forecasting Associates, Inc. – Director Latin American Economic Services
1981-1985	Wharton Econometric Forecasting Associates, Inc. – Senior Economist and Assistant Director, Mexican Services
1981-1982	Temple University – Assistant Professor, Economics
1978-1981	Haverford College – Lecturer in Economics
1977-1977	State University of New York at Stony Brook – Lecturer in Economics
1971-1974	United Press International Inc. – Reporter/Editor, Caribbean Bureau

OTHER PROFESSIONAL ACTIVITIES

1993-2000	Consultant to CIEMEX-WEFA, the Mexico service at the WEFA Group, Philadelphia, PA.
1995- Present	Country contributor for Puerto Rico, The Economist Intelligence Unit, London, U.K.
2005-2011	Editor, Boletín de Economía, University of Puerto Rico, Río Piedras.
2011- Present	Member, Editorial Board, Caribbean Studies Review, University of Puerto Rico, Río Piedras.
2009-2012	Member, Governor's Economic Council, San Juan, Puerto Rico.

PAPERS AND PUBLICATIONS

- "The Transmission of Inflation to a Less Developed Country," unpublished doctoral dissertation, S.U.N.Y. at Stony Brook, Stony Brook, N.Y., August 1981.
- "The Use of Foreign Exchange Intervention in Stabilization Policy Under Flexible Exchange Rates," with Prof. Lois Ernstoff Stekler, Stony Brook Working Paper No. 183, July 1977.
- "Foreign Trade Practices of Centrally Planned Economies and Their Effects on U.S. International Competitiveness," with Prof. Egon Neuberger, National Planning Association, Washington D.C., 1977.
- "Mexico's Perspectives Under a Three-Year Agreement with the IMF," in Trade, Debt and Growth in Latin America, E. Sánchez, J. Salazar Carrillo, and A. Jorge, editors. Pergamon Press, 1984.
- "Escenarios alternos para la Economía de Puerto Rico en el año 2001," with Alfredo González. Paper presented during a seminar in Puerto Rico: 2001, San Juan, November 1987.

- "El Tratado de Libre Comercio y sus implicaciones para Puerto Rico," serie de ponencias, Unidad de Investigaciones Económicas, UPR, Río Piedras, 1993.
- "Más allá de las expectativas pendulares: la crisis mexicana y el reto del TLC," Caribbean Studies, Vol. 29, No. 1 Instituto de Estudios del Caribe, UPR, Río Piedras, January-June 1996.
- "El contexto económico actual", with José J. Villamil, Chapter 3 of Futuro Económico de Puerto Rico, Editorial de la Universidad de Puerto Rico, University of Puerto Rico, 1996.
- "Los fondos 936 en el sistema financiero de Puerto Rico", Boletín de Economía, Unidad de Investigaciones Económicas, UPR, Río Piedras, April-June 1996, pp. 20-24.
- "Some Key Economic Issues for Puerto Rican Leaders in the (Early) 21st Century," presented at the panel on Leadership and Economic Transformation, at the Puerto Rican Leadership into the New Millenium conference: Global Transitions, Lehman College, N.Y.C., November 20, 1998. Published by the Unidad de Investigaciones Económica, UPR, Río Piedras, 1999.
- "Desarrollo productivo e inserción externa," Chapter 2 of Globalización y Desarrollo: Desafíos de Puerto Rico Frente al Siglo XXI, UN Economic Commission for Latin America and the Caribbean (ECLAC), Mexico City, 2004.
- "Trade Performance and Industrial Policy," Chapter 9 of The Economy of Puerto Rico: Restoring Growth, CNE/Brookings Institution, 2006.

OTHER PUBLISHED WORKS AND SPECIAL REPORTS

Regular Chapters in:

- The Economist Intelligence Unit Country Report, Puerto Rico, published quarterly by The Economist Intelligence Unit Limited, London, UK. (Since 1999).9
- Claves Económicas: Puerto Rico, published quarterly BBVA Puerto Rico, San Juan, PR. (1999-2006).
- CIEMEX-WEFA: Perspectivas Económicas de México, published quarterly by The WEFA Group, Philadelphia, PA, since 1993.
- DIEMEX-Wharton: Perspectivas Económicas de México, published quarterly by Wharton EFA, Inc., Philadelphia, PA. (1981-1985).
- Latin American Economic Outlook published bi-annually by Wharton EFA, Inc., Philadelphia, PA. (1983-1986).
- World Economic Outlook published quarterly by Wharton EFA, Inc., Philadelphia, PA. (1983-1986).
- Foreign Exchange Outlook published monthly by Wharton EFA, Inc., Philadelphia, PA. (1985-1986).

NEWSPAPER ARTICLES AND REPORTS

- "Una tercera vía frente al neoliberalismo", Diálogo, abril de 1996.
- "El TLC y el Chupacabras", El Nuevo Día, 28 de julio de 1996.

- "Funes y la selección de sistemas económicos: reseña del libro Autogestión o Privatización, de Francisco Catalá Oliveras", Diálogo, octubre de 1996.
- "La globalización: una visión desde la economía", Diálogo, noviembre de 1997.
- "Tigres, jaguares y golondrinas: una fábula política de fin de siglo", Diálogo, mayo de 1998.
- "Puerto Rico y las negociaciones Norte-Sur", Diálogo, septiembre de 1998.
- "Puerto Rico y la crisis financiera global", El Nuevo Día, 29 de octubre de 1998.
- "El emperador está desnudo…otra vez", Diálogo, noviembre de 1998.

SAMPLE RESEARCH AND CONSULTING REPORTS

- Supporting economic analysis for credit evaluation presentations to bond-rating agencies. 2013-2014.
- Supporting economic analysis for the establishment of business-to-business Sales and Use Tax. Summer 2013.
- Study for the design of an integral tax reform in Puerto Rico, for the Fundación del Colegio de CPA. 2010.
- Study of financial and other needs of women entrepreneurs in low-income communities. For the Fundación Sila M. Calderón. 2007.
- Responsible for the economic section of The Interagency Study for the Reduction of Greenhouse Gases in Puerto Rico, a study for the Government of Puerto Rico's Department of Natural Resources and the Environment
- Responsible for the economic section of a study on Smart Growth in Puerto Rico, prepared jointly with the Metropolitan University's School of Environmental Studies, with funding from the EPA.
- Responsible for the economic sections of the ongoing Master Plan for the Sustainable Development of Vieques and Culebra Islands in Puerto Rico.
- Senior economist responsible for The Demand and Need for Housing in Puerto Rico, a study for the Puerto Rico Bankers Association, 2001.

EXPERIENCE AS EXPERT WITNESS

- Witness for the Ayerst-Wyeth pharmaceutical company in a lawsuit against the company. US District Court in San Juan. 1989-1990. Settled in 1990.
- Witness for the Puerto Rico Telephone Company in proceedings before the Puerto Rico Telecommunications Board regarding the setting of domestic telephone rates in Puerto Rico. 2005.
- Witness for the Cooperativa Agro-Comercial in a case involving the expropriation of a building in Cayey. San Juan Superior Court. 2006.
- Witness for the Centro de Recaudación de Impuestos Municipales (CRIM) in a suit against the CRIM. Settled in 2010.

JUAN LARA, PhD.

- Witness for the Puerto Rico Department of Education to calculate the cost of complying with the sentence in Rosa Lydia Vélez v. Departamento de Educación. Engagement began in 2007 and ended in December 2009.
- Witness for the National Life Insurance Company (NLIC) in a suit against the company. Settled in 2010.
- Witness for the Asociación de Suscripción Conjunta (a grouping of insurance companies providing jointly Puerto Rico's compulsory automobile insurance) in a suit against the Asociación. Currently active.
- Witness for UBS of Puerto Rico, Inc. in a FINRA Dispute Resolution Arbitration case. Settled in 2011.
- Witness for Metro Tech Corporation in a suit against TUV Rhineland of North America, Inc. Settled in 2010.
- Witness for DDR Atlántico in PR Records and Entertainment Corp. vs. CPR Cayey LP, S.E. and DDR Atlántico LLC, S.E., DAC 2010-2705(703). Tried in 2012.
- Witness for Roberto Hatton Gotay in Ramón A. Cacho Pérez v. Ramon Hatton Gotay, in Ponce Superior Court. Currently active.
- Witness for SP Blank in Caso Civil No. KAC 12-0348 (PR ONE INC. vs VILLA DEL CABO LLC), in San Juan Superior Court
- Witness for Banco Popular Inc. in Tirado vs. BPPR, caso civil núm.: cipe 2011-0010, in San Juan Superior Court.
- Witness for SeaStar Solutions in Santos Vs. SeaStar Solutions (formerly Telefex Canada), CIVIL-11-1602-JAG-MEL, in US District Court in San Juan. Currently active.
- Witness for Luis. R. Navarro in a suit for damages resulting from medical malpractice. Settled.
- Witness for Gabriel Mojica Alvarez and Gabriela Mojica Alvarez in Civil case KDP2016-1592 (801), 2018
- Witness for American Paper Corporation v Gabino Irizarry et al. in the Civil case DPE 2013-0242 504, 2018

Exhibit 2

LECO's Responses and Objections
to LUMA's First Set of Interrogatories and Request for Production of Documents Addressed to
Economist José Alameda,
p. 75, Request: LUMA-LECO-ALAMEDA-ROI-01-60

REQUEST: LUMA-LECO-ALAMEDA-ROI-01-60

Please indicate whether the Coase Theorem referenced on page 16, lines 17-19 of your testimony has been applied to the concept of outage compensation in the context of electric utilities before. If answered in the affirmative, please provide a list of the publication(s) in which the aforementioned has been discussed or analyzed.

RESPONDER:
José Alameda Lozada

RESPONSE:

The Coase Theorem provides a framework for "incentive- driven regulatory systems." The Coase Theorem allows for a solution that benefits both the consumers and companies when market inefficiencies arise. The Coase Theorem seeks to save both the consumers and companies money. PREB should further study the theorem and consider applying it to LUMA. While it may not have been –to my knowledge—applied to electric utilities, the PREB has a unique opportunity to implement this theorem.[3]

[3] The Coase Theorem, Britannica (last accessed January 12, 2022), https://www.britannica.com/topic/environmental-economics/The-Coase-theorem.