

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

**NEPR**

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**IN RE: DESPLIEGUE DE  
INFRAESTRUCTURA DE CARGADORES  
PARA VEHICULOS ELECTRICOS**

**CASE NO. NEPR-MI-2021-0013**

**SUBJECT: Request that Comments in this Proceeding  
be taken into Consideration in Connection with the  
Principles for EV Infrastructure Deployment**

**MOTION REQUESTING THAT LUMA’S COMMENTS IN THIS PROCEEDING BE  
TAKEN INTO CONSIDERATION IN CONNECTION WITH THE PRINCIPLES FOR  
INITIATING EV INFRASTRUCTURE DEPLOYMENT**

**TO THE HONORABLE PUERTO RICO ENERGY BUREAU:**

**COMES** now **LUMA Energy ServCo, LLC** (“LUMA”), through the undersigned legal counsel, and respectfully states and request the following:

1. On August 26, 2021, this Puerto Rico Energy Bureau (the “Energy Bureau”) issued a Resolution (the “August 26 Resolution”) commencing the instant proceeding seeking to “examine the necessary requirements to promote the efficient and orderly deployment of charging infrastructure for electric vehicles [(“EV”)]” in order to “promote and facilitate their proliferation in Puerto Rico” (*see* August 26 Resolution at p. 1 (translation ours)); and to “obtain the input of the various interest groups in the energy sector and parties interested in topics related to the use of [EV]” (*see id* at p. 2 (translation ours). To “commence the dialogue on the tendencies for the adoption of [EV] and to promote the deployment of the necessary infrastructure”, this Energy Bureau scheduled a virtual Workshop of Interested Parties for September 23, 2021 at 10:00 a.m. and provided interested parties until October 7, 2021 to submit their comments in writing. *See id.* at p. 3 (translation ours).

2. On September 23, 2021, the Energy Bureau held the virtual Workshop of Interested Parties (“First Technical Workshop”) wherein LUMA participated, among other interested parties.

3. On October 6, 2021, LUMA requested this honorable Energy Bureau an extension of thirty (30) days to submit written comments on the questions raised by this Energy Bureau during the First Technical Workshop. *See* LUMA’s *Request for Extension of Time to Submit Written Comments* of that date (“October 6<sup>th</sup> Motion”) at p. 3. In the October 6<sup>th</sup> Motion, LUMA indicated that “[g]iven the variety of topics and their complexity and the significant impact the deployment of [EV charging] infrastructure may have on the transmission and distribution system, LUMA [was] consulting with its subject matter experts and conducting additional analyses to address these subjects in a manner that would be of great benefit to the Energy Bureau in its consideration of the future regulatory framework for [EV] charging infrastructure”. *See id.* at p. 2. As a result, LUMA indicated it needed additional time to submit its written comments. *See id.*

4. On November 5, 2021, LUMA submitted its written comments on the questions raised by the Energy Bureau during the First Technical Workshop as well as additional discussion topics related to EV charging infrastructure deployment (“LUMA’s Comments”). *See* LUMA’s *Motion to Submit LUMA’s Written Comments on Electric Vehicles Charging Infrastructure Topics* of that date (“November 5<sup>th</sup> Motion) and its Exhibit A.

5. On November 18, 2021, the Energy Bureau issued a Resolution and Order (“November 18<sup>th</sup> Order”) indicating that it was adopting and publishing, through the November 18<sup>th</sup> Order, *Principles for Initiating EV Infrastructure Deployment* (the “General EV Guidance Principles”) (*see* November 18<sup>th</sup> Order at p. 1) which are to “guide the adoption of plans,

regulations and procedures related to this component of the energy sector in Puerto Rico” (*see id.* at p. 2).

6. The Energy Bureau also indicated in the November 18<sup>th</sup> Order that “[t]he [General EV Guidance Principles] take into considerations the comments received, both written and oral, during the [First] Technical Workshop, as well as public regulatory comments and proceedings in other jurisdictions that address the deployment of EV charging infrastructure” (*see id.* at p. 2); that the Energy Bureau had “received comments and reply comments from many different stakeholders, each with a unique perspective and expertise regarding EVs and the broader electric system” (*see id.*) and that “it had reviewed and considered these comments, in order to develop the [General EV Guidance Principles] [sic] make general and specific findings related to EVs in Puerto Rico that are intended to shape and guide future EV related filings by LUMA.” *See id.*

7. In the November 18<sup>th</sup> Order, the Energy Bureau specifically indicated that it had received written comments from CAMBIO PR; Colegio de Peritos Electricistas de Puerto Rico; Oficina Independiente de Protección al Consumidor (OIPC); Public Energy Policy Program of the Puerto Rico Department of Economic Development and Trade; Mr. Angel D. Rodriguez; and Tesla, Inc. *See id.* There is no mention in the November 18<sup>th</sup> Order of LUMA’s Comments submitted via the November 5<sup>th</sup> Motion.

8. In the November 18<sup>th</sup> Order, the Energy Bureau also ordered LUMA to file with the Energy Bureau on or before September 1, 2022, a First Phase of an EV Charging Infrastructure Deployment Plan (“Phase I EV Plan”) reflecting the General EV Guidance Principles and in compliance with a list of requirements set forth in the November 18<sup>th</sup> Resolution and Order. *See id.* at p. 4. In addition, the Energy Bureau ordered LUMA to attend Compliance Technical

Hearings every three (3) months (scheduled for February 25, 2022, May 31, 2022, and August 31, 2022), to file a presentation on or before February 24, 2022 at 12:00 p.m. to guide LUMA’s reporting during the Compliance Technical Hearings, and to file on or before May 31, 2022 a proposal for “one or more rate designs targeting the customer segments set forth in the [General EV Guidance Principles] and envisioned in the Phase I EV Plan” and to address the minimum requirements specified in the November 18<sup>th</sup> Order. *See id.* at pp. 5-9. Finally, the Energy Bureau indicated that it would schedule two additional Technical Workshops to be held in January 2022 and February 2022 (referred to as the “Second Technical Workshop” and the “Third Technical Workshop”, respectively) to address topics specified in the November 18<sup>th</sup> Order.

9. On December 17, 2021, this Energy Bureau issued a Resolution and Order (the “December 17<sup>th</sup> Order”) acknowledging that the Energy Bureau had received LUMA’s October 6<sup>th</sup> Motion requesting a thirty (30) -day extension to submit written comments and that LUMA had filed LUMA’s Comments via the November 5<sup>th</sup> Motion. *See* December 17<sup>th</sup> Resolution and Order at p. 1. The Energy Bureau also indicated that it reviewed LUMA’s Comments (*see id.*), providing a discussion of these comments (*see id.* at p. 2). The Energy Bureau then determined to revise the topics of the Second and Third Technical Workshops scheduled under the November 18<sup>th</sup> Order essentially to address certain topics raised by LUMA in LUMA’s Comments.<sup>1</sup> *See id.* at pp. 3-4.

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<sup>1</sup> Specifically, the Energy Bureau deferred the original topic of the Second Technical Workshop to the Third Technical Workshop (*see id.* at p. 4) and changed the topic of the Second Technical Conference to instead “specifically address multiple aspects of resource adequacy associated with EV infrastructure deployment”, including the topics of “Overview of Electric System Condition”, “Demand Curve Impacts”, and “Managing EV Load Effectively” as further elaborated in the December 17<sup>th</sup> Order (*see id.*, at pp. 3-4). The Energy Bureau further determined that the Third Technical Workshop would now focus on “EV infrastructure planning matters relevant to the Phase I EV Plan filing as well as subsequent plan filings” (*see id.* at p. 4), including the topics of “Planning for Incremental Deployment of EV Charging

10. In the December 17<sup>th</sup> Order, the Energy Bureau did not make any changes to the Principles.

11. From a review of the November 18<sup>th</sup> and December 17<sup>th</sup> Orders, it is evident that, when making its determinations in the November 18<sup>th</sup> Order, this honorable Energy Bureau did not consider LUMA's Comments submitted via the November 5<sup>th</sup> Motion. It is later, when this Energy Bureau issued the December 17<sup>th</sup> Order, that the receipt and contents of LUMA's Comments were acknowledged. Although by means of the December 17<sup>th</sup> Order this Energy Bureau amended parts of the November 18<sup>th</sup> Order, these amendments did not result in a revision of the General EV Guidance Principles.

12. LUMA appreciates that in the December 17<sup>th</sup> Order this Energy Bureau acknowledged LUMA's Comments and added topics for the Second and Third Workshops to address these. Although LUMA understands that the General EV Guidance Principles are meant to be general ideas to guide the future elaboration of policy and regulations with respect to EV infrastructure deployment, LUMA would like to highlight various comments included in LUMA's Comments and those submitted by other stakeholders that merit consideration in connection with the General EV Guidance Principles, which are discussed in **Exhibit A** herein. **Exhibit A** includes, for this Energy Bureau's consideration, (i) a discussion of some of the existing General EV Guidance Principles in light of LUMA's and other stakeholder Comments and (ii) suggestions to

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Infrastructure" and "System Planning and Implementation Strategies", as these subjects are elaborated in the December 17<sup>th</sup> Resolution (*see id.*). The Energy Bureau also ordered LUMA to (i) provide in the Second Technical Workshop certain data and information listed in the December 17<sup>th</sup> Order regarding the state of the distribution system and (ii) file, on or before January 25, 2022, certain documents listed in the December 17<sup>th</sup> related to LUMA's "Strategy for Recovery and Transformation" and certain data and analyses related to available capacity of the distribution system". *See id.* at p. 5.

include additional proposed Principles that are reflective of these comments. LUMA respectfully requests this honorable Energy Bureau to consider the comments and requests in **Exhibit A** and adopt the additional Principles proposed therein to ensure a more complete set of General EV Guidance Principles reflective of LUMA's Comments, as well as other stakeholders in this proceeding.

**WHEREFORE**, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned, **accept Exhibit A** to this Motion, take into consideration LUMA's Comments and those of other stakeholders as discussed in Exhibit A and adopt the proposed "Principles" and comments therein as part of the *Principles for Initiating EV Infrastructure Deployment*.

**RESPECTFULLY SUBMITTED.**

In San Juan, Puerto Rico, this 21<sup>st</sup> day of January 2022.

I hereby certify that I filed this Motion using the electronic filing system of this Energy Bureau.



**DLA Piper (Puerto Rico) LLC**  
500 Calle de la Tanca, Suite 401  
San Juan, PR 00901-1969  
Tel. 787-945-9107  
Fax 939-697-6147

/s/ Laura T. Rozas  
Laura T. Rozas  
RUA Núm. 10,398  
[laura.rozas@us.dlapiper.com](mailto:laura.rozas@us.dlapiper.com)

Exhibit A

*LUMA's Comments*



# Comments on Electric Vehicle Charging Infrastructure Resolution and Order

NEPR-MI-2021-0013

January 20, 2021



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## 1.0 Introduction

On November 18<sup>th</sup>, 2021, the Puerto Rico Energy Bureau issued Resolution and Order (November 18 Order) establishing Principles for Initiating EV Infrastructure Deployment (Principles) and directives for the deployment of electric vehicle (EV) charging infrastructure. The November 18 Order establishes the Principles to guide the adoption of plans, regulations and procedures related to this component of the energy sector in Puerto Rico. These Principles were “informed by the Energy Bureau’s review of input received during the Stakeholder Workshop<sup>1</sup> on September 23, 2021 and the comments filed by Stakeholders under the instant case and information from other jurisdictions.”<sup>2</sup> Based on review of the comments submitted and the November 18 Order, it does not appear that LUMA’s comments submitted on November 5, 2021 (LUMA’s Comments) were considered or incorporated into the findings and determinations of the November 18 Order, including the drafting of the Principles. In addition, these Principles do not appear to reflect comments provided by other stakeholders in this process.

On December 17, 2021, this Energy Bureau issued a Resolution and Order (December 17 Order) that acknowledged and discussed LUMA’s comments.

LUMA appreciates the Energy Bureau’s acknowledgment that “LUMA’s comments merit further discussion.”<sup>3</sup> However, the December 17 Order did not revise the original Principles set in the November 18 Order and therefore LUMA believes that LUMA’s comments and those of other stakeholders are not fully captured in the Principles that guide future planning for EVs. The Annex included in Section 4.0 of this document includes a summary of key points filed by other involved stakeholders and by LUMA.

For these reasons, LUMA respectfully requests that this Energy Bureau consider LUMA’s comments, as well as certain similar comments from other stakeholders, with respect to the Principles, as proposed in this document. LUMA requests that comments be considered if the Bureau revises the Principles. The key themes outlined in this document are listed below, and their rationale is discussed further in this document and the Annex:

- The Energy Bureau will establish necessary regulations, standards, permitting and/or certification processes to ensure the safety, interoperability and grid connectivity of EV charging infrastructure installations.
- Ensure adequate planning for T&D and generation upgrades necessary to meet increased demand.
- Maintain the safety and reliability of the grid.

## 2.0 Suggested Principles

The following section discusses LUMA’s and other stakeholder’s comments and respectfully requests that the following proposed Principles be including among the Principles set forth in the November 18 Order:

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<sup>1</sup> Stakeholder Workshop for tendencies on Electric Vehicles adoption and infrastructure deployment

<sup>2</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/11/20211118-MI20210013-Resolution-and-Order.pdf>

<sup>3</sup> See LUMA’s *Motion to Submit LUMA’s Written Comments on Electric Vehicles Charging Infrastructure Topics* filed with the Energy Bureau on November 5, 2021.

<sup>3</sup> Page 2. <https://energia.pr.gov/wp-content/uploads/sites/7/2021/12/Resolution-and-Order-NEPR-MI-2021-0013.pdf>

## 2.1 EV Standards and Regulations

### 2.1.1 Proposed Principle:

- The Energy Bureau will work to establish necessary regulations, standards, permitting and/or certification processes to ensure the safety, interoperability and grid connectivity of EV charging infrastructure installations.

There were various comments from LUMA, Colegio Peritos Electricistas, Energy Public Policy Program of the Department of Economic Development and Commerce of Puerto Rico (EPPP), and OIPC that suggested the need for the Energy Bureau to create regulations and standards.

As reflected in stakeholder comments, electric vehicle charging installations are currently being installed in Puerto Rico without regulatory oversight or permitting to certify they are installed according to applicable codes and standards. Interconnection regulations and standards are necessary to ensure the safety and reliability of the grid and the safety of homes and businesses, since incorrect and unrecorded installations could increase the risk of hazardous conditions both inside the home and to the T&D System.

LUMA considers EVs as a Distributed Energy Resource. EV's are decentralized, modular, and more flexible technologies, similar to distributed generation (DG) and batteries. As with DG projects, there are certain procedures that should be required to evaluate existing electrical infrastructure to determine if there is sufficient existing capacity, and to identify costs for any necessary upgrades to accommodate EV charging load. Furthermore, without a permitting process, LUMA has no visibility into where EV charging infrastructure is being installed, to monitor and address any grid issues that arise and require upgrades.

Therefore, regulations that establish the necessary standards, requirements and processes should be implemented before (or alongside) any actions that would accelerate unsafe, un-managed charging infrastructure deployment.

## 2.2 Grid Impacts of EV Charging Infrastructure

### 2.2.1 Proposed Principles:

- Ensure adequate planning for T&D and generation upgrades necessary to meet increased demand from EVs.
- Maintain the safety and reliability of the grid.

Comments on this matter were made by LUMA and other stakeholders - Angel David Rodriguez, OIPC, and CAMBIO PR - related to EV load impacts that LUMA believes should be reflected in the Principles.

As EVs are deployed in the marketplace, electricity demand will increase and change time of use patterns across Puerto Rico. Recent months and years have shown that the system does not have the available generating resources to adequately meet current load. Additional EV load can lead to a capacity shortfall. While these resource adequacy constraints related to increased demand and changing demand profiles could be partly addressed through, for example, demand response programs to shift peak demand, they also need to be met with more resources. In order to avoid negative grid impacts for all customers – EV and non-EV adopters – adequate planning and implementation of T&D and generation upgrades are required.

Further, these changes in the system will require analysis of feeder capacity to identify upgrade requirements or where EV charging locations should be installed to minimize grid upgrades.

Dealing with an increase in demand and changes in time of use require thorough analyses and planning to identify and deploy solutions that can maximize the deployment of EVs. For example, the US Department of Energy (DOE) intends to estimate electricity demand and system-wide impact under various EV adoption scenarios as part of the PR100 study. It is anticipated that this study will provide valuable information to help plan for grid impacts of EV charging and inform future policymaking.

## 3.0 Conclusion

LUMA agrees with the Energy Bureau in “recognition of the complexity and unprecedented nature of EV infrastructure deployment.”<sup>4</sup> LUMA is supportive of a collaborative approach to development of a roadmap for deployment of EV Charging Infrastructure. For this reason, LUMA prepared Comments submitted on November 5, 2021. LUMA would like to request that its comments be taken into consideration by the Energy Bureau and reflected in the Principles that are meant to guide future planning. In alignment with LUMA's Comments, LUMA respectfully requests that the following Principles be included among the Principles in the November 18 Order, which reflect LUMA's Comments in this proceeding:

- The Energy Bureau will work to establish necessary regulations, standards, permitting and/or certification processes to ensure the safety, interoperability and grid connectivity of EV charging infrastructure installations.
- Ensure adequate planning for T&D and generation upgrades necessary to meet increased demand.
- Maintain the safety and reliability of the grid.

LUMA looks forward to discussing these comments and other topics during the next Technical Workshops.

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<sup>4</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Comentarios-Cargadores-de-Vehiculos-Electricos-NEPR-MI-2021-0013.pdf>.

## 4.0 Annex

### 4.1 Comments and Suggested Principles

#### 4.1.1 EV Standards and Regulations

- “Es un hecho ineludible que, en la actualidad se están haciendo instalaciones de cargadores para autos eléctricos y no hay garantías que estas estén siendo realizadas por personal capacitado y certificado. También es un hecho que la proliferación de estas instalaciones levanta la necesidad imperiosa de una reglamentación en acorde con las nuevas tendencias y mejores prácticas. De otra parte, la dilación de esta reglamentación pone en riesgo la vida y propiedad de los usuarios ante la posibilidad que las mayorías de estas instalaciones no se encuentren en cumplimiento con los requerimientos del Código Nacional Eléctrico vigente.” (Colegio Peritos Electricistas de Puerto Rico<sup>5</sup>).
- “Deben realizarse todos los estudios, gestiones y adelantos necesarios en la red eléctrica, así como en la capacidad de generación de energía, con la mayor premura, para que la integración de vehículos eléctricos en Puerto Rico no se vea limitada por falta de capacidad de generación de energía o de condiciones no apropiadas de la red eléctrica.” (Energy Public Policy Program of the Department of Economic Development and Commerce of Puerto Rico (EPPP)<sup>6</sup>).
- “El Colegio de Peritos Electricistas tiene la responsabilidad delegada por la Ley 115 de 2 de junio de 1976 de garantizar la seguridad no solo de sus colegiados, sino también del consumidor. Es por eso por lo que estamos trabajando legislación para regular la instalación de cargadores de autos eléctricos. Esta iniciativa es motivada a que la instalación de estos artefactos cambiaría la carga requerida en residencias, comercios y en el caso de cargadores modo III y IV (*Super chargers*) que conllevarían la instalación de una subestación. Que a su vez conlleva cambios eléctricos en las instalaciones de hogares, comercios, incluyendo una evaluación de carga para verificar la necesidad de estos cambios. Es por eso que estas instalaciones conllevarán una certificación profesional para la capacitación del perito electricista en la instalación de estos cargadores eléctricos. Esta certificación profesional abre la posibilidad de certificación eléctrica de estas instalaciones y la creación de permisos. Equiparando a Puerto Rico a otros estados. Luego de una investigación en otras jurisdicciones de Estados Unidos se pudo constatar que la norma es la certificación de la instalación, mantenimiento y reparación de cargadores de autos eléctricos. La aplicación de una norma donde toda persona o entidad que instale mantenga o repare estaciones de cargadores eléctricos. Este permiso es ante una comisión reglamentaria y debe hacerse previo a la instalación, mantenimiento o reparación de la estación de carga. La información requerida por solicitud incluyendo la certificación profesional del instalador que garantiza que la persona está debidamente adiestrada y cualificada. Además, tiene como requerimientos de seguros para daño a la propiedad y a la vida y otro de “liability” para el comercio en general.” (Colegio Peritos Electricistas de Puerto Rico<sup>7</sup>).

<sup>5</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Comentarios-Despliegue-de-Infraestructura-de-Cargadores-para-Vehiculos-Elctricos-NEPR-MI-2021-0013-1.pdf>

<sup>6</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Declaraciones-Escritas-sobre-la-Postura-del-Programa-de-Politica-Publica-Energetica-Cargadores-Vehiculos-Elctricos-NEPR-MI-2021-0013-1.pdf>

<sup>7</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/09/Escrito-Urgente-Notificando-la-Intervencion-del-CPEPR-NEPR-MI-2021-0013.pdf>

- “El procedimiento de conexión de estaciones debe ser uno análogo al de generadores distribuidos, tramitados de forma expedita a través de un portal electrónico, con requerimientos mínimos y exentos de permisos de construcción. Sin embargo, entendemos que sí deben contar con el endoso de la utilidad.” (OIPC<sup>8</sup>).
- “Increase in load from electric vehicles (especially fleets) will eventually exceed feeder capacity and require system upgrades. Current residential electrical infrastructure in Puerto Rico may limit the ability to install EV chargers, where the load capacity design per home is usually limited to 5-7 kW. An EV charger could increase a home’s load to nearly 10 kW, which may overload service transformers at higher penetrations, as many existing service transformers are limited to 10-25 kW.

Load capacity upgrade projects have different phases including planning and permitting. It is important that an evaluation process is followed to ensure quality of the service and reliability on the system for the neighboring customers. In some instances, these evaluations require system modeling and other studies, including grid improvement cost estimates that require time to prepare. Managed charging strategies may offer a way to reduce impacts and reduce the need for grid upgrades.” (LUMA<sup>9</sup>).

- “LUMA suggests the following areas for further research and analysis to improve grid-readiness for the electric vehicle transformation: [...] Investigate methods for registering EV charging infrastructure installation to enable monitoring the rate of growth to plan for grid impacts.” (LUMA<sup>10</sup>).

#### 4.1.2 Grid Impacts of EV Charging Infrastructure

- “Sin lugar a duda, en la medida que entren estos vehículos a la isla, mayor será la demanda energética. La pregunta que nos hacemos, ¿Está el sistema preparado para este aumento? Definitivamente, no.” (Angel David Rodriguez<sup>11</sup>).
- “De más está decir que, esta tecnología modificará el patrón usual de demanda eléctrica en Puerto Rico. Si bien es cierto que el cambio será uno positivo para la utilidad, se requiere de mucha planificación e inversión a los fines de garantizar que ocurra de manera organizada y resulte en beneficio tanto para el consumidor como para Puerto Rico en general.” (OIPC<sup>12</sup>).
- “We appreciate that the Bureau is starting to plan for the widescale deployment of electric vehicles, which would significantly increase electricity demand in Puerto Rico, and which requires forethought and planning for the necessary infrastructure upgrades... A comprehensive analysis of distribution feeders should be undertaken in order to understand which feeders will likely need to be upgraded to accommodate some level of nighttime residential EV charging, and where non-

<sup>8</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Comentarios-Cargadores-de-Vehiculos-Electricos-NEPR-MI-2021-0013.pdf>

<sup>9</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/11/Motion-to-Submit-LUMAs-Written-Comments-on-Electric-Vehicles-Charging-Infrastructure-Topics-NEPR-MI-2021-0013.pdf> at pages 6-7.

<sup>10</sup> Id. at page 7.

<sup>11</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/20211001-MI20210013-Comentarios-Angel-D-Rodriguez.pdf>

<sup>12</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Comentarios-Cargadores-de-Vehiculos-Electricos-NEPR-MI-2021-0013.pdf>

residential charging stations should be located to minimize the need for grid upgrades.” (CAMBIO PR<sup>13</sup>).

- “Near-term EV policy research and development should also consider ways to mitigate resource adequacy constraints by, for instance, shifting peak demand to utilize renewable resources during the daytime hours. Most vehicle charging is expected to occur during evening hours. This is true for light-duty vehicle owners (passenger vehicles) where vehicles will be plugged in overnight as well as most fleet vehicles, when charging will occur after hours to ensure fleet vehicles are fully charged at the start of each workday. Recent months have shown that PREPA does not have the available baseload generating resources to adequately meet current load and which indicates that it cannot support the promotion of additional load without experiencing a baseload capacity shortfall.” (LUMA<sup>14</sup>).
- “EV charging can further burden the electricity grid by adding load at inopportune times. During peak demand periods when the generation supply may be struggling to meet increased demand, adding large amounts of vehicle charging would be extremely problematic for the system. While curtailment of EV charging behind the meter cannot be required, there are managed charging controls and approaches that can be utilized to mitigate or curtail charging loads during such periods. In addition, DER (solar and storage) can also be used to mitigate daytime charging impacts.” (LUMA<sup>15</sup>).
- “The “duck curve” is a situation that arises (and must be mitigated) as solar energy becomes a greater share of the generation supply. As solar production increases during daytime hours, the net load (customer demand minus solar generation) decreases. Then as solar production ebbs during late afternoon, thermal generation and batteries need to ramp up to meet the net load without the solar contribution. This will be problematic as EV charging schedules will coincide with system peak demand, further exacerbating the duck curve issue by increasing the evening ramp and the daily system peak. As the power grid increasingly becomes reliant on renewable generation, meeting the demand of customers during the peak evening hours will become more difficult if not mitigated...” (LUMA<sup>16</sup>).

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<sup>13</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/10/Comments-on-Electric-Vehicle-Deployment-NEPR-MI-2021-0013.pdf>

<sup>14</sup> <https://energia.pr.gov/wp-content/uploads/sites/7/2021/11/Motion-to-Submit-LUMAs-Written-Comments-on-Electric-Vehicles-Charging-Infrastructure-Topics-NEPR-MI-2021-0013.pdf> at pages 4-5.

<sup>15</sup> Ibid. at page 5.

<sup>16</sup> Ibid. at page 5.