

**PUBLIC SERVICE COMMISSION OF THE DISTRICT OF COLUMBIA
1325 G STREET, N.W., SUITE 800
WASHINGTON, D.C. 20005**

ORDER

December 20, 2019

FORMAL CASE NO. 1144, IN THE MATTER OF THE POTOMAC ELECTRIC POWER COMPANY'S NOTICE TO CONSTRUCT TWO 230kV UNDERGROUND CIRCUITS FROM THE TAKOMA SUBSTATION TO THE REBUILT HARVARD SUBSTATION, AND FROM THE REBUILT HARVARD SUBSTATION TO THE REBUILT CHAMPLAIN SUBSTATION (CAPITAL GRID PROJECT), Order No. 20274

Before the Commission:

Willie L. Phillips, Chairman
Richard Beverly, Commissioner
Greer Gillis, Commissioner

SUMMARY

1. The Commission is statutorily required to ensure that every public utility doing business within the District of Columbia furnishes service and facilities safe and adequate, and in all respects, just and reasonable. In this Order, the Commission considers Phase II of the Potomac Electric Power Company's ("Pepco" or "Company") Capital Grid Notice of Construction ("Phase II of the Capital Grid Project"). Phase II of the Capital Grid Project is focused on the proposed construction of the Mt. Vernon Substation, which is estimated to cost \$143 million.

2. Section 2111 of Title 15 of the District of Columbia Municipal Regulations ("DCMR") sets forth the requirements for a Notice of Construction ("NOC") for underground transmission lines that will exceed 69,000 volts and construction activity concerning substations to be connected to those lines.¹ The Commission's review of a NOC application is different from a rate case, as the NOC application review is to determine the reasonableness, safety, and need of the proposed facilities. The Commission also considers the requirements of the CleanEnergy DC Omnibus Amendment Act of 2018.² Unlike prior NOC proceedings, in this proceeding, the Commission allowed numerous rounds of comments and extensive discovery. Pepco provided all the detailed technical information required by the Commission's regulations and orders, including an analysis of possible alternatives. Also, Pepco responded to data requests and produced thousands of pages of documents. The Company also engaged in widespread community outreach in connection with the Capital Grid Project. This information combined with the fact that no overall material changes to the forecasted loads have occurred for the areas to be impacted by the proposed new substation since the time Pepco submitted its Application, provides a comprehensive and substantial record upon which we base our decision.

3. After reviewing Phase II of Pepco's Capital Grid NOC Application and the comments received in response thereto, the Commission finds that Pepco satisfactorily addressed each regulatory requirement applicable to a NOC filing. In addition, the Commission finds that Pepco provided the additional information related to Phase II that was required in Order No. 19274³ and satisfactorily addressed the requirements of the CleanEnergy DC Omnibus Amendment Act of 2018.

4. The Commission finds that without the proposed Mt. Vernon Substation, the contingency capacity margins of Pepco's distribution system will decline, representing a risk to the safe, and reliable operation of the distribution grid. Absent the Mt. Vernon Substation, Pepco's facilities in the Mt. Vernon area will be exposed to operation at high loading or overload during extreme weather, thus degrading the reliability of the distribution system and potentially

¹ 15 DCMR § 2111 (2004).

² CleanEnergy DC Omnibus Amendment Act of 2018, D.C. Law 22-257, effective March 22, 2019; codified as D.C. Code § 34-808.02 (Supp. 2019).

³ *Formal Case No. 1144, In the Matter of the Potomac Electric Power Company's Notice to Construct Two 230 kV Underground Circuits from the Takoma Substation to the Rebuilt Harvard Substation, And From the Rebuilt Harvard Substation to the Rebuilt Champlain Substation (Capital Grid Project)* ("Formal Case No. 1144"), Order No. 19274, rel. February 14, 2018 ("Order No. 19274").

shortening the useful service life of the surrounding substations and individual feeders in their network groups. Thus, any potential overloads during extreme hot weather could present a significant risk of widespread outages affecting many customers.

5. We also find that the weather-normalized 90/10 load forecast methodology applied by Pepco in this case is appropriate and reasonable. This methodology is better suited than the suggested alternative 50/50 methodology at ensuring that the distribution system has a higher probability of providing reliable service to District customers during the most extreme summer weather likely to be experienced over a ten-year period. As explained further in this Order, in this particular matter, the Commission concludes that Pepco's weather-normalized 90/10 load forecast methodology is appropriate and reasonable and is consistent with practices generally used in the utility industry for distribution system planning.

6. Opponents of the Mt. Vernon Substation asked us to reject Pepco's proposal because it does not broadly incorporate alternative solutions and relies on traditional planning principles. We support integration of more proven Distributed Energy Resources ("DER") into the distribution system as an alternative to traditional infrastructure projects and are directing Pepco to consider alternative solutions for future load serving projects. However, there are many challenges associated with integrating DER and other Non-Wires Alternatives ("NWAs") into the planning and operation of the distribution system, particularly where network feeder groups are involved. In this instance we conclude that Phase II of the Capital Grid Project, as proposed by Pepco, is the best alternative of those considered, to address current load growth in the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas of the District in a timely fashion.

7. The Commission believes that the Mt. Vernon Substation will relieve the potential overload conditions at the surrounding substations and network feeder groups and thus mitigate risks related to the reliability, overload, and overstress conditions identified by Pepco. Furthermore, the additional firm capacity at the Mt. Vernon Substation and the surrounding substations and on the Low Voltage Alternating Current ("LVAC") network feeder groups will allow for future scheduled load transfers, emergency load transfers, and future load growth. The Mt. Vernon Substation will entail creation of additional feeders which will improve overall reliability. As part of the Capital Grid Project, Pepco proposes to install a battery energy storage unit in the Mt. Vernon Substation that will be used to gain an understanding of the impacts of battery energy storage on the distribution system and may defer installation of the fourth transformer when the transformer would otherwise be needed. Finally, the Mt. Vernon Substation will notably increase the hosting capacity for DER, which would be in addition to the previously added hosting capacity from the Harvard Substation approved in Phase I of this proceeding.

8. For the above reasons, we conclude that Pepco has demonstrated the reasonableness, safety and need for the construction and operation of the Mt. Vernon Substation. We further conclude that the new Substation will provide substantial reliability benefits to the District and help prepare it for anticipated climate change challenges. Given the District's objective to maintain a reliable distribution system during extreme weather events, we believe that the Mt. Vernon Substation is necessary to: 1) maintain and enhance the District's high reliability standards and performance; 2) provide flexibility for planned and emergency load transfer; and 3)

reduce the risk of prolonged and widespread outages in the area to be served by the new Substation. The Mt. Vernon Substation would also provide additional DER hosting capability.

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ATTACHMENT A: Commission Directives

I. INTRODUCTION

1. By this Order, the Public Service Commission of the District of Columbia (“Commission”) finds that the Potomac Electric Power Company (“Pepco” or “Company”) has satisfactorily demonstrated the reasonableness, safety, and need for Phase II of the Capital Grid Project Notice of Construction, which is designed to build the Mt. Vernon Substation. Phase II also addresses the requirements established by the CleanEnergy DC Omnibus Amendment Act of 2018 (“CleanEnergy Act”).⁴ In connection with Phase II approval, Pepco is directed to complete several compliance actions and report to the Commission, as outlined in Attachment A to this Order. Therefore, construction of the Mt. Vernon Substation can proceed, subject to the permitting requirements from other District of Columbia (“District”) agencies.

II. BACKGROUND

2. On May 10, 2017, Pepco filed what it intended to be the first of two Notices of Construction (“NOC”) with the Commission seeking approval of the first part of its Capital Grid Project. Pepco expected to file the second NOC at a later date. Subsequently, on May 24, 2017, the Commission *sua sponte* opened an investigation into the reasonableness, safety, and need for Pepco’s NOC.⁵ Many individuals and organizations submitted comments on the first NOC-1. Based on the record, the Commission determined that a review of the overall reliability and resiliency benefits of the project necessitated a holistic view of Pepco’s entire Capital Grid Project and directed Pepco to refile its NOC-1, combined with NOC-2, as a single new comprehensive Capital Grid Application.⁶ In the decision, the Commission also invited interested persons to submit comments within 90 days of the application submission and reply comments within 120 days.⁷

3. On June 29, 2018, Pepco filed its new Capital Grid Application as directed.⁸ On July 6, 2018, the Commission issued a Public Notice once again inviting interested persons to submit comments.⁹ Comments and reply comments were due on September 27, 2018, and October 29, 2018, respectively. On October 16, 2018, the District of Columbia Government (“DCG”) filed a Motion requesting that the deadline for reply comments on Pepco’s Capital Grid Application be

⁴ CleanEnergy DC Omnibus Amendment Act of 2018, D.C. Law 22-257, effective March 22, 2019; codified as D.C. Code § 34-808.02 (Supp. 2019) (“CleanEnergy Act”).

⁵ *Formal Case No. 1144*, Public Notice, issued May 24, 2017.

⁶ *Formal Case No. 1144*, Order No. 19274, ¶¶ 12-14, rel. February 14, 2018. Also, Order No. 19274 outlines the procedural history of the case up until the date of the Order.

⁷ *Formal Case No. 1144*, Order No. 19274, ¶ 2.

⁸ *Formal Case No. 1144*, The Potomac Electric Power Company’s Formal Notice of Construction of the Capital Grid Project Pursuant to Order No. 19274, filed June 29, 2018 (“Pepco’s Capital Grid Application”).

⁹ *Formal Case No. 1144*, Public Notice, Capital Grid Project, ¶ 8, rel. July 6, 2018. The Notice was published in the D.C. Register on July 20, 2018 (See 65 *D.C. Reg.* 007618-007621 (July 20, 2018)).

extended from October 29, 2018, to November 20, 2018.¹⁰ The Commission granted DCG's Motion.¹¹

4. On October 30, 2018, Pepco filed a Confidential Errata to its Quanta Report, which is part of the Capital Grid Application, correcting cost data and the cost-benefit analysis for the Mt. Vernon Substation.¹² To allow all interested persons sufficient time to review the new information by Order No. 19738, the Commission extended the comment period in connection with Pepco's Capital Grid Application until December 10, 2018, and the reply comment period until December 28, 2018.¹³ Following an initial analysis of the entire record, including Pepco's responses to Staff Data Requests, by Order No. 19886, the Commission bifurcated its review of Pepco's Capital Grid Project into two phases.¹⁴ Phase I addressed the portion of Pepco's Capital Grid Application that included modifications to the existing Harvard and Champlain Substations, and construction of 10 miles of two networked 230 kV underground transmission lines supplying these Substations, extending up to the Waterfront Substation.¹⁵ Phase II, which is the subject of this Order focuses on the proposed construction of the Mt. Vernon Substation.¹⁶

5. After reviewing Phase I of Pepco's Capital Grid Application and all comments submitted by interested persons, the Commission in Order No. 20203 determined that Pepco had sufficiently demonstrated the reasonableness, safety, and need for Phase I of the Capital Grid Project NOC.¹⁷ The Commission also explained at that time that due to the complexities of the issues associated with the proposed Mt. Vernon Substation, it would hold a status conference to consider the process for reviewing Phase II of Pepco's Capital Grid Application.¹⁸ On October 22, 2019, the Commission held a Telephonic Status Conference to discuss what, if any, further process was necessary to facilitate the Commission's adjudication of Phase II of Pepco's Capital Grid Application.¹⁹ During the Status Conference, Pepco confirmed that it did not plan to

¹⁰ *Formal Case No. 1144*, Uncontested Motion of the District of Columbia Government for an Enlargement of Time to File Reply Comments, filed October 16, 2018.

¹¹ *Formal Case No. 1144*, Order No. 19727, ¶ 1, rel. October 24, 2018.

¹² *Formal Case No. 1144*, Order No. 19274 at Attachment A, Item 3(e); Potomac Electric Power Company's Errata to the Study Performed by Quanta Technology filed on June 29, 2018, as Appendix F to Pepco's Capital Grid Application NOC Construction ("Confidential Errata"), filed October 30, 2018.

¹³ *Formal Case No. 1144*, Order No. 19738, ¶ 1, rel. November 7, 2018. See also Public Notice informing the public of the extended deadlines at 65 *D.C. Reg.* 012907 (November 16, 2018).

¹⁴ *Formal Case No. 1144*, Order No. 19886, ¶ 1, rel. April 5, 2019 ("Order No. 19886").

¹⁵ *Formal Case No. 1144*, Order No. 19886, ¶¶ 1,4.

¹⁶ *Formal Case No. 1144*, Order No. 19886, ¶ 1.

¹⁷ *Formal Case No. 1144*, Order No. 20203, ¶ 1, rel. August 9, 2019 ("Order No. 20203").

¹⁸ *Formal Case No. 1144*, Order No. 20203 at ii.

¹⁹ *Formal Case No. 1144*, Public Notice of Status Conference Capital Grid Project, Phase II Mt. Vernon Substation, filed October 22, 2019. The Public Notice indicated that Pepco had recently advised the Commission that

supplement its Capital Grid Application or provide additional data. Participants were invited to submit any appropriate filings for the Commission's consideration by November 1, 2019, with responses due by November 5, 2019.

III. DECISION ON PROCEDURAL MATTERS

6. On November 1, 2019, the Office of the People's Counsel ("OPC")²⁰ and DCG²¹ filed requests seeking additional procedures to govern Phase II of *Formal Case No. 1144*. OPC states that the Commission cannot make a decision on Phase II based on the record before it because Pepco's information concerning its load forecasts, energy efficiency, Distributed Energy Resources ("DER"), and Prospective New Business ("PNB") is stale and should be updated.²² Specifically, OPC recommends that the Commission issue an Order: (1) directing Pepco to submit updated load forecast, energy efficiency, DER, and PNB data and analysis for the areas surrounding the proposed Mt. Vernon Substation; (2) requiring Pepco to submit an affidavit explaining the assumptions and methodology underlying the Company's load forecasts and energy-efficiency and new-business projections; (3) granting OPC and other interested persons time to conduct discovery on the updated submission and file responsive affidavits; (4) setting the reasonableness of the proposed Mt. Vernon Substation for evidentiary hearing; and (5) granting such other relief as the Commission deems appropriate under the circumstances.²³ DCG advocates for treating this matter as a contested case, requesting that the Commission accept petitions to intervene and designate persons for receipt of service, allow persons to conduct discovery and submit written testimony, convene an evidentiary hearing on what DCG considers to be material issues of fact in dispute especially in light of the requirements of the CleanEnergy Act, and accept post-hearing briefs.²⁴

it did not plan to supplement its June 29, 2018, Notice of Construction with any updated information related to the proposed Mt. Vernon Substation. *Formal Case No. 1144*, Pepco's Response to Commission Staff's Data Request No. 15, dated October 11, 2019.

²⁰ *Formal Case No. 1144*, Office of the People's Counsel for the District of Columbia's Motion for Additional Procedures, filed November 1, 2019 ("OPC's Motion for Additional Procedures").

²¹ *Formal Case No. 1144*, District of Columbia Government's Post-Status Conference Submission, filed November 1, 2019 ("DCG's Submission").

²² *Formal Case No. 1144*, OPC's Motion for Additional Procedures at 3-4.

²³ *Formal Case No. 1144*, OPC's Motion for Additional Procedures at 2.

²⁴ *Formal Case No. 1144*, DCG's Submission at 1-2. DCG presents the following four issues as examples of material issues in dispute: (1) Can Pepco's Load Forecasting Methodology be relied upon as the basis for the substation need; (2) What is the load/peak reducing potential of energy efficiency, demand response, battery storage, rooftop solar, combined heat power (CHP); (3) Is there spare capacity available from the nearby Northeast Substation 212; and (4) Are there examples from other jurisdictions that can serve as a guide.

7. In its Comments, Pepco states that the Commission has before it a comprehensive record.²⁵ Pepco asserts that it has provided all the detailed technical information required by the Commission's regulations and orders in this proceeding.²⁶ According to the Company, it has responded to nearly 850 data requests, including subparts, and produced thousands of pages of documents.²⁷ Pepco also states that there have been multiple rounds of comments submitted to the Commission from numerous participants regarding the Capital Grid Project.²⁸ Pepco indicates that it has engaged in extensive community outreach (approximately 250 meetings) in connection with the Capital Grid Project.²⁹ Pepco states that the comprehensive record before the Commission was sufficient for the Commission to approve Phase I in August 2019 and that nothing has occurred since that time to require that the Commission reopen this proceeding.³⁰ The Company submits that further proceedings are not required by the Commission's regulations and would only serve to delay the Commission's decision.³¹

8. Pepco also filed Reply Comments, reiterating its view that no further process is warranted. Pepco submits that DCG's list of material issues is based on arguments already raised.³² Similarly, Pepco disagrees with OPC's position on Pepco's load estimates and also claims that the requirements of the CleanEnergy Act will not impact the need for the Mt. Vernon Substation.³³

9. The issue now before the Commission is whether Pepco has established the reasonableness, safety, and need for the Mt. Vernon Substation, as 15 DCMR § 2111.4 requires. OPC and DCG argue that additional procedures should govern Phase II to include convening an evidentiary hearing, while Pepco asserts that the record contains sufficient information for the Commission to decide. The Commission examines below these arguments, in turn.

²⁵ *Formal Case No. 1144*, the Potomac Electric Power Company's Comments, at 1-2, filed November 1, 2019 ("Pepco's Comments Regarding Additional Procedures").

²⁶ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 1.

²⁷ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 1-2.

²⁸ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 2.

²⁹ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 2.

³⁰ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 7.

³¹ *Formal Case No. 1144*, Pepco's Comments Regarding Additional Procedures at 7.

³² *Formal Case No. 1144*, Potomac Electric Power Company's Reply Comments to OPC's Motion for Additional Procedures filed November 5, 2019 ("Pepco's Reply Comments to OPC's Motion for Additional Procedures"), and DCG's Submission at 3.

³³ *Formal Case No. 1144*, Pepco's Reply Comments to OPC's Motion for Additional Procedures and DCG's Submission at 4.

10. The Commission disagrees with OPC's argument that the passage of time since Pepco's NOC filing renders the record too stale for the Commission to decide on the Mt. Vernon Substation. The Commission notes that the load forecast for the Mt. Vernon Substation is based on a 2018 load forecast.³⁴ Pepco also represents that it reviews and updates its load forecasts on a two-year cycle, with one half of the small areas being analyzed in detail each year.³⁵ Thus, the load forecast information in the Capital Grid Application is still current. Moreover, as explained herein we find that Pepco's load growth forecasts are reasonable and support the reasonableness, safety, and need for the Mt. Vernon Substation. Further, the Commission allowed several rounds of comments over a period of about six months in this proceeding to give commenters enough opportunity to submit their arguments and for Pepco to respond. Additionally, the Company has responded to nearly 850 data requests, many of which were submitted by OPC and DCG concerning the Capital Grid Application. This proceeding was not dormant between the filing of the Capital Grid Application and the filing of OPC's Motion for Additional Procedures; interested persons engaged in extensive discovery and OPC and other stakeholders were granted additional time to file their respective comments. OPC rehashes its previous arguments on Pepco's load forecast methodology, presents no new evidence to support its request and seeks to have Pepco prove that there is no new load data which undermines Pepco's forecast. Thus, the information in Pepco's Capital Grid Application relating to the Mt. Vernon Substation is not stale.³⁶

11. DCG requests that we designate this matter as a contested case and hold an evidentiary hearing.³⁷ The Commission finds that the suggested material issues in dispute set forth by DCG in its filing are actually legal and policy arguments regarding how Pepco's load forecasts are to be used, the availability of alternatives to the Mt. Vernon Substation, and how the Mt. Vernon Substation would affect global climate change and the District's public climate commitments. DCG's Submission reflects arguments DCG has previously raised in its comments in this proceeding and that are not material issues of fact in dispute when considered with the record evidence that we rely on in making this decision, as more fully discussed below.³⁸

³⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application at 10.

³⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix R at 3.

³⁶ Although OPC asserts that Pepco "has chosen to abandon that best practice in this instance and not update its forecasts in this proceeding," OPC does not cite to Commission precedent showing where this has been a past practice of the Company.

³⁷ *Formal Case No. 1144*, DCG's Submission at 1-2.

³⁸ See DCG Submission at 3-5 for a summary of the issues with which DCG disagrees based on comments in the record. DCG's first issue, (Can Pepco's Load Forecasting Methodology be relied upon as the basis for the substation need?) was addressed in DOEE's Comments filed on September 27, 2018 ("DOEE's Comments") at 10, 16. DCG raised its second issue (What is the load/peak reducing potential of energy efficiency, demand response, battery storage, rooftop solar, combined heat power (CHP)?, DOEE's Comments at 48-55). DCG's third issue (Is there spare capacity available from nearby NE Substation 212?) was included in DOEE's Comments at 19-20. DCG's fourth issue (Are there examples from other jurisdictions that can serve as a guide?) was included in DOEE's Comments at 78.

12. After having considered both the OPC Motion and DCG Submission and the extensive record before us, the Commission denies OPC's Motion and DCG's request for an evidentiary hearing. The decision below addresses concerns raised by OPC and DCG.³⁹

IV. CAPITAL GRID PROJECT, PHASE II

13. In its Capital Grid Application, Pepco discusses the requirements of 15 DCMR § 2111.1, which include a detailed list of information necessary to demonstrate the reasonableness, safety, and need for the construction and operation of a substation, such as the Mt. Vernon Substation.⁴⁰ Pepco also met the directives in Order No. 19274, which required the Company to include additional information in its Application, such as a load forecast at substation level, and to address potential deferral of the Mt. Vernon Substation, and project alternatives.⁴¹

14. According to Pepco, the entire Capital Grid Project (Phase I and Phase II) represents a long-term plan addressing the distribution system's resiliency, reliability, and modernization needs.⁴² The Company states that the proposed Mt. Vernon Substation will be a high-capacity, 230 kV/13 kV substation that initially will provide 140 MVA of firm capacity, which could be expanded to 210 MVA.⁴³ The Company asserts that the forecasted need for the Mt. Vernon Substation is only for 140 MVA of the 210 MVA by 2023.⁴⁴ Pepco indicates that the final 70 MVA will be provided by adding a fourth transformer, the need for which is anticipated sometime after 2028.⁴⁵ Pepco submits that the Mt. Vernon Substation is needed to provide load relief to the Northeast Substation 212 Southwest Low Voltage Alternating Current ("LVAC") Network Feeder Group, the New Jersey Avenue Substation 161 South Network Feeder Group, the Northeast Substation, and the Tenth Street Substation.⁴⁶ According to Pepco, these distribution capabilities have been previously expanded to their maximum capacity and would be overloaded, overstressed or near full capacity as early as 2023, if the Mt. Vernon Substation were not to be constructed.⁴⁷

³⁹ The Commission previously held in abeyance OPC's August 22, 2017, petition for an evidentiary hearing in this matter. See Order No. 19274. For the same reasons stated herein, we now deny OPC's August 22, 2017, petition.

⁴⁰ Pursuant to 15 DCMR § 2111.1 (2004), "An electric corporation which plans to construct inside the District of Columbia an underground transmission line in excess of sixty-nine thousand (69,000) volts, or substation connected to such line, shall file formal notice with the Commission six (6) months prior to the construction."

⁴¹ *Formal Case No. 1144*, Pepco's Capital Grid Application at iv.

⁴² *Formal Case No. 1144*, Pepco's Capital Grid Application at v.

⁴³ *Formal Case No. 1144*, Pepco's Capital Grid Application at 8.

⁴⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application at 18.

⁴⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application at 18.

⁴⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application at 8.

⁴⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application at 8.

15. Pepco states that “the cause of the initial overload is the rapid and dynamic load growth that is currently occurring and forecasted to continue in the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas.”⁴⁸ Specifically, Pepco indicates that these areas will be experiencing significant new growth, with approximately 126 MVA of new load from 132 new developments scheduled to be added over the next ten years (2018-2027).⁴⁹ The Company asserts that “[m]any of the areas that have recently been parking lots or empty buildings with minimal load requirements are being developed into high-load, multi-unit buildings.”⁵⁰ According to Pepco, “[t]ransforming a parking lot or low-load building into a mixed-use development, such as Northwest One, results in a significant amount of load being added to the distribution system.”⁵¹ Pepco states that the increase in load is studied and quantified for planning purposes and results in a determination of: (1) how much load is being added and where it is planned to be added through Prospective New Businesses (“PNB”) data; and (2) how the expected PNB data will affect future system needs.⁵² Also, according to Pepco, for load-driven projects like the Mt. Vernon Substation, Pepco reassesses the status of the PNB every year and to the extent the PNBs are behind schedule and the load is not materializing in the timeframe originally forecasted, the Company will adjust the in-service date of load-driven projects based on the most recent assessment of the forecasted load.⁵³ Indeed, the Mt. Vernon Substation in-service date was deferred from 2022 to 2023 because the PNBs were behind schedule.⁵⁴ Moreover, Pepco states that the current load forecasts do not incorporate anticipated load growth associated with potential rapid advancement of the electric vehicle sector.⁵⁵

16. Because the Mt. Vernon Substation project is load-driven, Pepco includes a detailed explanation of its short-term and long-term distribution forecasting methodology. For its short-term load forecasting process, Pepco states that it develops a base load for each feeder, transformer, and substation under study in the planning cycle by: (1) analyzing Advanced Metering Infrastructure (“AMI”) and supervisory control and data acquisition (“SCADA”) data; (2) determining any new load and any new DER installations that have gone into service; and (3) including any permanent load transfers that have occurred between the peak demand period identified for use in developing a forecasting base and the most recent summer period using data from AMI, SCADA, and the DER database as well as operating records and previous planning

⁴⁸ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 8.

⁴⁹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 10.

⁵⁰ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 8.

⁵¹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 9.

⁵² *Formal Case No. 1144*, Pepco’s Capital Grid Application at 9.

⁵³ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 9-10.

⁵⁴ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 10.

⁵⁵ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 14.

studies.⁵⁶ Pepco states that after the base load for each feeder has been developed, expected loads are determined for each of the three years into the future for each transformer, and substation under study in the planning cycle by adding forecasted PNBs load and that it also accounts for any permanent load transfers and subtracts any forecast DER from the previously determined base load.⁵⁷ Pepco then develops distribution system models incorporating the short-term load forecast and analyzes the models by looking for any thermal or voltage violations in the system and that if there are any future violations identified in the system, it provides solution options to reliably provide adequate capacity or voltage to mitigate the identified violations.⁵⁸

17. The Company states that it uses its most recent short-term planning process results as the basis for the long-term load forecast.⁵⁹ The long-term load forecast looks seven years beyond the short-term process, resulting in an overall ten-year load forecast.⁶⁰ According to the Company, the expected loadings are determined for each of the years four through ten of the long-term forecast by adding PNBs and subtracting forecasted new DER from the last year of the short-term forecast as well as accounting for any other known changes.⁶¹

18. Through the affidavit of Donald Hall, manager of capacity planning for Pepco, Pepco explains in detail how the Company develops its “bottom-up” load forecast, using a weather normalized 90/10 approach.⁶² According to Mr. Hall “90/10” means that over the long run the peak or a value higher than it is expected to occur in one summer in every ten.”⁶³ To address stakeholders’ assertions that Pepco should use a 50/50 load forecast as compared to Pepco’s 90/10 approach, Mr. Hall includes a description of events on the Commonwealth Edison (“ComEd”) system in 1999 that ultimately led to ComEd moving from a 50/50 forecast to a 90/10 forecast for distribution system planning. Mr. Hall also describes a report of the U.S. Department of Energy’s Power Outage Study Team which investigated the above Chicago outages that attributed the failures to the use of a 50/50 load forecasting approach rather than a 90/10 load forecasting approach:

Load forecasting techniques and associated distribution planning tools failed to accurately accommodate the effects of unusual summer weather conditions as experienced in 1999. Planning has been based on “average” weather conditions, meaning

⁵⁶ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17.

⁵⁷ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17.

⁵⁸ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17.

⁵⁹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17.

⁶⁰ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17.

⁶¹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 17-18.

⁶² *Formal Case No. 1144*, Pepco’s Capital Grid Application, Appendix R, at 6.

⁶³ *Formal Case No. 1144*, Pepco’s Capital Grid Application, Appendix R, Affidavit of Donald Hall, ¶ 13, n.3.

that load exceeds the design criterion approximately once in every 2 or 3 years. A criterion of 1 in 10 years is more commonplace in the industry. These shortcomings were compounded by further uncertainty in predictions for individual substation load levels.⁶⁴ [Emphasis in original.]

19. Further, Mr. Hall explains that Pepco revised its methodology for accounting for DER contributions to peak demand: “if it is available (or coincides) 95% of the time with the peak on whichever component of the distribution system is being evaluated (feeder, transformer, or substation).”⁶⁵ Pepco planners perform a separate analysis for each type of DER.⁶⁶

20. Pepco states that it proposes to use battery energy storage, a NWA solution, to defer the need for the fourth 70 MVA Mt. Vernon Substation transformer.⁶⁷ This addresses Pepco’s need to obtain 140 MVA of firm capacity by 2023 while allowing Pepco to test alternative NWA solutions with respect to additional firm capacity on a scale that will limit the risk to customers.⁶⁸ Pepco indicates that its proposed 3 MWh battery can be expanded upon if the deferral requires expansion.⁶⁹ According to the Company, the battery can be connected in 2023 when the Substation is first placed into service and may be used to test various load scenarios. This type of testing will allow Pepco to gain knowledge of the battery system and could defer the need for the fourth transformer.⁷⁰ Pepco indicates that it is actively looking into other battery energy storage projects in the District and in its other jurisdictions that would provide valuable learning on how to use battery energy storage in lieu of wires solutions, in a manner that would ensure safe and reliable electric service to customers.⁷¹

21. Pepco states that a delay of the Mt. Vernon Substation beyond 2023 would lead to a 5% firm capacity overload at Northeast Substation 212 Southwest LVAC Network Feeder Group in 2023, without sufficient capacity at any current feeder group and without enough feeder positions to extend new feeder groups from other substations to take the load.⁷² According to Pepco, the surrounding feeder groups and substations will also be nearing 100% of their capacity

⁶⁴ *Formal Case No. 1144*, Pepco’s Capital Grid Application, Appendix R, Affidavit of Donald Hall, ¶ 15.

⁶⁵ *Formal Case No. 1144*, Pepco’s Capital Grid Application, Appendix R, Affidavit of Donald Hall, ¶ 26.

⁶⁶ *Formal Case No. 1144*, Pepco’s Capital Grid Application, Appendix R, Affidavit of Donald Hall, ¶ 28.

⁶⁷ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 18.

⁶⁸ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 18.

⁶⁹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 18.

⁷⁰ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 18.

⁷¹ *Formal Case No. 1144*, Pepco’s Capital Grid Application at 18.

⁷² *Formal Case No. 1144*, Pepco’s Capital Grid Application at 36.

in 2023.⁷³ The New Jersey Sub. 161 South LVAC Network Feeder Group will be at 99% capacity, the Northeast Substation will be at 95% capacity, and the Tenth Street Substation will be at 94% capacity in 2023. Pepco indicates that this puts the network feeders in the Northeast Substation 212 Southwest LVAC Network Feeder Group at risk of being overloaded during a single contingency outage event, which could lead to cascading feeder failures.⁷⁴ Should this occur, the entire network could be out of service for up to several days, depending on the extent of the damage, while repairs are made.⁷⁵ The Company also submits that the New Jersey Sub. 161 LVAC South Network Feeder Group will continue to be overstressed at 99% to 100% until it overloads in 2025 and the prolonged overstressing of the feeder group followed by subsequent overloading places customers at risk of outages.⁷⁶ Pepco states that project delays will lead to a 2% firm capacity overload at the Northeast Substation in 2025 thereby putting the Northeast Substation at risk of overload during a single contingency outage event which could lead to a catastrophic failure inside that substation.⁷⁷ The Company asserts that should this occur, the entire Northeast Substation could be out of service for up to several weeks, depending on the extent of the damage, while repairs are made.⁷⁸ According to the Company, this failure would result in extended outages for all of the Northeast Sub. 212 Southwest LVAC Network Feeder Group's approximately 6,700 residential and 150 commercial customers, representing 52.7 MVA of load.⁷⁹

22. In addition, Pepco's Quanta Report provides a preliminary analysis of the use of portfolios of DER to defer construction of the Mt. Vernon Substation for one (1) to four (4) years.⁸⁰ The Quanta Report generally concludes that "there may be scenarios under which deferral of the entire substation could be conceptually possible and may be cost beneficial if the reliability improvements that the Mt. Vernon Substation provides to six area underground radial distribution feeders are excluded and the solution focuses only on the two LVAC network groups."⁸¹ The Quanta Report provides the specific DER types (batteries, solar PV, and demand response) for five different portfolios studied, DER sizing needed for the portfolios and related cost/benefit analysis results for deferral of the Mt. Vernon Substation for one to four years, excluding the reliability enhancements to the six radial distribution feeders. The Quanta Report concludes that it would be difficult to find the necessary space and obtain the requisite permitting to place all 12 batteries,

⁷³ *Formal Case No. 1144*, Pepco's Capital Grid Application at 36.

⁷⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application at 36-37.

⁷⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application at 36-37.

⁷⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

⁷⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

⁷⁸ *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

⁷⁹ *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

⁸⁰ *Formal Case No. 1144*, Pepco's Capital Grid Application at 51.

⁸¹ *Formal Case No. 1144*, Pepco's Capital Grid Application at 51.

one for each feeder in the LVAC feeder groups that are at least as large as the trailer from a semi-truck on the LVAC networks requiring the load relief plus a safety perimeter, necessary for this potential deferral.⁸² Subsequently, Pepco filed an Errata to its Quanta Report regarding the cost/benefit analysis results for deferral of the Mt. Vernon Substation. In the Errata, Pepco explains that it had incorrectly included some transmission costs (\$128 million) in the cost of the Mt. Vernon Substation that should not have been included.⁸³ Pepco explains that the transmission costs incorrectly included in the calculation will be incurred even if the Mt. Vernon Substation was deferred and, thus, should not have been included in the cost/benefit deferral analysis. With the revised Mt. Vernon Substation cost, the Quanta Report concludes that there are no alternative scenarios in which the deferral of the Mt. Vernon Substation is economic, including the scenarios based solely on providing relief for network overloads.⁸⁴

23. As a part of the Company's environmental analysis, Pepco addresses concerns regarding the electric and magnetic fields ("EMF") that will emanate from the equipment within the Mt. Vernon Substation. Pepco states that "[f]or efficient operation, substations are designed to contain the magnetic fields from equipment within the substation" while "the electric field will be blocked by the surrounding enclosure."⁸⁵ The Company states that the "magnetic fields from the proposed substations will be even lower than standard substations of open design because of their compact, gas-insulated equipment within the substations."⁸⁶

V. COMMENTS AND REPLY COMMENTS

A. OPC

24. OPC asserts that Pepco has not demonstrated the need for the Mt. Vernon Substation and offers two main arguments against the proposal – first, that Pepco is overestimating its load forecast to justify the project and second, that Pepco has not considered NWAs or even other traditional wires alternatives. OPC argues that Pepco's load forecasts are "unreliable and significantly overstate the load growth in the Mt. Vernon Triangle/NoMa areas of the District."⁸⁷

⁸² *Formal Case No. 1144*, Pepco's Capital Grid Application at 51. The Commission also noted *inter alia*, that Pepco also discussed whether Exelon and Pepco Holdings Inc. Merger Commitments 116 (*i.e.*, 7 MW solar generation outside of Blue Plains) or 117 (*i.e.*, \$5 million in capital for the development of renewable energy projects in the District of Columbia) could be used to defer the Mt. Vernon Substation and generally determined that they could not be used as deferral methods.

⁸³ *Formal Case No. 1144*, Potomac Electric Power Company's Errata to the Study Performed by Quanta Technology filed as Appendix F to the Notice of Construction ("Errata"), filed October 30, 2018. Commenters submitted responses to the Errata.

⁸⁴ *Formal Case No. 1144*, Errata at 1.

⁸⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application at 54.

⁸⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application at 54.

⁸⁷ *Formal Case No. 1144*, Comments of the Office of the People's Counsel for the District of Columbia and Affidavit of Kevin J. Mara, at 4, filed September 27, 2018 ("OPC's Comments").

Even if Pepco's forecasts are accurate, OPC states it still opposes the project because "those [Pepco's] analyses show only a 2.7 MW overload of existing facilities in the Mt. Vernon Triangle area by 2023."⁸⁸ Kevin Mara, OPC's expert also claims that Pepco's load is decreasing, after comparing the total system load to the load forecasts relied upon by Pepco in its Capital Grid Application.⁸⁹ According to Mr. Mara, total system demand in the District has been flat, if not decreasing, in the last 12 years, and thus it is unfair to ratepayers to finance capacity on the scale envisioned by Pepco.⁹⁰ Mr. Mara recommends that Pepco provide a 50/50 load forecast⁹¹ and a weather normalized 90/10 forecast,⁹² which "will clearly show the adjustments to Pepco's load forecasts being made for extreme weather and provide a baseline for confidence in Pepco's ability to project the 50/50 demands."⁹³ Mr. Mara argues that Pepco is overstating the projected growth in the Mt. Vernon Triangle area and, if a different method is used, the forecasted new load from future buildings will drop from 126 MVA to 94 MVA and could be as low as 76 MVA.⁹⁴ He argues that the projects factored into Pepco's load growth are not materializing as fast as the Company claims,⁹⁵ and that improved energy efficiency standards further reduce demand.⁹⁶ In addition, Mr. Mara states that Pepco's load forecasts are overstated because they do not include several load reduction factors claimed by OPC.⁹⁷ Specifically, OPC represents that there are both NWAs and traditional utility alternatives that would "alleviate the minimal overload projected on certain portions of the Pepco distribution system."⁹⁸ Mr. Mara states that there are non-wires resources that could be added to the mix of resources capable of reducing peak demand, thus deferring system capacity increases.⁹⁹ For example, Mr. Mara states that a behind-the-meter

⁸⁸ *Formal Case No. 1144*, OPC's Comments at 4.

⁸⁹ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 4, 12-13.

⁹⁰ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 4-5.

⁹¹ The load forecast probability of 50 percent, also known as a 50/50 forecast, refers to the situation when there is a 50 percent chance that the actual system peak load will exceed the forecasted value in any given year.

⁹² The 90/10 forecast describes a scenario where there is a 10 percent probability of the load being exceeded by the actual system peak in any given year.

⁹³ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 7. Mr. Mara's recommendations are based on the Quanta Report, which reviewed Pepco's forecasting methods.

⁹⁴ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 7.

⁹⁵ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 8. Mr. Mara asserts that Pepco's has an error rate of 46% on the completion date of PNBs just one year into the future.

⁹⁶ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 47-55.

⁹⁷ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 8-9, 54, 56-57 and 59-60.

⁹⁸ *Formal Case No. 1144*, OPC's Comments at 4.

⁹⁹ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit at 65, 67.

Battery Energy Storage Systems (“BESS”) would be more cost effective for deferring a substation or feeder expansion where duplicate batteries are not required, and solar could provide support for deferring a substation or transmission project.¹⁰⁰ Mr. Mara concludes that “[t]he non-wire alternatives provide room for capacity growth beyond 2027.”¹⁰¹ With respect to wires alternatives, Mr. Mara claims that Pepco can use capacity from nearby substations, including the Florida Avenue and Northeast substations, to serve load without constructing the Mt. Vernon Substation.¹⁰²

B. DOEE’s Synapse Study

25. On January 29, 2018, DOEE filed comments in *Formal Case No. 1130*, which included the Synapse Study.¹⁰³ In those comments DOEE proffered two arguments. First, Pepco’s load forecast supporting the need for the new Mt. Vernon Substation is questionable and without adequate support. Second, even if Pepco’s load forecast is assumed to be correct, there is a lower-cost and more sustainable and resilient alternative to the Mt. Vernon Substation.¹⁰⁴

26. The Synapse Study challenges Pepco’s load forecast and presents a portfolio of options utilizing DER as an alternative to the proposed Mt. Vernon Substation. The Synapse Study questions Pepco’s load growth assumptions and calculations for specific locations of the Pepco system, such as the Northeast Substation 212 SW Network Feeder Group and the remainder of Northeast Substation 212.¹⁰⁵ The Study concludes that Pepco began forecasting rising loads in the

¹⁰⁰ *Formal Case No. 1144*, OPC’s Comments, Mara Affidavit at 64-65. Mr. Mara explains that if the customers equipped their buildings with BESS on the customer side of the meter, it would be possible to leverage these batteries for single-contingency situations. He also urges the Commission to require Pepco to assign a capacity value for solar during contingency outages. Mr. Mara lists Combined Heat and Power (“CHP”) as another load-reducing source, along with Conservation Voltage Reduction (“CVR”), which together can help reduce peak demand by 1.1% to 2.5% for residential and non-residential customers.

¹⁰¹ *Formal Case No. 1144*, OPC’s Comments, Mara Affidavit at 67. *See also* OPC’s Supplemental Initial Comments Concerning the Potomac Electric Power Company’s Errata to the Study Performed by Quanta Technology Filed October 30, 2018, at 4, filed December 10, 2018.

¹⁰² *Formal Case No. 1144*, OPC’s Comments, Mara Affidavit at 67-68, 74.

¹⁰³ *Formal Case No. 1130*, In the Matter of the Investigation into Modernizing the Energy Delivery System for Increased Sustainability (“*Formal Case No. 1130*”), Comments by the Department of Energy and Environment, Synapse Energy Economics, Inc. (“Synapse Study”), filed January 29, 2018 (“January 29, 2018, DOEE Comments”). By Order No. 19274, in FC1144, the Commission directed Pepco to provide an assessment of DOEE’s January 29, 2018, Comments, including an assessment of the Synapse Study, and docket its assessment in both *Formal Case No. 1144* and *Formal Case No. 1130*.

¹⁰⁴ *Formal Case No. 1130*, January 29, 2018, DOEE Comments at 1. DOEE recommended that the Commission: (1) “Consider deploying \$10 million from the MEDSIS Subaccount Fund to procure a portfolio of DER that can defer the need for a new substation for 2 years; and (2) Convene a working group consisting of all stakeholders, led by an independent expert to guide the process, evaluate relevant analyses and develop recommendations of cost-effective NWAs to the Commission.”

¹⁰⁵ *Formal Case No. 1130*, Synapse Study at 14-19.

area of the Northeast Substation 212 SW Network Feeder Group in 2013, and “if there were large additional buildings planned for occupancy before 2024 that Pepco knew about at that time, they would have made some sort of public appearance by now.”¹⁰⁶ The Synapse Study advocates for deferral of the Mt. Vernon Substation as a way to bring benefits to customers. For example, the Study estimates that present value of a deferral until 2027 is \$39.5 million.¹⁰⁷ The Study presents the potential to transition from deferral of the Substation to a total avoidance if peak load is reduced. According to the Study, “[i]f reducing the peak load in the [Northeast Substation 212] SW Network Feeder Group by 20 MVA or so would completely remove the need to build the new substation . . . , then the return to ratepayers would be even greater. It would be worth paying more than \$11,000 per kVA for 20 MVA of peak reduction to completely avoid the construction of this substation.”¹⁰⁸ Synapse concludes that “Pepco’s forecast for the [Northeast Substation 212] SW Network Feeder Group is hard to believe.”¹⁰⁹ Synapse asserts “[w]ithout the load on the [Northeast Substation 212] SW Network Group above 50 MVA, there would be no need to build the new Mt. Vernon substation.”¹¹⁰ Synapse explains that “if the peak can be kept below 50 MVA on [Northeast Substation 212 Southwest LVAC Network Feeder Group] through ‘non-wires’ alternatives at a lower cost than the substation, reliability will be maintained and ratepayers will be better off.”¹¹¹ After two (2) years of deferral, solar photovoltaic (“PV”) energy and battery storage can be added to achieve indefinite deferral.¹¹²

27. With respect to alternatives, the Synapse Study concludes that the net result of energy efficiency measures in the Northeast Substation 212 SW Network Feeder Group would be a 14% peak reduction, which is sufficient to defer the new Mt. Vernon Substation by one year.¹¹³ The Study notes the possibility that new buildings can be substantially more energy efficient than expected and that there is a growing number of net-zero energy commercial buildings in the country.¹¹⁴ Further, the benefits and associated costs of solar, co-generation, demand response, and battery storage, are discussed in detail by the Synapse Study as a potential strategy to defer and avoid the Mt. Vernon Substation.¹¹⁵ Finally, the Synapse Study develops portfolios of

¹⁰⁶ *Formal Case No. 1130*, Synapse Study at 19.

¹⁰⁷ *Formal Case No. 1130*, Synapse Study at 20.

¹⁰⁸ *Formal Case No. 1130*, Synapse Study at 21.

¹⁰⁹ *Formal Case No. 1130*, Synapse Study at 18.

¹¹⁰ *Formal Case No. 1130*, Synapse Study at 20.

¹¹¹ *Formal Case No. 1130*, Synapse Study at 22.

¹¹² *Formal Case No. 1130*, Synapse Study at 50-51.

¹¹³ *Formal Case No. 1130*, Synapse Study at 25.

¹¹⁴ *Formal Case No. 1130*, Synapse Study at 29.

¹¹⁵ *Formal Case No. 1130*, Synapse Study at 22-47.

demand-side measures that would allow Mt. Vernon Substation to be deferred a year (to 2023), two years (to 2024) or indefinitely (past the 2026 end of Pepco's load forecast).¹¹⁶

C. PNNL Report

28. On July 12, 2018, DOEE submitted Comments and a report by the Pacific Northwest National Laboratory ("PNNL Report"), which includes analysis of the District's building codes—both currently in effect and proposed for 2018.¹¹⁷ According to DOEE, the PNNL Report reveals a serious flaw in Pepco's projection for new capacity requirements.¹¹⁸ If the energy demand values for PNB assumed by Pepco are adjusted based on the PNNL Report analysis, "the existing capacity for the Mt. Vernon area may be sufficient for the current planning horizon."¹¹⁹ DOEE explains that, in developing its load forecast, Pepco assigned a coincident peak energy demand of 6 watts per square foot for large office buildings, and 3 watts per square foot for apartments (3 kW per residential unit using 1,000 square feet per unit) in estimating the load from new construction based on AMI-measured loads in buildings constructed over the last ten years.¹²⁰ In contrast, says DOEE, the PNNL Report provides energy consumption values (kWh/sq. ft.) for new offices and apartments based on the District of Columbia's building codes that, when DOEE converts them to peak energy demand values (W/sq. ft.), would result in much lower values than the values Pepco uses.¹²¹ DOEE explains how it converted the PNNL Report's energy demand intensity estimates into peak demand intensity values using a 2016 average load factor based on data from Pepco.¹²²

¹¹⁶ *Formal Case No. 1130*, Synapse Study at 48. According to the Study (at 50-51), deferring the Substation to 2025 or later would require about another 5.5 MW of real power peak reductions. This can come from demand response and efficiency in new buildings, distributed generation, and battery storage. Synapse modeled a portfolio that adds another 0.5 MW of energy efficiency (to 3.5 MW), 0.5 MW of demand response (to 5 MW), 1 MW of solar PV (modeled as contributing 0.25 MW to peak reduction), and 5 MW of battery storage (storing 28.1 MWh of energy). This portfolio, plus Pepco's projected loads, should keep the SW Network Feeder Group 90/10 peak below 49.5 MVA.

¹¹⁷ *Formal Case No. 1144*, Department of Energy and Environment's Comments and Report of the Pacific Northwest National Laboratory, filed July 12, 2018 ("DOEE's Comments and PNNL Report"). The PNNL report was prepared in December 2017.

¹¹⁸ *Formal Case No. 1144*, DOEE's Comments and PNNL Report at 1.

¹¹⁹ *Formal Case No. 1144*, DOEE's Comments and PNNL Report at 1.

¹²⁰ *Formal Case No. 1144*, DOEE's Comments and PNNL Report at 2.

¹²¹ *Formal Case No. 1144*, DOEE's Comments and PNNL Report at 2.

¹²² *Formal Case No. 1144*, DOEE's Comments and PNNL Report at 42-43. The term "load factor" refers to the ratio of the average demand to the peak demand, where the average demand is the energy use over a period of time divided by that period of time.

D. DOEE's September 27, 2018, and December 10, 2018 Comments

29. DOEE updated its Synapse Study in response to Pepco's comments submitted as part of its Capital Grid Application pursuant to the Commission's directive. DOEE also provided Synapse's detailed response to Pepco's comments.¹²³ The updated Synapse Study explains several changes Synapse made in its analysis in response to Pepco's criticism: Synapse first adopts a top-down method for energy savings instead of building by building. Secondly, Synapse no longer claims any additional savings from the new building codes. Synapse asserts that Pepco should be more aggressive on energy efficiency.¹²⁴ Synapse also argues that Pepco has sufficient lead time to recruit participants before the demand reductions in the NoMa area are needed in 2024.¹²⁵ Synapse criticizes Pepco for its reliance on AMI data from buildings that were built prior to 2015 which mostly misses potential energy improvements from the current building codes that went into effect in 2014.¹²⁶

30. Synapse also rejects Pepco's view that buildings certified under the Leadership in Energy and Environmental Design ("LEED") program are always more energy efficient. Synapse contends that its initial study correctly took into account already installed energy efficiency measures, against Pepco's contention that it had not.¹²⁷ Synapse also rejects Pepco's contention that its estimates depend on limited data.¹²⁸ Synapse says that, even after revisions, "our new demand response potential estimate is now about 37% less than the original estimate, but still has 3.9 MW of potential at a reasonable cost of about \$2.4 million in Net Present Value ("NPV") (or \$600 per kW)."¹²⁹ Synapse contends that demand response could be implemented successfully in multi-family residential buildings and can be very effective in large commercial buildings.¹³⁰ Synapse rejects Pepco's complaint that it would not have control over demand-response programs by pointing to the experience of New York utilities.¹³¹

¹²³ *Formal Case No. 1144*, Comments by the Department of Energy and Environment on behalf of the District of Columbia Government on Capital Grid Project, Appendix at 2, filed September 27, 2018 ("September 27, 2018, DOEE Comments"). The Appendix contains Synapse Response to Pepco's Reply Comments on the Synapse Report filed January 29, 2018.

¹²⁴ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 9.

¹²⁵ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 9-10.

¹²⁶ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 12.

¹²⁷ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 15.

¹²⁸ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 16.

¹²⁹ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 16-17.

¹³⁰ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 20-24.

¹³¹ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 25.

31. Responding to Pepco, DOEE asserts that the main point in DOEE's analysis of the PNNL Report is that the watt per square foot number under the building codes that have been in effect since 2013 is 50% less than the number that Pepco has been using to forecast the load to establish the need for a potential Mt. Vernon Substation [emphasis in the original].¹³² DOEE claims that its conversion of energy values into demand values using load factors was appropriate.¹³³ The Synapse Study, points out that the current building codes took effect in 2014 and previously constructed buildings "should be less efficient, and thus should have more energy savings potential [emphasis added]."¹³⁴

32. According to DOEE, its forecast included conservative assumptions.¹³⁵ DOEE contends that if energy efficiency resources are used to reduce load by 0.2 MVA, the Mt. Vernon Substation could be deferred to 2025.¹³⁶ DOEE reiterates that demand response, battery storage, cogeneration, and on-site generation could be used to defer or avoid the Mt. Vernon Substation.¹³⁷ DOEE calculated that even if savings from efficiency programs and improved building code requirements are smaller than DOEE's projections, 3.3 MVA of demand response would be sufficient to defer the Mt. Vernon Substation beyond 2027 and provide load relief to feeders during stressed peak load conditions.¹³⁸

33. DOEE challenges Pepco's assertion that DER on a given feeder would be unavailable to assist in maintaining service when a feeder is out of service (N-1 contingency).¹³⁹ DOEE submits that demand response remains available as a utility resource when a N-1 contingency occurs, similar to on-site generation that does not export to the utility's system or BESS in a customer's building.¹⁴⁰ DOEE challenged Pepco's Quanta Report, stating that the report is flawed because it creates load matrices on the percentage increase in load on each feeder when each of the other feeders goes out of service.¹⁴¹ DOEE believes the loss of a feeder does not

¹³² *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 48.

¹³³ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 48.

¹³⁴ *Formal Case No. 1144*, September 27, 2018, DOEE Comments, Appendix at 2-3.

¹³⁵ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 42.

¹³⁶ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 45.

¹³⁷ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 46. DOEE also challenges Pepco's application of the building code energy efficiency requirements to its load forecasting methodology.

¹³⁸ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 53.

¹³⁹ In this case, the N-1 contingency is applied to the six feeders comprising an LVAC network feeder group to ensure that that the remaining five can handle the load if any one feeder is out of service.

¹⁴⁰ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 56-57.

¹⁴¹ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 60.

immediately change the total load demanded by customers or served by the network.¹⁴² DOEE maintains that the Quanta Report overstates the required battery capacity in each examined scenario and incorrectly assumes that the “load shift factors”¹⁴³ will remain unchanged overtime.¹⁴⁴

34. With respect to the accuracy of Pepco’s load forecasting methodology, DOEE shares OPC’s concern about the “growing gap” between forecasted non-coincidental peak load and historical systemwide coincidental peak load.¹⁴⁵ DOEE contends that the accuracy of Pepco’s load forecast can be assessed by comparing actual historical load to forecasted load.¹⁴⁶

35. Following Pepco’s submission of the Errata to Pepco’s Quanta Report, both OPC and DOEE filed supplemental comments.¹⁴⁷ Generally, DOEE contends that the error in the Quanta Report does not impact DOEE’s analysis because the benefits associated with each NWA presented in DOEE’s comments used \$143 million as the cost basis for the Mt. Vernon Substation. DOEE’s analysis of the Quanta Report leads it to conclude that Pepco overestimates the costs and underestimates the benefits to ratepayers of deferring or avoiding construction of the proposed Mt. Vernon Substation.¹⁴⁸ OPC contends that the Errata is flawed because it is based on the premise that the 230 kV transmission system would be expanded even if the Mt. Vernon Substation was deferred or found to be entirely unnecessary based on forecasted load levels,¹⁴⁹ a point made moot by the Commission’s decision in Order No. 20203.

E. Sunrun

36. Sunrun, Inc. (“Sunrun”) recommends the “Commission [] give close consideration to whether and how Pepco’s proposed Capital Grid Project meaningfully addresses the integration of DER, including the ability of DERs to provide grid services and non-wires solutions to

¹⁴² *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 60.

¹⁴³ The term “load shift factor” accounts for the reallocation of load among the remaining feeders on a networked feeder group when one feeder is out of service.

¹⁴⁴ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 61.

¹⁴⁵ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 11-13.

¹⁴⁶ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 11-13.

¹⁴⁷ *Formal Case No. 1144*, Office of the People’s Counsel’s Supplemental Initial Comments Concerning the Potomac Electric Power Company’s Errata to the Study Performed by the Quanta Technology filed October 30, 2018 at 3, filed December 10, 2018; Second Supplemental Initial Comments of the Department of Energy & Environment on behalf of the District of Columbia Government, filed December 10, 2018 (“DOEE’s Second Supplemental Comments”).

¹⁴⁸ *Formal Case No. 1144*, DOEE’s Second Supplemental Comments at 2. DOEE also filed Reply Comments on December 28, 2018 (“DOEE’s Reply Comments”). In its Reply Comments, DOEE supported OPC’s comments and the findings of Mr. Mara.

¹⁴⁹ *Formal Case No. 1144*, OPC’s December 10, 2018, Supplemental Comments at 3.

traditional utility infrastructure investments.”¹⁵⁰ Overall, “Sunrun believes that the Synapse Report presents well-researched and meaningful options that are more consistent with the Commission’s MEDSIS proceeding vision” and could also “defer major, costly investments.”¹⁵¹ Sunrun advocates for preserving competition in the DER marketplace as more solar and battery storage are deployed in the District.¹⁵² Sunrun also notes that Pepco’s proposal is the opportune time for “the Commission [[to] carefully evaluate Pepco’s conclusions regarding the viability of non-wires solutions to defer the construction of the Mt. Vernon Substation.”¹⁵³ Sunrun recommends the use of NWAs because it will: 1) clearly articulate the specific needs of the project; 2) be structured to effectively deploy storage capacity; and 3) instill customer trust in the solutions and technologies.¹⁵⁴ Sunrun states that it supports DOEE’s analysis and conclusions that “[c]orrecting Pepco’s errors further demonstrates that NWAs have lower expected costs than building a Mt. Vernon Substation.”¹⁵⁵ Sunrun also believes that both grid-scale and behind-the-meter (“BTM”) battery storage can play a key role in achieving substation deferral and that BTM battery storage will be the predominant anchor resource for NWAs in the District.¹⁵⁶

F. General Services Administration

37. The General Services Administration (“GSA”) expresses concerns related to the rate impact of the project and states that it may be possible that the substation may be necessary in the future, but Pepco has not adequately demonstrated the need for it at this time.¹⁵⁷ Also, like OPC and DOEE, GSA is concerned that Pepco’s load growth projections may be overstated.¹⁵⁸

G. Greentel Group

38. Greentel Group urges the Commission to consider NWAs to the proposed Mt. Vernon Substation. According to Greentel Group, “non-wires alternatives have been demonstrated across the country and have continued to prove to be a viable option for deferring significant capital

¹⁵⁰ *Formal Case No. 1144*, Sunrun Inc.’s Comments at 4, filed September 27, 2018 (“Sunrun’s Comments”).

¹⁵¹ *Formal Case No. 1144*, Sunrun’s Comments at 4.

¹⁵² *Formal Case No. 1144*, Sunrun’s Comments at 4.

¹⁵³ *Formal Case No. 1144*, Sunrun’s Comments at 5.

¹⁵⁴ *Formal Case No. 1144*, Sunrun’s Comments at 6.

¹⁵⁵ *Formal Case No. 1144*, Sunrun Inc.’s Reply Comments at 1-2, filed December 28, 2018 (“Sunrun’s Reply Comments”).

¹⁵⁶ *Formal Case No. 1144*, Sunrun’s Reply Comments at 2.

¹⁵⁷ *Formal Case No. 1144*, Comments of the United States General Services Administration on the Potomac Electric Company’s June 29, 2018 Notice of Construction at 12, filed September 27, 2018 (“GSA’s Comments”).

¹⁵⁸ *Formal Case No. 1144*, GSA’s Comments at 12.

investments to the benefit of ratepayers.”¹⁵⁹ Greentel Group contends that the Mt. Vernon Substation proposal presents “an incredible opportunity to consider the various innovative technologies now available, utilize the pilot funding from the [Pepco-Exelon] merger to deploy such projects and prove these technologies can be viable alternatives to meet our capacity needs.”¹⁶⁰

H. Empower DC

39. Empower DC opposes the Mt. Vernon Substation.¹⁶¹ Empower DC urges the Commission to opt for the DOEE proposals which it believes shows “that the use of Energy Efficiency, Demand Management, and Distributed Energy Resources can do the job at a fraction of the cost.”¹⁶²

I. Solar United Neighbors of D.C.

40. Solar United Neighbors opposes the Mt. Vernon Substation.¹⁶³ Specifically, Solar United Neighbors requests that the Commission: (1) reject Pepco’s proposal to build the Mt. Vernon Substation; (2) deploy funds from the MEDSIS Subaccount Fund to develop a suite of programs that will defer the Mt. Vernon Substation in the short-term; and (3) task the Grid Investments Working Group with developing a NWA portfolio that will defer the substation indefinitely.¹⁶⁴

J. Community Commenters

41. Comments were received from various persons and entities in the community either opposing or supporting the proposed Mt. Vernon Substation. Some commenters filed comments regarding the retention of the aesthetics of the K Street urban area.¹⁶⁵ One commenter supports the Mt. Vernon Substation, claiming that it will help supply growing electricity needs in the rapidly developing central corridor in the District, as the replacement of vacant lots and smaller structures with multi-family residential buildings and substantially larger commercial buildings place

¹⁵⁹ *Formal Case No. 1144*, Greentel Group Comments, filed September 26, 2018 (“Greentel Group Comments”).

¹⁶⁰ *Formal Case No. 1144*, Greentel Group Comments, filed September 26, 2018.

¹⁶¹ *Formal Case No. 1144*, Empower DC Comments, filed September 26, 2018 (“Empower DC Comments”).

¹⁶² *Formal Case No. 1144*, Empower DC Comments at 1.

¹⁶³ *Formal Case No. 1144*, Comments of Solar United Neighbors of D.C., filed September 27, 2018 (“DC’s Comments”).

¹⁶⁴ *Formal Case No. 1144*, SUN DC’s Comments at 10-11.

¹⁶⁵ *Formal Case No. 1144*, Kenyattah Robinson Comments filed July 2, 2018; Robin-Eve Jasper Comments, filed July 2, 2018.

elevated demands on the existing power grid.¹⁶⁶ Another commenter, a minority and woman-owned national engineering, architectural, and construction management firm, filed comments describing a number of design aesthetics that will blend the Mt. Vernon Substation into the surrounding residential community, including the District Public Library and the RH Terrell Recreation Center.¹⁶⁷ Another commenter, a community organization, urges the Commission to consider NWAs instead of Pepco's proposed Mt. Vernon Substation and that the funds available for the MEDSIS pilots could be used to help determine the feasibility of NWAs in the Mt. Vernon Square area.¹⁶⁸

42. A significant number of commenters oppose the proposed Substation due to the proximity between the Substation and Jones Elementary School, located at 1125 New Jersey Avenue, NW.¹⁶⁹ These commenters claim that due to this proximity electromagnetic emissions from the substation will impose harmful health effects upon students at this school and others nearby.¹⁷⁰

K. Pepco's Reply Comments to DOEE's Synapse Study and PNNL Report

43. With its Capital Grid Application, Pepco filed Reply Comments in response to DOEE's Synapse Study on alternatives to the Mt. Vernon Substation.¹⁷¹ Pepco generally states that the "Synapse Study does not recognize the full extent of the need for the Mt. Vernon Substation, resulting in solutions that will present unacceptable reliability risks to customers."¹⁷² Pepco asserts that the assumption in the Synapse Study that by shaving 2.7 MVA of load in 2023 could defer the Mt. Vernon Substation and provide safe and reliable service to its customers is incorrect and would result in a deferral solution that would jeopardize reliable distribution service for the customers on the Northeast Sub. 212 Southwest LVAC Network Feeder Group and the New Jersey Sub. 161 South LVAC Network Feeder Group.¹⁷³ Specifically, Pepco states that

¹⁶⁶ *Formal Case No. 1144*, Federal City Council Comments at 2, filed July 3, 2018.

¹⁶⁷ *Formal Case No. 1144*, McKissack & McKissack Comments, filed October 2, 2018.

¹⁶⁸ *Formal Case No. 1144*, Comments of Sierra Club, filed January 29, 2019.

¹⁶⁹ *See, e.g., Formal Case No. 1144*, Kathy Boylan Comments, filed July 12, 2018; Kathy Boylan filed several petitions; filed August 1, 2018 (57 signatures); August 29, 2018 (39 signatures); October 2, 2018 (15 signatures); and October 10, 2018 (32 signatures); Tiffany Aziz, Keith Silver and Will Jones III, Joint Comments, filed September 26, 2018; Nell Greenfield-Boyce Comments, filed August 28, 2018; and Theodora Scarato Comments, filed September 10, 2018. On September 26, 2018, "form" letters dated September 22, 2018 were filed by forty-five (45) District residents opposing the Mt. Vernon Substation, expressing health concerns regarding exposure to electromagnetic fields expected from the Substation and urging the Commission to consider alternatives to the Substation.

¹⁷⁰ *See, e.g., Formal Case No. 1144*, Tiffany Aziz Petition, filed August 8, 2018.

¹⁷¹ *Formal Case No. 1144*, Pepco's Capital Grid Application, at Appendix G, filed June 29, 2018. Appendix G contains Pepco's Response to Synapse Study.

¹⁷² *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 24.

¹⁷³ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 28.

because the Synapse Study does not account for the nature of the District of Columbia LVAC system or the basic facts underlying Pepco's load forecasts, it has created a solution that would not allow it to safely serve its customers under peak conditions and would unnecessarily place 7,400 residential and 270 commercial customers, representing 100.1 MVA of load, at unreasonable risk of extended outages.¹⁷⁴ The Company also indicates that because it requires three to four years of construction after it receives all permits and approvals, "the consequences could be amplified exponentially should the chosen alternative solution fail and the Mt. Vernon Substation be required to provide safe and reliable service to the customers on the two LVAC network groups and the two substations that the Mt. Vernon Substation is being constructed to relieve."¹⁷⁵ Also, the Company states that "[w]ithout the Mt. Vernon Substation, the increased stress on the Northeast Sub. 212 Southwest LVAC Network Feeder Group and the New Jersey Sub. 161 South LVAC Network Feeder Group in an N-1 contingency under peak loading conditions could result in a cascading failure in which one overloaded feeder fails and its load is carried by the remaining feeders in the network group which in turn, overloads the remaining feeders and results in the loss of all six feeders comprising each Northeast Sub. 212 Southwest LVAC Network Feeder Group and the New Jersey Sub. 161 South LVAC Network Feeder Group."¹⁷⁶

44. With respect to the alternatives proposed by the Synapse Study, Pepco states that the Synapse Study assessments of the potential for peak load reductions from demand response measures are unsupported.¹⁷⁷ Pepco asserts that customer participation in demand response programs is voluntary and is dependent on such factors as economics, convenience, and altruistic motivations and that an effective demand response program would need to be accompanied by the appropriate incentives, such as those provided through a dynamic pricing program which is currently not in place in the District.¹⁷⁸ The Company asserts that the Synapse Study fails to explain how, without this type of critical program, multiple megawatts of demand response can be achieved and how Pepco can rely on it being achieved.¹⁷⁹

45. According to Pepco, the Synapse Study ignores the realities about the management, participation, and other limitations of implementing energy efficiency measures.¹⁸⁰ The Company asserts that energy efficiency and conservation programs in the District are currently provided by the District of Columbia Sustainable Energy Utility ("SEU") and that Pepco is a member of the oversight board with no ability to control the types of energy efficiency and conservation programs

¹⁷⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 24-25.

¹⁷⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 29.

¹⁷⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 29.

¹⁷⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 35.

¹⁷⁸ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 36.

¹⁷⁹ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 37.

¹⁸⁰ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 47.

established, reduction targets, and/or geographic reduction targets.¹⁸¹ According to Pepco, this eliminates Pepco's ability to directly reduce load within the geographic area served by Mt. Vernon.¹⁸² Also, Pepco indicates that any energy efficiency programs targeted at reducing electric energy and demand in the area to be served by the Mt. Vernon Substation would require a minimum lead time of 12 to 24 months after program approval prior to providing electricity savings that would need to be evaluated and verified.¹⁸³ Pepco also submits that the Synapse Study's analysis of the potential for peak demand reductions from energy efficiency improvements in existing buildings is flawed because it relies on limited data and ignores the fact that the potential for incremental reductions is heavily mitigated by the fact that many buildings already have taken advantage of energy efficiency measures.¹⁸⁴ In addition, Pepco asserts that the Synapse Study also overstates the savings potential from each existing building that has not yet installed significant energy efficiency measures.¹⁸⁵

46. With respect to a local rooftop solar alternative, Pepco states the Synapse Study fails to address the possibility that some buildings already may have solar PV systems, thus reducing the solar PV potential.¹⁸⁶ Also, the Company asserts that the Study does not account for the fact that solar PV is an intermittent resource that cannot be guaranteed to generate 25% of its maximum output throughout the duration of any period in which it is needed to reduce congestion that otherwise would be remedied by the construction of the Mt. Vernon Substation.¹⁸⁷

47. Pepco responds that DOEE draws erroneous conclusions that are not supported by the PNNL Report discussing the District of Columbia building codes and energy usage.¹⁸⁸ Pepco analyzed peak load using actual data from District of Columbia customers' AMI meters and SCADA data that accounts for the existing construction code and reflects current construction practices.¹⁸⁹ Pepco emphasizes that PNNL did not analyze peak demand but examined the amount of electricity used over a period of time.¹⁹⁰ Therefore, Pepco claims that the comparison with

¹⁸¹ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 47-48.

¹⁸² *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 48.

¹⁸³ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 49.

¹⁸⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 51.

¹⁸⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 51.

¹⁸⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 60.

¹⁸⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix G at 60.

¹⁸⁸ *Formal Case No. 1144*, Potomac Electric Power Company's Reply Comments to the Department of Energy and Environment and the Report Prepared by the Pacific Northwest National Laboratory ("PNNL"), at 4, filed September 7, 2018 ("Pepco's Reply to PNNL Report").

¹⁸⁹ *Formal Case No. 1144*, Pepco Reply to PNNL Report at 5.

¹⁹⁰ *Formal Case No. 1144*, Pepco Reply to PNNL Report at 7.

Pepco's load forecast on peak demand, which looks at the rate of electricity use, is inappropriate because the studies are completely different in both content and purpose.¹⁹¹ The PNNL Report itself does not address the impact on peak demand that might result from a change in building codes.¹⁹² Pepco also cited research demonstrating that there is a gap between modeled and realized energy savings, particularly during times of peak demand.¹⁹³

L. Pepco's December 28, 2018, Response to Commenters

48. In its response to comments, Pepco states that it generally agrees with the need to integrate more DER and NWA solutions into the electric distribution system and shares the interest of stakeholders in quickly deploying new technologies that are shown to be effective in support of an increasingly modern and sustainable distribution system.¹⁹⁴ Pepco asserts, however, that deferral of the entire Mt. Vernon Substation does not reflect a reasonable approach to the integration of NWA solutions into the system.¹⁹⁵ The Company states that it has provided affidavits from industry-leading experts in load forecasting, distribution system planning, and storage who have determined that the Mt. Vernon Substation is needed in 2023 and cannot be deferred or replaced by NWAs.¹⁹⁶

49. Pepco asserts that its load forecast supports the need for the Mt. Vernon Substation.¹⁹⁷ Pepco reiterates its position that forecasted total system load and the forecasted load in the area served by the Mt. Vernon Substation is increasing.¹⁹⁸ The Company submits that the conclusion in OPC's Mara Affidavit that the historical load is decreasing is inappropriate.¹⁹⁹ According to Pepco, the data submitted by Mara has no relevance to the Capital Grid Project.²⁰⁰ Pepco states that the correct values and the values that the Pepco load forecast reflect are forecasts at the substation level as opposed to the coincident peak loads on which the Mara Affidavit relies.²⁰¹ The Company indicates that the values in its load forecast are the total of noncoincident

¹⁹¹ *Formal Case No. 1144*, Pepco Reply to PNNL Report at 7.

¹⁹² *Formal Case No. 1144*, Pepco Reply to PNNL Report at 7.

¹⁹³ *Formal Case No. 1144*, Pepco Reply to PNNL Report at 9-11.

¹⁹⁴ *Formal Case No. 1144*, Pepco's Reply Comments of the Potomac Electric Power Company at 6, filed December 28, 2018 ("Pepco Reply Comments").

¹⁹⁵ *Formal Case No. 1144*, Pepco's Reply Comments at 6.

¹⁹⁶ *Formal Case No. 1144*, Pepco's Reply Comments at 7.

¹⁹⁷ *Formal Case No. 1144*, Pepco's Reply Comments at 29.

¹⁹⁸ *Formal Case No. 1144*, Pepco's Reply Comments at 30.

¹⁹⁹ *Formal Case No. 1144*, Pepco's Reply Comments at 30.

²⁰⁰ *Formal Case No. 1144*, Pepco's Reply Comments at 31.

²⁰¹ *Formal Case No. 1144*, Pepco's Reply Comments at 31.

substation peak loads for the distribution system.²⁰² Moreover, Pepco states that the weather-corrected noncoincident substation peak load has been growing in the District of Columbia and at a fairly consistent rate with regard to a system that is already, in some areas, near peak capability at 90/10 weather.²⁰³ Also, Pepco states that load growth can be expected to increase based on District policies and that this increase is not taken into account in the current load forecast, Pepco cites as an example, the District's goals for the adoption of electric vehicles with aggressive adoption targets by 2030.²⁰⁴

50. Specifically, Pepco addresses the commenters' concern that Pepco's load forecasts diverge from actual load data.²⁰⁵ The Company states that, for purposes of planning the system, load forecast values are normalized to 90/10 weather, meaning that, over time, forecast loads will exceed actual loads experienced in nine out of 10 years by an average of 8% and this factor alone will cause the load forecast to equal or fall short of the actual load in only one year of 10.²⁰⁶ Secondly, Pepco submits that summer weather in the District in the last six summers has been less extreme than 90/10 weather and that in two summers the weather has been less extreme than 50/50 weather.²⁰⁷ The Company asserts that such weather should result in load forecasts that are above the loads actually seen.²⁰⁸ Also, Pepco states the use of the 90/10 forecasting is an industry best practice, constitutes prudent planning, and protects District distribution customers.²⁰⁹ According to the Company, "[a] 90/10 approach is generally regarded in the industry as providing an appropriate level of risk management against the risk of equipment damage and failure leading to long-duration and possibly widespread outages during an extreme loading event."²¹⁰

51. Also, the Company asserts that the Mara Affidavit and DOEE Comments claim that Pepco's load forecasts are overstated because they do not include several proposed reductions to forecasted peak demand derived by DOEE from the PNNL Report which assesses the potential impact of proposed building codes. OPC and DOEE also assert that a combined heat and power ("CHP") project should be included.²¹¹ With respect to the PNNL Report, Pepco states that it

²⁰² *Formal Case No. 1144*, Pepco's Reply Comments at 31.

²⁰³ *Formal Case No. 1144*, Pepco's Reply Comments at 31.

²⁰⁴ *Formal Case No. 1144*, Pepco's Reply Comments at 31.

²⁰⁵ *Formal Case No. 1144*, Pepco's Reply Comments at 32.

²⁰⁶ *Formal Case No. 1144*, Pepco's Reply Comments at 32.

²⁰⁷ *Formal Case No. 1144*, Pepco's Reply Comments at 32-33.

²⁰⁸ *Formal Case No. 1144*, Pepco's Reply Comments at 33.

²⁰⁹ *Formal Case No. 1144*, Pepco's Reply Comments at 33.

²¹⁰ *Formal Case No. 1144*, Pepco's Reply Comments at 34.

²¹¹ *Formal Case No. 1144*, Pepco's Reply Comments at 36.

would be inappropriate to incorporate the building codes that the PNNL Report assesses into load forecast when those building codes have not yet been implemented.²¹² Similarly, it would be inappropriate that a CHP project that is not yet planned to be included in load forecast.²¹³ Pepco submits that contrary to DOEE's assertions, "Pepco's policy of ensuring that CHP will produce the peak load reductions that are claimed prior to including the CHP in its load forecasts is the epitome of proper distribution planning."²¹⁴ In addition, Pepco asserts that the Mara Affidavit claims that Pepco has significantly overstated its short-term PNB load forecast.²¹⁵ In response, the Company asserts that Pepco's use of common June in-service construction timeframe is consistent with industry practice.²¹⁶

52. The Company also states that the DOEE and DC Sun's reliance on DER and storage projects in other jurisdictions to support their assertions that there are viable NWA solutions to defer the construction of the Mt. Vernon Substation is misplaced.²¹⁷ Pepco submits that the Commission should disregard these projects because none are similar in size, scope, and purpose to what DOEE and DC Sun Comments are proposing.²¹⁸ The Company states that the projects are small pilot projects, limited in scope and duration, and none except one involve non-wires solutions as an alternative to traditional wires investment.²¹⁹ Specifically, with respect to using BESS, to defer a substation expansion, the Company states that the use of BESS has to be carefully planned as part of the distribution system, taking into consideration the difficulties that fire codes pose for siting the storage within buildings and enclosed parking garages.²²⁰

53. Pepco again refutes DOEE's argument to defer the Mt. Vernon Substation. The Company reminds DOEE that "protecting service on the New Jersey Sub. 161 South LVAC Network Feeder Group, the Northeast Sub. 212 Southwest LVAC Network Feeder Group, and the Northeast Substation would require approximately 10 tractor trailer-sized diesel generators that would need to run for the duration of the summer peaking period and as needed during other high-load periods for the years that it takes to construct the Mt. Vernon Substation."²²¹ Moreover, Pepco

²¹² *Formal Case No. 1144*, Pepco's Reply Comments at 36.

²¹³ *Formal Case No. 1144*, Pepco's Reply Comments at 36.

²¹⁴ *Formal Case No. 1144*, Pepco's Reply Comments at 44.

²¹⁵ *Formal Case No. 1144*, Pepco's Reply Comments at 36, 41.

²¹⁶ *Formal Case No. 1144*, Pepco's Reply Comments at 41.

²¹⁷ *Formal Case No. 1144*, Pepco's Reply Comments at 63.

²¹⁸ *Formal Case No. 1144*, Pepco's Reply Comments at 63.

²¹⁹ *Formal Case No. 1144*, Pepco's Reply Comments at 63-64.

²²⁰ *Formal Case No. 1144*, Pepco's Reply Comments at 71-72.

²²¹ *Formal Case No. 1144*, Pepco's Reply Comments at 27.

states that running diesel generators are noisy and release emissions into the air that would run afoul of the CleanEnergy Act's goals of reducing greenhouse gas emissions.²²² The generators would likely need to be placed in streets in busy areas, disrupting traffic and parking, and would require refueling multiple times a day, thus causing further traffic disruption.²²³

VI. 15 DCMR § 2111.5 and D.C. Code § 34-808.02

54. Our consideration of Phase II is focused on a determination of whether construction of the proposed Mt. Vernon Substation is reasonable, safe and needed.²²⁴ To make our determination, Pepco must file a detailed analysis of the information required by 15 DCMR § 2111.5.²²⁵ Moreover, while we do not determine how costs for these projects will be recovered from District ratepayers, we do examine the reasonableness of Pepco's proposed capital expenditures in light of a cost-benefit analysis of the deferral of the Substation.

55. The role of the Commission in this proceeding is not to step into the shoes of Pepco and replace the Company's business judgment with our own.²²⁶ Instead, the Commission's role is to determine the "reasonableness, safety and need" for the proposed Mt. Vernon Substation.²²⁷ Further, D.C. Code Section 34-808.02 requires the Commission, in supervising and regulating utility or energy companies, to consider "the public safety, the economy of the District, the conservation of natural resources, and the preservation of environmental quality, including effects on global climate change and the District's public climate commitments."²²⁸ Finally, it is the

²²² *Formal Case No. 1144*, Pepco's Reply Comments at 27.

²²³ *Formal Case No. 1144*, Pepco's Reply Comments at 27.

²²⁴ 15 DCMR § 2111.4 (2004).

²²⁵ A *prima facie* showing of the reasonableness, safety and need for the substation is established when the electric corporation files the requisite information prescribed by Chapter 21. If no investigation is initiated by the Commission prior to the proposed date of construction, the electric corporation may begin construction. See 15 DCMR § 2111 *et. seq.*

²²⁶ *Formal Case No. 1020, In the Matter of the Office of the People's Counsel's Complaint Regarding Washington Gas Light Company's Failure to Hedge a Portion of Its Natural Gas Supply Portfolio for the 2002-2003 Winter*, Order No. 13827, ¶ 24, rel. November 29, 2005,

"In reaching this conclusion, we are not stepping into the shoes of the company and attempting to substitute our business judgment for that of the company. [Footnote omitted.] It is a well-settled principle of regulatory law that companies must be free to exercise their business judgment and manage their affairs accordingly. [Footnote omitted.] Our role in this case was simply to ensure that the company considered the relevant factors, as they existed at the time, and made a decision that was within the zone of reasonableness."

²²⁷ 15 DCMR § 2111.4 (2004).

²²⁸ See D.C. Code § 34-808.02 (Supp. 2019).

Commission's task to ensure that its decision in this matter is neither arbitrary nor capricious,²²⁹ but is the product of reasoned decision making, in which the facts found, and the choices made are rationally connected to credible evidence of record.²³⁰

56. Pepco, as the proponent of the Capital Grid Project, bears the burden of proving these elements are satisfied.²³¹ If Pepco makes a *prima facie* case showing that construction of the Mt. Vernon Substation is reasonable, safe, and needed, the burden then shifts to opponent of the project²³² to offer a persuasive rebuttal through evidence, averments or arguments of their own.²³³

VII. DISCUSSION

A. The Need for The Mt. Vernon Substation

57. After reviewing the information contained in Pepco's Capital Grid Application and Comments filed in response thereto, we find that the Mt. Vernon Substation Capital Grid (Phase II) project is in the public interest. In our view, Pepco has met its burden and has demonstrated the proposal is reasonable, safe, and needed. Although, there has been substantial opposition against Pepco's proposal, suggesting that construction of the Mt. Vernon Substation can be substantially deferred or avoided altogether, we are not persuaded that the alternatives to Pepco's proposal to construct the Mt. Vernon Substation are as safe, reliable, or cost effective as what Pepco proposes. Specifically, we are persuaded (for the reasons stated below) that the Mt. Vernon Substation is needed in 2023 to provide load relief to the Northeast Substation 212 Southwest LVAC Network Feeder Group, the New Jersey Ave. Substation South 161 Network Feeder Group,

²²⁹ D.C. Code § 34-606 (2012 Repl.).

²³⁰ *AOBA v. PSC*, D.C. Court of Appeals No. 18-AA-275 (March 7, 2019), Slip. Op. at 7 (Commission orders must not be unreasonable, arbitrary nor capricious) and (Commission decision must be based upon substantial evidence).

²³¹ The D.C. Administrative Procedures Act, D.C. Code § 2-509(b) (2002) places the burden of proof on the proponent of a rule or order.

²³² *Cf.*, *Formal Case No. 1121, In the Matter of the Application of the Potomac Electric Power Company for a Financing Order*, Order No. 17797, ¶ 78, rel. February 2, 2015, ("While the initial burden of proof was on the Joint Applicants to show that their proposed treatment of forecasted sales data was reasonable, once they did so, the burden shifted to AOBA to demonstrate why the use of forecasted sales data was unreasonable.").

²³³ *See e.g.*, *Formal Case No. 1139, In the Matter of the Application of the Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service*, Order No. 18846, ¶¶ 223-226, rel. July 25, 2017 ("However, other parties who challenge the utility's proposals have a burden to present credible, concrete challenges to the utility's proposals."); *Formal Case No. 766, In the Matter of the Commission's Fuel Adjustment Clause Audit and Review Program*; *Formal Case No. 982, In the Matter of the Investigation of Potomac Electric Power Company Regarding Interruption to Electric Energy Service*; and *Formal Case No. 991, In the Matter of an Investigation into Explosions Occurring in or Around the Underground Distribution Systems of the Potomac Electric Power Company*, Order No. 16066, ¶ 13, rel. November 22, 2010 ("Although Pepco has the burden of proof as the proponent of an action, OPC, even though it has no burden of proof, still must defeat the Company's contentions with evidence, averments or arguments of its own.").

the Northeast Substation, and the Tenth Street Substation, as well as to provide reliability improvements to six underground radial feeders. We agree with the Company that these distribution capabilities have been previously expanded to their maximum capacity and would otherwise be overloaded, overstressed or near full capacity as early as 2023, if the Mt. Vernon Substation were not to be constructed. Also, the Commission is convinced that in addition to relieving the surrounding substations and feeder groups and mitigating the reliability, overload, and overstress conditions, the additional firm capacity at surrounding substations and LVAC network feeder groups would allow for future scheduled load transfers, emergency load transfers, and future load growth.

B. Pepco's Load Forecast

58. Pepco's load forecasting methodology is a central issue in this case. Generally, the commenters' express concern about the accuracy of Pepco's load forecasts. OPC (through the Mara Affidavit), DOEE and GSA each express a concern about Pepco's load forecast methodology. Also, OPC and DOEE state that Pepco significantly overstates the load growth in the Mt. Vernon Triangle/NoMa areas of the District because it does not include enough load reductions from energy efficiency and DER.

59. We have addressed Pepco's load forecast methodology in the past. When reviewing Pepco's 2014 Annual Consolidated Report, the Commission simultaneously examined the results of studies prepared by Siemens Industry, Inc. ("Siemens") and Liberty Consulting Group ("Liberty") addressing, among other issues, Pepco's load forecasting methodology.²³⁴ We noted that Siemens concluded "Pepco's approach to system modeling and evaluation, including load growth, is one that is fairly standard in the industry and allows the simultaneous consideration of all substations serving an area, when assessing the best ways to supply new load."²³⁵ In addition, "Siemens concludes that Pepco's load forecasting is adequate for a mature system, incorporates some level of new customer forecasting, and that Pepco is effective in planning its capital expenditures for substation and feeder investments to attend load growth."²³⁶ Similarly, in its Audit Report, Liberty concluded that "Pepco's distribution planning processing [including load forecasts] is consistent with good utility practice" and that "Liberty did not recommend any changes in Pepco's load forecasting methodology."²³⁷

60. OPC noted in its Comments in the present proceeding that the Commission expressed concern in *Formal Case No. 1139* about the "widening gap between Pepco's load

²³⁴ *Formal Case No. PEPACR-2014-01, In the Matter of the Commission's Fuel Adjustment Clause Audit and Review Program – Annual Consolidated Report ("PEPACR-2014-01")*, Order No. 17816 ("Order No. 17816"), rel. February 27, 2015 (Siemens Reliability Audit Report and Liberty Audit Report).

²³⁵ *PEPACR-2014-01*, Order No. 17816, ¶ 157.

²³⁶ *PEPACR-2014-01*, Order No. 17816, ¶ 158.

²³⁷ *PEPACR-2014-01*, Order No. 17816, ¶ 161.

forecasts and the actual demand experienced on the Pepco distribution system”²³⁸ and held a technical conference in 2017²³⁹ to consider those concerns.²⁴⁰ To address this “growing gap” the Commission directed Pepco to provide a load forecast that is weather normalized in its next rate case.²⁴¹ Pepco submitted a weather normalized load forecast in *Formal Case No. 1150*.²⁴²

61. While OPC is correct that the Commission had some concerns with Pepco’s methodology, the Commission in that same order stated that “[t]wo independent audits performed by Siemens and Liberty [described above] that this Commission ordered have found that Pepco’s load forecasting methodologies are generally sound, consistent with widespread utility practice, and reasonable.”²⁴³ Furthermore, the Commission found in that Order that there was “no sufficient justification at present (as OPC requests) to establish a separate new proceeding on load forecasting.”²⁴⁴ Moreover, the Commission also stated that it “does not object to Pepco’s 90/10 method²⁴⁵ and its bottom-up approach for the present.”²⁴⁶ The Commission, however, also stated that “Pepco should also explain and compare its current approach with the ‘top-down’ approach used by other utilities.”²⁴⁷ The Commission also requested additional information about the outage experiences of Pepco’s sister utilities owned by Exelon, including Commonwealth Edison in Illinois.²⁴⁸ The Commission noted that the Company had updated its methodology to include estimates of DER in its load forecasts noting that it was “too soon to determine” whether those changes constituted “an appropriate and sufficient improvement.”²⁴⁹

²³⁸ *Formal Case No. 1139, In the Matter of the Application of the Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service (“Formal Case No. 1139”).* Order No. 18846, ¶ 578, rel. July 25, 2017 (“Order No. 18846”).

²³⁹ *Formal Case No. 1139, Load Forecasting Methodology Technical Conference Report*, filed November 15, 2017. This technical conference was held pursuant to Commission Order No. 18846.

²⁴⁰ *Formal Case No. 1144*, OPC Comments at 3-4.

²⁴¹ *Formal Case No. 1139*, Order No. 18846, ¶ 578.

²⁴² *Formal Case No. 1150*, Direct Testimony of Donald Hall (December 19, 2017).

²⁴³ *Formal Case No. 1139*, Order No. 18846, ¶ 576.

²⁴⁴ *Formal Case No. 1139*, Order No. 18846, ¶ 576.

²⁴⁵ The 90/10 load forecasting methodology relies upon the highest peak load experienced over a ten-year period or, stated in another manner, the peak load yielded by this methodology will be experienced only once in ten years.

²⁴⁶ *Formal Case No. 1139*, Order No. 18846, ¶ 577.

²⁴⁷ *Formal Case No. 1139*, Order No. 18846, ¶ 577.

²⁴⁸ *Formal Case No. 1139*, Order No. 18846, ¶ 577.

²⁴⁹ *Formal Case No. 1139*, Order No. 18846, ¶ 577.

62. Pepco responded to each Commission concern with its submissions on load forecasting in *Formal Case No. 1150*²⁵⁰ and in the present case.²⁵¹ Although it was contemplated at that time that an analysis of Pepco's new weather normalized approach would be reviewed in the context of Pepco's next base rate proceeding, the issue is squarely before us in this matter and must be decided based on the record before us. Everyone who chose to participate in this proceeding has been given a fair opportunity to provide their comments for our consideration which we address herein.

63. The commenters' concerns regarding the accuracy of Pepco's load forecasts are rooted in a fundamental difference between Pepco's and the commenters' load forecasting methodology. OPC uses a whole-system or "top-down" approach to forecasting load, which emphasizes coincident system-wide peak loads and the resultant system peak aggregate load.²⁵² In contrast, Pepco uses a "bottom-up" method of developing a load forecast, in which it develops a non-coincident peak load forecast by adding together each individual substation's forecasted peak load, based upon an aggregation of the expected load on each feeder supplied by the particular substation.²⁵³ Pepco claims that this "bottom-up" approach assures system planners that all system components will provide the necessary capacity to meet customer needs under anticipated weather conditions.²⁵⁴

64. Pepco builds this base load forecast for each of its substations based on the highest peak load experienced in the previous 10 years ("observed peak load") and adjusts the observed peak load either upward or downward to account, respectively, for projected new customer loads, load transfers in and out of the substation, and DER (including energy efficiency, demand response, distributed generation, and energy storage) changes that have occurred; a final adjustment is made to reflect 90/10 normalized weather.²⁵⁵ Pepco claims that this "bottom-up" approach assures system planners that all system components will provide the necessary capacity to meet customer needs under anticipated weather conditions.²⁵⁶ Significantly, Pepco's "bottom-up" approach, because it utilizes non-coincident peak load forecasts at a substation level, is inherently more flexible and better mimics the manner in which power is dispatched, than the whole system "top-down" load forecasting methodology advocated by OPC. Pepco's methodology recognizes that load may increase in various areas within the District while at the same time, load

²⁵⁰ *Formal Case No. 1150*, Direct Testimony of Donald Hall (December 19, 2017) at PEPCO (H) and Quanta Technology; Lee Willis; "Pepco Weather Variable Analysis;" at PEPCO (H)-4.

²⁵¹ *Formal Case No. 1144*, Pepco's Capital Grid Application, Affidavit of Donald Hall, Appendix R; and Quanta Report; Lee Willis; "Load Forecasting Review;" June 25, 2018 at Appendix R.

²⁵² *Formal Case No. 1144*, Pepco Reply Comments at 31.

²⁵³ *Formal Case No. 1144*, Pepco Reply Comments, Affidavit of Howard Willis at 21.

²⁵⁴ *Formal Case No. 1144*, Pepco Reply Comments at 78.

²⁵⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application, Affidavit of Donald Hall, Appendix R at 2, 8-15.

²⁵⁶ *Formal Case No. 1144*, Pepco Reply Comments at 29.

may decrease, even to a greater degree, at other areas within the District. In contrast, the “top-down” approach treats the system as an integrated whole and may downplay rapid load increases in discrete areas if they are offset by slow or no growth in other areas of the District. Further, a substation must serve the maximum load whenever it occurs and not merely the load occurring at the substation at the time of the overall system peaks (*i.e.*, coincidental peak load). In the Commission’s view, this is one of the factors illustrating the reasonableness of our preference for Pepco’s load forecasting methodology.

65. OPC prefers a “top-down” approach, which avoids the detailed, bottom-up, feeder-by-feeder calculations for PNBs, DLC and DERs.²⁵⁷ OPC contends that its approach can be adjusted for extreme weather.²⁵⁸ OPC finally recommends that Pepco be required to present a load forecast based on OPC’s alternate methodology for comparison with Pepco’s approach. The Commission concludes that Pepco’s bottom-up approach is best suited to capturing the effects of uneven commercial development across the District of Columbia. The Commission further rejects OPC recommendation for two load forecasts because as discussed above, in *Formal Case No. 1139*, the Commission directed Pepco to provide certain information about its load forecast and the Company complied. We believe requiring Pepco to present an alternative load forecast in this proceeding is unnecessary.

66. In the view of the Commission, reliance by DOEE and OPC on the PNNL Report to generate what they consider to be a “corrected” load forecast turns largely on the use of unsupported assumptions, including the load-factor used to convert PNNL’s energy values into demand values, extrapolation of results to building types not modeled by PNNL, and application of energy data based on a future building code. DOEE and OPC provide no support for their assumptions. While the load factors they use are derived from Pepco data, we find them insufficient for the reasons Pepco cited. Pepco’s studies show that energy efficiency measures have less impact on peak energy usage than on average energy usage, allowing the reasonable conclusion that as buildings become more energy efficient, their peak day demand would decline. However, the peak demand does not necessarily decline proportionally. The Commission concludes that the relationship among load factor and changing energy efficiency is not as settled as OPC and DOEE imply and, therefore, the PNNL Report, as converted by OPC and DOEE cannot be relied upon to assess the need for the Mt. Vernon Substation. The Commission notes that while the PNNL Report only modeled a limited number of office and mid-rise multi-family residential buildings, Mr. Mara has applied the energy use estimates from these models to retail and hotel buildings, which we find to be inconsistent with Pepco’s AMI data for these building types.

67. The Commission notes that the Second Notice of Proposed Rulemaking (“NOPR”) for the District’s 2017 building code revision was published in the *D.C. Register* on July 26, 2019. The latest available minutes of the Construction Codes Coordinating Board from the meeting held

²⁵⁷ *Formal Case No. 1144*, OPC Comments, Mara Affidavit, ¶ 12.

²⁵⁸ *Formal Case No. 1144*, OPC Comments, Mara Affidavit, ¶ 31.

on September 19, 2019, show that the board is debating whether to prepare a third NOPR.²⁵⁹ In view of the combination of further delay and possible grandfathering of executed construction contracts, the Commission concludes that the proposed building codes will not be fully effective in time to address the demonstrated need for the Mt. Vernon Substation capacity in 2023.

68. The Commission agrees with Pepco that the PNNL Report was not a study of the specific need for the Mt. Vernon Substation nor was it an analysis of peak demand in the District and that its results were converted into demand values only through calculations made by DOEE and Mr. Mara. Pepco instead relies on AMI data reflecting actual building performance in the District of Columbia, which is reasonable and which the Commission believes to be preferable instead of relying on converting data from a study performed for a purpose unrelated to the need for the Mt. Vernon Substation. The Commission concludes for these reasons the PNNL Report is inappropriate for the purpose of forecasting peak load.

69. Considering our prior examination of Pepco's load forecasting methodology, and after reviewing Pepco's load forecast assumptions and calculations as they relate to the Mt. Vernon Substation, we find that Pepco's load forecast is reasonable and supports the need for the Mt. Vernon Substation. Pepco's load forecast reasonably projects that the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas (currently served by Florida Avenue Substation, New Jersey Avenue Substation, Northeast Substation and Tenth Street Substation) are and will continue to experience significant new growth, projecting approximately 126 MVA of additional load from 132 new developments scheduled between 2018-2027.²⁶⁰ We find that failing to construct the Mt. Vernon Substation would present an unacceptable level of risk to customers, since the additional load growth, combined with the current configuration of Northeast Sub. 212 Southwest LVAC Network Feeder Group, would, in the absence of this construction, create an overload of approximately 5% in 2023 and the surrounding feeder groups and substations will also be nearing 100% of capacity by 2023.²⁶¹ We also accept as reasonable the Company's load forecast showing that the New Jersey Sub. 161 South LVAC Network Feeder Group will be at 99% capacity, the Northeast Substation will be at 96% capacity, and the Tenth Street Substation will be at 94% capacity in 2023.²⁶² This forecasted overload means that in the event that the District experiences extremely hot weather, there is a significant risk of widespread outages affecting many customers, potentially over a prolonged duration.

70. We also believe that Pepco was correct in using the 90/10 load forecasting methodology rather than the 50/50 load forecast recommended by Mr. Mara.²⁶³ The 90/10 approach is regarded generally in the industry as providing an appropriate level of risk management against the possibility of equipment damage and failure, leading to prolonged and

²⁵⁹ Available online at: <https://dcra.dc.gov/node/1385696>, last accessed on December 16, 2019.

²⁶⁰ *Formal Case No. 1144*, Pepco's Capital Grid Application at 10.

²⁶¹ *Formal Case No. 1144*, Pepco's Capital Grid Application at 11.

²⁶² *Formal Case No. 1144*, Pepco's Capital Grid Application at 11.

²⁶³ *Formal Case No. 1144*, OPC's Comments, Mara Affidavit, ¶¶ 3-3, 15-16.

widespread outages during an extreme weather event. We conclude that Pepco's use of weather-normalized 90/10 load forecasting methodology in the instant matter is reasonably calculated to create a distribution system that can provide reliable service to customers, including minimizing risks to customers during the most extreme weather.

71. With respect to the comments that Pepco significantly overstates the load growth in the Mt. Vernon Triangle/NoMa areas of the District because the Company does not include several load reductions scenarios advocated by the commenters, we find the probable load reductions to be speculative in nature. In our view, load forecasts should only be based on realistic estimates of new demand from prospective new businesses and load reductions based on well-founded methods and data.

72. DOEE raises several questions about Pepco's load forecasting methodology but the thrust of DOEE's approach relies on using its load-factor methodology to calculate forecasted peak demands based on the PNNL Report. DOEE's arguments about the viability of DER alternatives are premised on the lowered forecasts resulting from their in-house calculations based on energy usage. As the Commission has rejected reliance on the PNNL Report to forecast peak demand, DOEE's critique of Pepco's load forecast is also rejected.

73. The Commission concludes that Pepco's load forecasting methodology as presented in this case provides a reasonable basis for assessing the need for the Mt. Vernon Substation. The Commission's conclusion is consistent with what Pepco describes in its Reply Comments: "a 90/10 approach is generally regarded in the industry as providing an appropriate level of risk management against the risk of equipment damage and failure leading to long-duration and possibly widespread outages during an extreme loading event."²⁶⁴ Pepco described one situation in which Commonwealth Edison under-forecasted load, using a 50/50 approach, which led to three major events over a two-week period in which service to over 100,000 customers was disrupted for several hours in one event and in another event, intentional load shedding was deemed necessary to protect overloaded equipment.²⁶⁵ According to Pepco, the U.S. Department of Energy's review of this incident attributed these failures to the use of a 50/50 load forecasting approach rather than a 90/10 load forecasting approach.²⁶⁶

74. The Commission believes that the 90/10 weather normalization and the bottom-up approach components of Pepco's load forecasting methodology are reasonable, well-founded, and adhere to industry standards. The Commission realizes that accounting for energy efficiency, distributed energy resources, and prospective new business are still evolving and will continue to do so in the future. While the Commission believes that the load forecast as presented by Pepco in this case including the adjustments for energy efficiency, distributed energy resources, and prospective new business is reasonable to support the construction of the Mt. Vernon Substation,

²⁶⁴ *Formal Case No. 1144*, Pepco Reply Comments, Willis Affidavit, ¶¶ 106-114.

²⁶⁵ *Formal Case No. 1144*, Pepco Reply Comments at 34-35.

²⁶⁶ *Formal Case No. 1144*, Pepco Reply Comments at 35.

these adjustments may require further refinement in the future as new technology, usage patterns, and demands on the distribution system continue to emerge.

C. The Reasonableness and Safety of the Mt. Vernon Substation and Alternative Proposals

1. Reasonableness and Safety

75. We evaluated the safety, reliability and feasibility of the alternative proposals offered by DOEE, OPC, DC Sun, and Sunrun and conclude that the deferral of the Mt. Vernon Substation beyond 2023 presents risks of reduced reliability without offering offsetting benefits to customers in the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas. The Mt. Vernon Substation was already deferred twice by Pepco and further delays may ultimately lead to customer outages.²⁶⁷ The Mt. Vernon Substation is not only needed to serve growing customer load in the area but will also allow Pepco to make future reliability upgrades and provide invaluable learning on how to incorporate more NWAs into its upcoming projects. Without the Mt. Vernon Substation, 7,400 residential customers and 270 commercial customers, with a total of over 100 MVA of load, could experience service interruptions.²⁶⁸ The Commission believes that such events, especially if occurring during extreme weather conditions, could negatively affect the reliability of service to customers as well as the economy of the District.

76. Based on the record, we agree that construction of the Mt. Vernon Substation will reduce the risk of the expected reliability, overload, and overstress conditions in the NoMa area and provide load relief to the surrounding substations and feeder groups.²⁶⁹ Pepco has already performed planned load transfers and operational measures to delay the need to build the Mt. Vernon Substation but no similar measures can be employed beyond 2023.²⁷⁰ The New Jersey Sub. 161 South LVAC Network Feeder Group, Northeast Sub. 212 Southwest LVAC Network Feeder Group, the Northeast Substation, and the Tenth Street Substation are among the facilities the Mt. Vernon Substation will relieve. Pepco could mitigate the risk to the New Jersey Sub. 161 South LVAC Network Feeder Group using operational measures until the Mt. Vernon Substation is constructed, but after 2023 customers would be exposed to increased risk of outages.²⁷¹

77. As explained by Pepco, a delay of the Mt. Vernon Substation will lead to a 5% firm capacity overload at Northeast Substation 212 Southwest LVAC Network Feeder Group in 2023 without sufficient capacity at any current feeder group and without enough feeder positions to extend new feeder groups from other substations to take the load. The surrounding feeder groups

²⁶⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application at 16.

²⁶⁸ *Formal Case No. 1144*, Pepco's Reply Comments at 29.

²⁶⁹ *Formal Case No. 1144*, Pepco's Reply Comments at 14.

²⁷⁰ *Formal Case No. 1144*, Pepco's Reply Comments at 25.

²⁷¹ *Formal Case No. 1144*, Pepco's Reply Comments at 25.

and substations will also be nearing 100% of their capacity in 2023. In addition, the New Jersey Sub. 161 LVAC South Network Feeder Group will continue to be overstressed at 99% to 100% until it overloads in 2025. The prolonged overstressing of the feeder group followed by subsequent overloading places customers at risk of outages. Project delays will lead to a 2% firm capacity overload at Northeast Substation in 2025 putting the Substation at risk of overload during a single contingency outage event which could lead to a catastrophic failure inside the Substation.²⁷² Should this occur, the entire Northeast Substation could be out of service for up to several weeks, depending on the extent of the damage. This could result in extended outages for all of the Northeast Sub. 212 Southwest LVAC Network Feeder Group's approximately 6,700 residential and 150 commercial customers, representing 52.7 MVA of load.²⁷³ The possibility for extended outages would not only impact public safety but also the economy of the District.

78. We are convinced that it is unreasonable to further defer the Mt. Vernon Substation because the risk to system reliability is compelling and the alternative solutions we have considered are not feasible to address the reliability risk. For example, protecting service on the New Jersey Sub. 161 South LVAC Network Feeder Group, the Northeast Sub. 212 Southwest LVAC Network Feeder Group, and the Northeast Substation in the event of failure of deferral through alternative NWAs would require approximately ten (10) tractor trailer-sized diesel generators around the areas served by the LVACs and the Mt. Vernon Substation. This option is not viable for the District, due to the lack of space for these generators, high costs, increased greenhouse gas emissions, and air quality and traffic issues.²⁷⁴ Further, we agree with Pepco that given the short time left until the Substation is needed, deferral of the Mt. Vernon Substation using NWAs is not an option. The NoMa area has already reached the point where Pepco has exhausted the potential of load transfers and operational measures to reliably serve customers.²⁷⁵

79. Also, with respect to using batteries to defer the Mt. Vernon Substation, we agree that there would be siting and permitting challenges associated with placing batteries throughout the city, that are similar to the permitting challenges and fire concerns that have been an issue in New York for its battery system projects.²⁷⁶ Pepco has explained that deferral will require placement of batteries that are at least as large as the trailer from a semi-truck on the LVAC

²⁷² *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

²⁷³ *Formal Case No. 1144*, Pepco's Capital Grid Application at 37.

²⁷⁴ *Formal Case No. 1144*, Pepco's Reply Comments at 27-28.

²⁷⁵ *Formal Case No. 1144*, Pepco's Reply Comments at 14, 21.

²⁷⁶ *Formal Case No. 1144*, Pepco's Reply Comments at 71-74. In its Reply Comments, the Company indicates that for example, ConEd has dealt with siting and regulatory issues stemming from fire concerns for some of its BESS projects and that ConEd suspended its Clean Virtual Power Plant demonstration project due to residential battery system installation permitting issues with the New York Department of Buildings and the New York City Fire Department. Pepco's expert Masiello also discusses the emerging National Fire Protection Association's codes and indicates that battery installation costs may be significant to provide adequate clearance and fire rating of enclosures. *See Affidavit of Masiello*, ¶¶ 129-132.

networks requiring the load relief plus a safety perimeter.²⁷⁷ As Pepco explained, the LVAC networks run from around Chinatown through various parts of the downtown area to north of New York Avenue and from H Street, NW and around Union Station, through the area around the Capitol Building and ending in the National Mall. Given the location of these networks, Pepco believes that it would likely be very difficult to find the necessary space and obtain the requisite permitting to place all batteries that would be needed.²⁷⁸

2. Reliability and Feasibility of the Alternative Proposals

80. DOEE, OPC, DC Sun, and Sunrun oppose the Mt. Vernon Substation and present alternatives to Pepco's proposal.²⁷⁹ DOEE basically argues that the Mt. Vernon Substation could be deferred and possibly replaced by a combination of NWAs, demand response, renewable energy, and implementation of new energy efficiency building standards. OPC offers similar comments, advocating for BESS and solar PV as being more cost effective and reliable alternatives. OPC claims that Pepco can use load transfers from nearby substations to serve load in the area, thus avoiding the construction of the Mt. Vernon Substation.

81. OPC and DOEE advocate for extensive use of DER, and we agree that these resources can and do reliably provide energy to customers in the District of Columbia. However, in this case, the issue is whether such DER could be used to reliably manage peak demands on the distribution system caused by extreme (hot) weather as well provide sufficient capacity in all hours of the year. We conclude and are persuaded by Pepco's filings that DER cannot allow for the economic deferral of the Mt. Vernon Substation because (1) DER integration on LVAC networks is complicated by the need to manage N-1 contingencies; and (2) their application in densely populated, urban locations presents additional complexities in contrast to the pilot programs cited by the opponents of Pepco's proposal. First, demand response programs²⁸⁰ require regulatory approval and their impact may not be sufficiently focused on the over-loaded feeders in question.²⁸¹ Second, customer-owned storage resources: (1) are located behind-the-meter; (2) may not be necessarily installed where Pepco needs them and are not directly controlled by Pepco; and (3) may not have secure communications necessary for the Company to call on these assets to reliably serve peak demand during contingencies; furthermore, inadequate maintenance by non-utility owners could also present reliability challenges.²⁸² Further, utility-side storage requires a

²⁷⁷ *Formal Case No. 1144*, Pepco's Capital Grid Application at 51 (discussion of Alternative No. 5).

²⁷⁸ *Formal Case No. 1144*, Pepco's Capital Grid Application at 51.

²⁷⁹ DC Sun recommends tasking the NWA working group in the MEDSIS proceeding with responsibility for designing non-wires solutions to defer and entirely eliminate the need for the Mt. Vernon Substation. Sunrun proposes establishment of various principles for NWAs employed in the District. We appreciate these suggestions in general but do not believe they are specific enough to address the immediate needs for the Mt. Vernon Substation.

²⁸⁰ Demand response programs include direct load control and dynamic pricing programs.

²⁸¹ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix H; *See also* Pepco's Reply Comments at 22-23.

²⁸² *Formal Case No. 1144*, Pepco's Reply Comments at 57, Affidavit of Masiello, ¶ 127.

large and costly amount of batteries and space requirements, as well as permitting, which are key cost considerations and pose difficulties in their implementation, as illustrated by New York's experience.²⁸³ With respect to cogeneration plants, they are beneficial to the system but under Pepco's policies and procedures, they must operate reliably for a one peak loading season before being counted as firm capacity.²⁸⁴ Finally, the Quanta Report evaluated the DER portfolios that could meet Pepco's needs and showed that their cost is not justified by the potential economic benefits of deferring the construction of the Mt. Vernon Substation for one, two, and three years.²⁸⁵

82. In its Second Supplemental Initial Comments, DOEE reiterates six (6) major objections against the validity of the Quanta Report, and we reject them for the following reasons.²⁸⁶ First, the Commission rejects DOEE's use of its load-factor methodology to modify the results of the PNNL Report upon which DOEE relies to assess the purported benefits of both existing and proposed building codes. Based on our review, we agree with Pepco's explanation that "... the DOEE Comments' arguments regarding the impact of energy efficiency requirements contained in the District's building codes overstate their impact when it comes to peak load." Second, the Commission agrees with Pepco's expert Masiello that the Quanta Report does not inflate the BESS requirements by requiring one battery per networked feeder instead of relying on BTM storage, as DOEE recommends, which would require more battery capacity, not less, than DOEE says.²⁸⁷ Third, the Commission accepts the demonstration by Pepco's expert Masiello that the use of DOEE's approach to "load shift factors" is not sufficiently material to alter the conclusion of the Quanta Report; Masiello recalculates the results of the Report using DOEE's methodology and final results support the conclusions of the original Quanta Study, as corrected in the Errata.²⁸⁸ Fourth, the Commission agrees that the alleged miscalculation of the number of years of possible deferral associated with battery storage systems is not sufficient to alter the conclusions of the Quanta Report that the Mt. Vernon Substation is necessary by 2023.²⁸⁹ Again, Masiello recalculated the BCAs using the methodology proposed by the DOEE and found that the

²⁸³ *Formal Case No. 1144*, Pepco's Reply Comments at 73.

²⁸⁴ *Formal Case No. 1144*, Pepco's Reply Comments at 43.

²⁸⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix F.

²⁸⁶ *Formal Case No. 1144*, Department of Energy and Environment's Second Supplemental Initial Comments to Pepco's Notice of Construction, at 2, filed December 10, 2018 ("DOEE's Second Supplemental Initial Comments"). DOEE's objections are as follows: (1) Pepco's load forecast does not account for energy efficiency benefits of current or future building codes; (2) Quanta oversized the required BESS; (3) Quanta has inappropriately applied "load shift factors," in its analysis; (4) Quanta has miscalculated the number of years of possible deferral associated with battery storage systems; (5) Quanta's assumption that the full battery system would need to be installed in the first year of the Mt. Vernon operation, rather than spread over time as load increases; and (6) Quanta overestimates land required for battery siting.

²⁸⁷ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Masiello, ¶¶ 129-133.

²⁸⁸ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Masiello, ¶¶ 8, 58.

²⁸⁹ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Masiello, ¶¶ 66-71.

changes are not material to alter the Quanta Report's conclusion. Fifth, the Commission agrees with Pepco's expert Masiello that changing the Quanta Report's assumption that the full battery system would need to be installed in the first year of the Mt. Vernon Substation operation, rather than spread over time as load increases. Spreading the installation is not sufficient to alter the conclusions of the Quanta Report and does not provide economic benefits to customers.²⁹⁰ Sixth, the Commission agrees with Masiello that the Quanta Report did not overestimate the size of the land required to site batteries.²⁹¹ As Masiello explained, the emerging safety requirements in the National Fire Protection Association ("NFPA") codes on stationary battery systems will require more space around each battery, thus requiring more land for the overall project. For these reasons, the Commission concludes that DOEE's arguments do not undermine the conclusions of the Quanta Report.

83. Furthermore, the Commission accepts Pepco's Errata pertaining to the Quanta Report and rejects the arguments made against the Errata by OPC and DOEE.²⁹² When the corrections to the cost of the Mt. Vernon Substation contained in the Errata are considered, then all of the representative DER portfolios analyzed by Quanta are uneconomic, even under the conservative assumptions used by Quanta.²⁹³ The Commission concludes that the Quanta Report demonstrates that further deferral of the Mt. Vernon Substation is not economically feasible. A deferral using BESS, solar PV, DR, or other types of DER entail risks for ratepayers in the event that the energy sources do not perform as expected or load growth is greater than expected. Pepco's Masiello affidavit demonstrates that none of DOEE's objections, taken together or separately, are sufficient to overcome the results of the Quanta Report. The Commission also notes that the space required to introduce the BESS solutions suggested by the opponents is substantial and presents challenges that may be difficult to overcome in an urban environment.

84. OPC and DOEE's approach to incorporating DERs into the system to defer the Mt. Vernon Substation is overly ambitious given the status and needs of the distribution system in the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas. For example, OPC assumes that Pepco could subscribe 4,368 direct load control participant households in the Mt.

²⁹⁰ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Masiello, ¶¶ 137-143.

²⁹¹ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Masiello, ¶¶ 129-132, 136.

²⁹² *Formal Case No. 1144*, DOEE's Second Supplemental Initial Comments filed December 10, 2018, OPC's Supplemental Initial Comments, filed December 10, 2018.

²⁹³ The Quanta Report, which concluded that DER solutions for deferral of the Mt. Vernon Substation are uneconomic, can be considered conservative for the following reasons: (1) Quanta did not include any cost for installing solar PV and DR in the Study; and (2) the Quanta Report did not include any cost to improve the reliability of the six radial feeders, although part of the benefit of the Substation deferral includes the components of the Mt. Vernon Substation that will serve those six feeders. If these costs for NWAs had been included, then the cost side of the cost-benefit analysis would have been even larger. The Quanta Report was "conservative" in the sense that inclusion of the costs identified above would only have made a positive finding favoring deferral more difficult to achieve. The alternative DER portfolios were found to be uneconomic even when these costs were excluded.

Vernon Substation area, and thus reduce peak load in time to defer the Mt. Vernon Substation.²⁹⁴ These expectations are unsubstantiated, are overly optimistic and cannot be relied upon to ensure reliable service to customers in the Mt. Vernon Triangle, NoMa, Capitol Crossing, and Northwest One areas because they are contingent on Pepco receiving approval for these activities and on the customers' participation rates.²⁹⁵ Pepco reports only 1,766 participants in direct load control on the feeders that will be connected to the new Mt. Vernon Substation.²⁹⁶ Further, DOEE's Synapse Study estimates potential peak-load reduction of 1.9 MW from energy efficiency and 3.9 MW from demand response.²⁹⁷ As Pepco correctly points out, these peak load reductions depend on the customers' participation rates, which are unproven at this time.²⁹⁸ DOEE's assumptions of participation rates of 25% for multifamily buildings and 50% for other commercial buildings in demand response programs are not based on actual past participation rates and thus, are unreliable for distribution planning purposes.²⁹⁹ Similarly, energy efficiency improvements to newly constructed buildings could not be calculated with any certainty given that the improvements depend on the full implementation and enforcement of the building codes cited by the opponents of the project.

85. The Commission notes that DOEE's Synapse Study has acknowledged that many of Pepco's criticisms were valid, which led DOEE abandoning its "bottom-up" critique of Pepco's load forecast.³⁰⁰ The relationship between the energy efficiency measures advocated by the Synapse Study and the potential reductions in peak demand remains tenuous and cannot be relied

²⁹⁴ *Formal Case No. 1144*, Pepco's Reply Comments at 24, n. 34. Citing OPC's 2018 Mara Affidavit, ¶¶ 122-25.

²⁹⁵ *Formal Case No. 1144*, Pepco's Reply Comments at 24, n. 34. Citing OPC's 2018 Mara Affidavit, ¶¶ 122-25.

²⁹⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application, Appendix H.

²⁹⁷ *Formal Case No. 1144*, DOEE's Comments, Synapse Response at 1, 5, 6, 16, 23.

²⁹⁸ *Formal Case No. 1144*, Pepco's Reply Comments at 116-117.

²⁹⁹ *Formal Case No. 1144*, September 27, 2018, DOEE Comments at 6,23; *see generally* Pepco's Reply Comments at 116-117, citing DOEE Comments, Synapse Response. Pepco demonstrates that during the entire seven-year period of 2011 through 2017, the DC Sustainable Energy Utility program was able to achieve a demand reduction from energy efficiency programs of 12.9 MW. This figure, if considered to be peak-coincident load reduction, represents 0.57% of the 2017 peak electric load of the District. If this current rate of demand reduction is applied to the Mt. Vernon area, the reduction would equal 0.3 MW or 0.6% of the forecast peak-load requirement, which is insufficient to defer the Mt. Vernon Substation. More information about the DC Sustainable Energy Utility program is available at dcseu.com.

³⁰⁰ *Formal Case No. 1144*, *see generally* Pepco's Reply Comments at 117-122. Pepco rejects the DOEE's Synapse Study's revised peak-load reduction estimates of 1.9 MW from energy efficiency and 3.9 MW from demand response, arguing that Synapse's estimates should not be relied upon for planning purposes to ensure distribution system reliability for customers. Pepco insists that Synapse often relied upon an average value from a very small number (in most cases, below 10) of comparable, cost-effective measures that vary drastically in size and scope to estimate peak demand savings from energy efficiency measures; limited sample size means greater uncertainty about effectiveness, which translates to potential risks for the distribution system.

upon for deferring the Mt. Vernon Substation without imposing unacceptable risks on District customers. Further, the Synapse Study based its approach more closely on the results of the PNNL Report, which the Commission has found not to be a reliable foundation for assessing peak load forecasts associated with the Mt. Vernon Substation. The PNNL Report assessed the potential reductions in annual energy usage, which do not correspond directly to reductions in peak load, and therefore could not be used as a basis of reliable load forecasting. The Commission concludes that the Synapse Study and related commentary from DOEE do not provide sufficient basis for outweighing Pepco's capacity planning process, which is designed to provide reliable service to District residents.

86. The NWAs proposed to defer or eliminate the need for the Mt. Vernon Substation do not offer the same emergency rating capacity for peak loads during contingencies, including off-peak hour emergencies.³⁰¹ During off-peak periods, storms occur, contingencies occur, and the utility must take equipment off line for maintenance and construction of new service. As a result, the distribution system can be stressed in a network area or substation perhaps even more than at the time of peak load with all equipment operating. A measure of this can be seen in the fact that in most years, 60% of Pepco's customer reliability issues (SAIFI) occur during the off-peak period of the year.³⁰² While alternative resources mentioned by OPC and DOEE provide great value to the grid, they are mainly targeting peak-load reduction and are not available at all times to provide reliability and resiliency to the grid.³⁰³ Therefore, we agree with Pepco that DER and NWAs must be carefully planned and incorporated in projects where they can provide optimal value to customers without increasing the reliability, resiliency, and safety risks.

87. The Commission agrees with Pepco that the Mt. Vernon Substation is needed for more than simply shaving 2.7 MVA of peak overload on a single facility in 2023. Other downtown facilities will soon be loaded at over 95% of their firm capacity, which over-stresses these facilities and cannot be sustained for long. The new Mt. Vernon Substation will also improve the radial feeders with poor reliability and relieve high loadings on the existing feeders.³⁰⁴ This will reduce year-round outages on this equipment and improve reliability for customers. Finally, the new Substation will add transfer capacity and enable future planned and emergency load transfers, allowing Pepco to improve reliability.³⁰⁵

³⁰¹ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Howard Willis at 34.

³⁰² *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Howard Willis at 34. *See also* Affidavit of Howard Willis at 38, explaining that the alternative solutions will not provide reliable service if peak flattening and restoration flexibility is considered, among other reliability factors.

³⁰³ *Formal Case No. 1144*, Pepco's Reply Comments, Affidavit of Howard Willis at 35. *See also* Table 2 at page 36, showing an evaluation of OPC and DOEE's proposed alternatives in terms of duration of potential outages in the event the Mt. Vernon Substation is further deferred or eliminated.

³⁰⁴ *Formal Case No. 1144*, Capital Grid Application at 13 (Table 4).

³⁰⁵ The Commission takes administrative notice of OPC's "Initial Comments of the Office of the People's Counsel for the District of Columbia Regarding Pepco's 2019 Consolidated Report" in *PEPACR-2019-01*, filed on June 18, 2019 ("OPC Comments to 2019 ACR"). In this pleading OPC addressed Pepco's load forecast underlying the proposed Mt. Vernon Substation. Specifically, OPC compared Pepco's peak demand projections for the Northwest

88. When proposing “wires alternatives,” OPC’s expert Mara contends that Pepco’s planned load transfers to the Northeast Substation should be deferred.³⁰⁶ Mara suggests alternative routes to extend new feeders from the Northeast Substation. However, Pepco notes that Mr. Mara does not explain whether he is referring to radial feeders, spot network feeders, or a networked feeder group; as each has distinct requirements to ensure reliability on an underground distribution system in a dense urban area, which Mara fails to address.³⁰⁷ While extending a new network from the Florida Avenue Substation as OPC proposes is physically feasible, transferring load among heavily loaded facilities will not decrease the amount of load to be served in the area; it simply transfers the loading problems to another portion of the distribution system. Therefore, we conclude that OPC’s proposal would be a temporary solution which would not be cost effective and provide less reliability benefits than a new Mt. Vernon Substation.

89. DOEE’s “wires alternatives” recommendation points to the Northeast Substation and asserts that Pepco’s concerns about lack of space in the right-of-way can be overcome through improved utility coordination or leasing private space for conduits.³⁰⁸ DOEE contends that Pepco’s eight-position duct banks can be used to add two additional feeders to the Company’s six-feeder LVAC network feeder groups that could address forecasted overloads if the load is properly balanced among the feeders.³⁰⁹ DOEE recommends, despite acknowledging that spare ducts are installed to pull new cables in the event of a failure, that two feeders could be added to the six feeder networks which could be split into groups of four feeders while acknowledging there would be some cost for “re-wiring” but any such cost would be less than a new substation.³¹⁰ Finally, DOEE contends that Pepco fails to properly maintain more equal loads among the six feeders in the LVAC network feeder groups and that if it did so, the networks would be better able to manage load during N-1 contingency events and asserts that Pepco’s improper maintenance should not be used to justify investment in “unneeded capacity.”³¹¹ Pepco responds that DOEE glosses over space constraints as did Mara.³¹² Pepco explains that even where there is physical space to exit a substation or empty ducts, it must also consider operating issues such as thermal loading of the

Substation 212 and the Northwest Substation Southwest LVAC provided, respectively, in its 2019 ACR and the Capital Grid Project and concluded that the projections in the 2019 ACR were down roughly 2.5% from what was projected by Pepco in its Capital Grid NOC. OPC Comments to 2019 ACR at 11. Nonetheless, as discussed further in the body of this Order, when the projected load increases for the Southwest LVAC Feeder Group and the Tenth Street Substation 52 are also taken into account, the need for the Mt. Vernon Substation remains.

³⁰⁶ *Formal Case No. 1144*, OPC’s Comments, Mara Affidavit, ¶ 140.

³⁰⁷ *Formal Case No. 1144*, Pepco’s Reply Comments at 97.

³⁰⁸ *Formal Case No. 1144*, DOEE’s Reply Comments at 20-21.

³⁰⁹ *Formal Case No. 1144*, DOEE’s Comments at 22-23.

³¹⁰ *Formal Case No. 1144*, DOEE’s Comments at 23-24.

³¹¹ *Formal Case No. 1144*, DOEE’s Comments at 24-25.

³¹² *Formal Case No. 1144*, Pepco’s Reply Comments at 97-98.

surrounding conduits and soil; further adding a circuit may reduce the operating life of existing circuits or lower their operating capacity.³¹³ Pepco expert Willis avers that there were no maintenance issue or planning mistake with regard to the Northeast Substation and its feeders explaining the planning for load balance on network feeder groups during contingency situations may result in unbalanced loads during normal operation.³¹⁴

90. The Commission concludes that OPC and DOEE have not provided sufficient support for their “wires alternatives.” Pepco has provided reasonable explanations to demonstrate that the alternatives are not feasible. Even if these proposals were feasible, the Commission notes that these proposed “wires alternatives” come with considerable expense to move feeders and only defer the need for the Mt. Vernon Substation briefly, thus requiring additional investments in the future. Also, the “wires alternatives” do not address the overall lack of capacity among the substations in the Mt. Vernon area, which is needed to improve reliability and support both planned and emergency load transfers. In addition, we conclude that the wires solutions proposed by OPC and DOEE are concepts rather than engineered solutions in that OPC and DOEE provide no engineering analysis or design details that can be used to assess feasibility or cost.

91. Finally, we find that the alternative solutions proposed by commenters do not offer substantial and verified savings to customers. A number of those opposing the construction of the Mt. Vernon Substation claim that capacity needs can be met through non-wires alternatives³¹⁵ which, according to one commenter, can “do the job at a fraction of the cost.”³¹⁶ We agree with Pepco’s contentions that these claims are insufficiently supported by data. For example, a 1.9 MW energy efficiency reduction from the customers that will be served by the Mt. Vernon Substation, would cost up to \$9.9 million, which is more than DOEE’s projection.³¹⁷ Similar analysis related to savings from retrofit projects and demand response demonstrate that the proposed alternatives do not offer substantial savings to customers. Therefore, we are not persuaded by the commenters’ claims that in this specific case, the alternative solutions offer the same level of reliability and resiliency, while also providing savings to customers.

92. Accordingly, the Commission finds that Pepco satisfactorily addressed each regulatory requirement applicable to a NOC filing, as set forth in Section 2111 of the Commission

³¹³ *Formal Case No. 1144*, Pepco’s Reply Comments at 98; Affidavit of Willis, ¶¶ 169-180.

³¹⁴ *Formal Case No. 1144*, Pepco Reply Comments; Affidavit of Willis, ¶¶ 192-193.

³¹⁵ *Formal Case No. 1144*, Greentel Group Comments, filed September 26, 2018; Empower DC Comments, filed September 26, 2018; and Sunrun Inc. Comments, filed September 27, 2018.

³¹⁶ *Formal Case No. 1144*, Empower DC Comments at 1.

³¹⁷ *Formal Case No. 1144*, Pepco’s Reply Comments at 118. *See also* Affidavit of Howard Willis at 57-58, providing an example of PG&E’s energy efficiency and DER project, which resulted in higher cost to consumers and the subsequent construction of a substation, which the project attempted to avoid.

Rules. Pepco also provided all of the additional information required by Order No. 19274 and satisfactorily addressed all alternative solutions to the proposed Substation.³¹⁸

D. Directives to Pepco to Incorporate NWAs into Future Projects

93. Implementing the goals of the CleanEnergy Act of 2018 is a top priority of the Commission and we believe that with the Mt. Vernon Substation, Pepco will be able to both study and optimally incorporate NWAs into its distribution system. Therefore, we direct Pepco to take certain actions designed to facilitate the penetration of NWAs in the District.

94. At the Mt. Vernon Substation, Pepco indicates that it will use a 1 MW, three-hour battery (3 MWh) which could be extended to defer the need for the fourth 70 MVA transformer, currently forecasted to be needed after 2028.³¹⁹ Given that the new transformer will not be needed until 2028, we direct Pepco to use best efforts to expand the 1 MW pilot battery project at the Mt. Vernon Substation during this time to defer or eliminate the need for the transformer. To facilitate our understanding of the impacts of battery storage on the distribution system, we direct Pepco to submit a plan and implementation details for battery energy storage, including the physical location and expansion possibilities of the proposed battery storage at the Mt. Vernon Substation within 90 days of the date of this Order.

95. We are also of the opinion that Pepco should simultaneously focus on pilot and demonstration projects for NWAs in Ward 8, where Pepco expects that a new substation will be required in the 2026-2028 timeframe.³²⁰ Pepco has stated that it is already developing an energy storage project in the area of Alabama Avenue (in Ward 8) for the purpose of deferring investment in new distribution feeders for three (3) years.³²¹ Given that Pepco is already working on this NWAs project, we believe that the Company will have sufficient time to develop a number of NWA solutions for this projected Ward 8 substation. To facilitate our understanding of the impacts of battery storage on the distribution system, we direct Pepco to provide a preliminary assessment and implementation framework for battery energy storage deployment which may enable the new Substation deferral at Ward 8 (Alabama Avenue) within 180 days of this Order. Furthermore, to advance the goals of the CleanEnergy Act, the Commission expects Pepco to explore pilot and demonstration projects which would integrate more NWAs throughout the electric distribution system in the District.

96. The Commission believes that a consensus-based NWAs planning process is necessary to ensure adequate and reliable incorporation of DERs into Pepco's distribution system. This process will provide for a longer planning horizon within which Pepco, stakeholders, and DER developers could reach consensus in addressing the complex questions posed by DER-driven

³¹⁸ *Formal Case No. 1144*, Order No. 19274, ¶ 1.

³¹⁹ *Formal Case No. 1144*, Pepco's Reply Comments at 17.

³²⁰ *Formal Case No. 1144*, Pepco's Reply Comments at 5, 17-18.

³²¹ *Formal Case No. 1144*, Pepco's Reply Comments at 16.

capacity planning and load forecasting. Through this process, the District would avoid the risk of introducing unreliable or unsafe solutions and diminishing the quality service to which customers are accustomed. The Commission will soon establish this critical working group in its imminent PowerPath DC order.

E. Electromagnetic Fields

97. As part of its environmental impact statement for the project, Pepco considered the effect of EMFs on public safety and specifically on the nearby communities.³²² Some community members claim that EMF from the Mt. Vernon Substation will impose harmful health effects upon nearby residents. Previously, when approving Pepco's Waterfront Substation Project, the Commission considered these same concerns and found no evidence showing that EMF from the new substation would harm nearby residents.³²³

98. Based on our review of the record in the present proceeding, we find no evidence showing that EMF will harm nearby residents. We expect the impact of electromagnetic fields associated with the Mt. Vernon Substation will not be significantly different from the Harvard and Champlain Substations approved in Order No. 20203 and the Waterfront Substation approved in *Formal Case No. 1123*. However, as we did in Order No. 20203, regarding the Harvard and Champlain substations, we direct Pepco to provide, as a compliance filing, final design calculations of electromagnetic fields for the Mt. Vernon Substation within 90 days of the completion of the substation design.³²⁴

F. Permits, Community Advisory Group(s), Communication/Education Plan, and Public Safety

99. Consistent with our decision on Phase I, Pepco is directed to provide a Customer Communication/Education Plan for the Mt. Vernon Substation that meets the criteria in Order No. 20203, Paragraphs 54-55. Also, Pepco shall convene at least one community advisory group on the Mt. Vernon Substation, as required by 15 DCMR § 2107. The community advisory group must meet at least two times per year and no more than four times per year and must be initiated no later than 30 days before the specified Substation construction begins.³²⁵

³²² *Formal Case No. 1144*, Pepco's Capital Grid Application at 54.

³²³ *See Formal Case No. 1123, In the Matter of the Potomac Electric Power Company's Notice to Construct a 230kV/138 kV/13 kV Substation and Four 230 kV/138 kV Underground Transmission Circuits on Buzzard Point*, Order No. 17851, ¶ 64, rel. April 9, 2015.

³²⁴ *Formal Case No. 1144*, Pepco's 90-Day Compliance Filing at 6-17, filed November 7, 2019. In this filing, Pepco provided additional information regarding its study of the magnetic field strength associated with the facilities described in Phase I of the Capital Grid Project.

³²⁵ *Formal Case No. 1144*, Order No. 20203, ¶¶ 54-55.

100. With respect to public safety, Pepco has acknowledged that the project will cause temporary disturbance and traffic/parking restrictions associated with the construction activities but promises to take all necessary measures to minimize these temporary impacts by various means.³²⁶ To monitor the health and environmental conditions during the period of construction, Pepco is directed to file quarterly construction reports updating the Commission on the construction plans of Phase II. The reports shall be filed by the 15th of the month following the end of the quarter until the first quarter after the Mt. Vernon Substation Project is completed. The reports shall contain the completed logs and forms from Pepco's Construction Manual, as listed in paragraph 63 of Order No. 20203.³²⁷ To the extent not otherwise addressed, these quarterly reports shall also describe the means by which Pepco minimized temporary disturbances and traffic/parking restrictions associated with the reported upon construction activities.

101. Similar to our decision in Phase I, we are directing Pepco to report on its Certified Business Enterprise ("CBE") contracting and hiring of District residents by all Capital Grid Project contractors on a quarterly basis. Pepco shall develop a plan with percentage goals and timelines associated with CBE contracting and hiring of local residents. Pepco should submit this plan within 90 days of this Order.³²⁸

102. Finally, Pepco is directed to provide the Commission with additional compliance filings, as listed in Attachment A of this Order.

G. Environmental, Safety, and Economic Considerations

103. The CleanEnergy Act requires the Commission, in supervising and regulating utility or energy companies, to consider the public safety, the economy of the District, the conservation of natural resources, and the preservation of environmental quality, including effects on global climate change and the District's public climate commitments. In addition to addressing the traditional requirements of 15 DCMR § 2111.5, Phase II of the Capital Grid Application sufficiently addresses the requirements of D.C. Code § 34-808.02.

104. Pepco explains that the project will increase the DER hosting capacity within the District and increase the ability to safely and reliably interconnect DER to Pepco's distribution grid.³²⁹ Specifically, Pepco estimates that upgrades made through the proposed Capital Grid Project will support over 70 MW of new hosting capacity, and each of the new distribution transformers in the project is estimated to support 10 MW of aggregated large systems, i.e., systems over 250 kW.³³⁰ The Mt. Vernon Substation will initially provide 30 MW of additional

³²⁶ *Formal Case No. 1144*, Pepco's Capital Grid Application at 23-24.

³²⁷ *Formal Case No. 1144*, Order No. 20203, ¶ 63.

³²⁸ *Formal Case No. 1144*, Order No. 20203, ¶ 53.

³²⁹ *Formal Case No. 1144*, Pepco's Capital Grid Application at vii.

³³⁰ *Formal Case No. 1144*, Pepco's Capital Grid Application at 20.

hosting capability, 10 MW per transformer, and an additional 10 MW if load growth or transfers, support the need for the fourth transformer. Increased DER hosting capability is an ancillary benefit of the Mt. Vernon substation; it is not a basis for the need or the substation firm capacity proposed by Pepco.

105. The Company states that increase DER hosting capacity would accommodate more customer-produced power and DER in the future, which would help the District achieve its goals of 50% carbon reduction by 2032 and the requirement that 5% of the District's energy should be generated from solar sources by 2032.³³¹ The project will bring reliability, resilience, and sustainability benefits to the grid, and result in increased economic activity associated with the professional services required to construct the Substation.³³²

106. Pepco has explained that the Mt. Vernon Substation battery deferring the fourth transformer that has been proposed as part of the Mt. Vernon Substation will allow Pepco to learn about the feasibility of using less-costly non-wires solutions in a controlled manner that does not introduce unreasonable reliability risks to the customers.³³³ Because only three of the transformers in the Mt. Vernon Substation are needed by 2023, a storage battery will be used to defer the fourth transformer for several years to gain an understanding of the impacts of battery storage on the distribution system. Pepco states the storage battery project can be expanded, but the maximum size is limited by physical space constraints within the fourth transformer bay and cannot be determined until a manufacturer has been selected. By providing Pepco and the Commission with experience and data on how battery storage can be effectively deployed within the District, this experience may lead to additional projects that can be sited at other locations to defer necessary upgrades for a longer period of time, while at the same time achieving the District's environmental goals. As such, we conclude that Pepco has demonstrated that the new Mt. Vernon infrastructure in Phase II contributes to the District's clean energy future.³³⁴

107. Also, as required by Commission Rule 2111.5(j), Pepco provided its analysis of the potential impact of the Capital Grid Project on the environment as well as an Environmental Impact Study.³³⁵ No comments were received opposing Pepco's Environmental Impact Statement.

108. Further, Pepco's project is designed to resist a 500-year flood event. No comments were received on the floodplain risks to the project. Appendix J of Pepco's Application clearly shows that the proposed Mt. Vernon Substation does not lie within the 500-year floodplain. However, we analyzed this concern in view of the District's need to adapt to the effects of climate

³³¹ *Formal Case No. 1144*, Pepco's Capital Grid Application at xi.

³³² *Formal Case No. 1144*, Pepco's Capital Grid Application at vii, xi.

³³³ *Formal Case No. 1144*, Pepco's Capital Grid Application at xi.

³³⁴ *Formal Case No. 1144*, Pepco's Capital Grid Application at vii.

³³⁵ *Formal Case No. 1144*, Pepco's Capital Grid Application at Appendix M.

change, as outlined in its Sustainable DC 2.0 Plan.³³⁶ Pepco's Data Responses show that Pepco's underground equipment is designed to be submersible and would function normally under flood conditions. Furthermore, the tip of the Waterfront Substation that lies within the 500-year floodplain was built to withstand stormwater.³³⁷ The project will be built to withstand a 500-year flood event (0.2% annual probability). By designing the system to be functional even during a 500-year flood event, Pepco's electric distribution system will make a significant contribution to the overall resilience of the District during such a catastrophic event. Therefore, the Commission is convinced that Pepco has adequately addressed this serious safety and sustainability aspect of the project, which will help the District face the challenges of global climate change.

109. We are convinced that Phase II of the Capital Grid Project sufficiently addresses the requirements of D.C. Code § 34-808.02. Moreover, we will closely monitor Pepco's Ward 8 energy storage project to ensure consideration of NWA solutions for the projected Ward 8 substation. Furthermore, to advance the goals of the CleanEnergy Act, the Commission expects Pepco to explore pilot and demonstration projects which would integrate more NWAs throughout the electric distribution system in the District.

THEREFORE, IT IS ORDERED THAT:

110. The Commission **DENIES** the Office of the People's Counsel's Motion for Additional Procedures;

111. The Commission **DENIES** the District of Columbia Government's Post-Status Conference Submission request;

112. Having filed all information required pursuant to Commission Rules 2111.1 and 2111.5, having established on the record the reasonableness, safety, and need for the Mt. Vernon Substation and having sufficiently addressed the requirements of the CleanEnergy DC Omnibus Amendment Act of 2018, the Potomac Electric Power Company can **PROCEED** with Phase II of the Capital Grid Project, as described herein;

113. The Potomac Electric Power Company is **DIRECTED** to comply with the Directives outlined in this Order and Attachment A; and

114. The Potomac Electric Power Company's Response to Commission Staff's Data Request No. 15, dated October 11, 2019, is **ENTERED** into the record.

³³⁶ District of Columbia's Sustainable DC 2.0 Plan, Department of Energy and the Environment, at 49, rel. April 23, 2019. The Plan states, in pertinent part: "it is essential that critical infrastructure remain in service or be quickly restored in the event of extreme weather, heat, or flooding. These services keep residents safe, healthy, and connected. Any significant climate risks to energy, water, transit, and telecommunications infrastructure should be evaluated and addressed."

³³⁷ *Formal Case No. 1144*, Pepco's Response to Staff Data Request No. 11, dated March 29, 2019.

A TRUE COPY:

BY DIRECTION OF THE COMMISSION:

CHIEF CLERK:

**BRINDA WESTBROOK-SEDGWICK
COMMISSION SECRETARY**

**FC1144 Capital Grid Phase II – Compliance Requirements
Attachment A**

Order No. 20274

<i>Topic</i>	<i>Actions</i>	<i>Timeline*</i>
Explore Battery Storage at Ward 8 Alabama Avenue Substation	To facilitate our understanding of the impacts of battery storage on the distribution system, Pepco shall provide a preliminary assessment and implementation framework for battery energy storage deployment which may enable the new Substation deferral at Ward 8 (Alabama Avenue).	180-days
Battery Storage at Mt. Vernon Substation	To facilitate our understanding of the impacts of battery storage on the distribution system, Pepco shall file its plan and implementation details for battery energy storage, including the physical location and expansion possibilities of the proposed battery storage at Mt. Vernon Substation.	90-days
Fourth Transformer Addition at Mt. Vernon Substation	For reporting purposes only, Pepco shall file its plan for the fourth transformer for the Mt. Vernon Substation.	By mid-2027
<p>For the Mt. Vernon Substation, Pepco is to comply with the following directives which were also required in the Phase I, Order No. 20203:</p> <ol style="list-style-type: none"> 1. Communication Plan, 2. Communication Plan (Community Advisory Group), 3. Utility Co-ordination Plan, 5. Construction Reporting, 6. Construction Plans, 7. Quarterly Status Report, 8. Contractors’ Plans for monitoring Quality, Safety, and Environment, 9. Permits, 10. Annual Report, 11. Quarterly Supplier Diversity and District Hiring Report, 12. Economic Opportunities, 13. Magnetic Field Mitigation, and 16. Substation Design Schedule Review. 		

* Unless otherwise stated, the time reflects days from the date of this Order.