PUBLIC SERVICE COMMISSION OF MARYLAND

TEN-YEAR PLAN (2018 – 2027) OF ELECTRIC COMPANIES IN MARYLAND

Prepared for the
Maryland Department of Natural Resources
In compliance with Section 7-201
of the Public Utilities Article, *Annotated Code of Maryland*
December 2018

State of Maryland
Public Service Commission

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This report was drafted by the Commission's Energy Analysis and Planning Division.

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I. Introduction

This report constitutes the Maryland Public Service Commission's *Ten-Year Plan (2018-2027) of Electric Companies in Maryland*. The Ten-Year Plan is submitted annually by the Commission to the Secretary of the Department of Natural Resources in compliance with § 7-201 of the Public Utilities Article, *Annotated Code of Maryland*. It is a compilation of information pertaining to the long-range plans of Maryland's electric companies. The report also includes discussion of selected developments that may affect these long-range plans. The analysis contained in the Ten-Year Plan uses forecasts provided by Maryland utilities, PJM Interconnection, LLC ("PJM"), and other State and federal agencies.

The 2018 – 2027 Ten-Year Plan provides a forward-looking analysis of the composition of Maryland's electricity and generation profile and covers topics relevant to Maryland, including load growth forecasts, and the state of the State's generation resources and electric transmission system.

Changes to Maryland's supply and demand profile may necessitate additional infrastructure investment in the State's distribution network to ensure the safe, reliable, and economic supply of electricity to end users. The Commission exercises its statutory and regulatory power to ensure adequate, economical, and efficient delivery of utility services in the State. A record of these proceedings is published in the Commission's annual report.

II. Background

Maryland is geographically divided into thirteen electric utility service territories.[1] The four largest, by number of Maryland customers, are served by investor-owned utilities ("IOUs"); four areas are served by electric cooperatives (two of which serve mainly rural areas of Maryland); and five are served by electric municipal operations.[2] PJM sub-regions, known as zones, generally correspond with the IOU service territories. PJM zones for three of the four IOUs traverse state boundaries and extend into other

[1] The Maryland utilities are as follows: Baltimore Gas and Electric Company ("BGE"), Delmarva Power & Light Company ("DPL"), The Potomac Edison Company ("PE"), Potomac Electric Power Company ("Pepco"), Berlin Municipal Electric Plant ("Berlin"), Easton Utilities Commission ("Easton"), City of Hagerstown Light Department ("Hagerstown"), Thurmont Municipal Light Company ("Thurmont"), Williamsport Municipal Electric Light System ("Williamsport"), A&N Electric Cooperative ("A&N"), Choptank Electric Cooperative, Inc. ("Choptank"), Somerset Rural Electric Cooperative ("Somerset"), and Southern Maryland Electric Cooperative, Inc. ("SMECO").

[2] The Commission regulates all Maryland public service companies, as defined by §1-101(x) of the Public Utilities Article, *Annotated Code of Maryland*.

jurisdictions.[3] Figure 1 provides a geographic picture of the Maryland utilities' service territories. Figure 2 depicts the PJM control zones in Maryland.

Figure 1: Maryland Utilities and their Service Territories in Maryland[4]

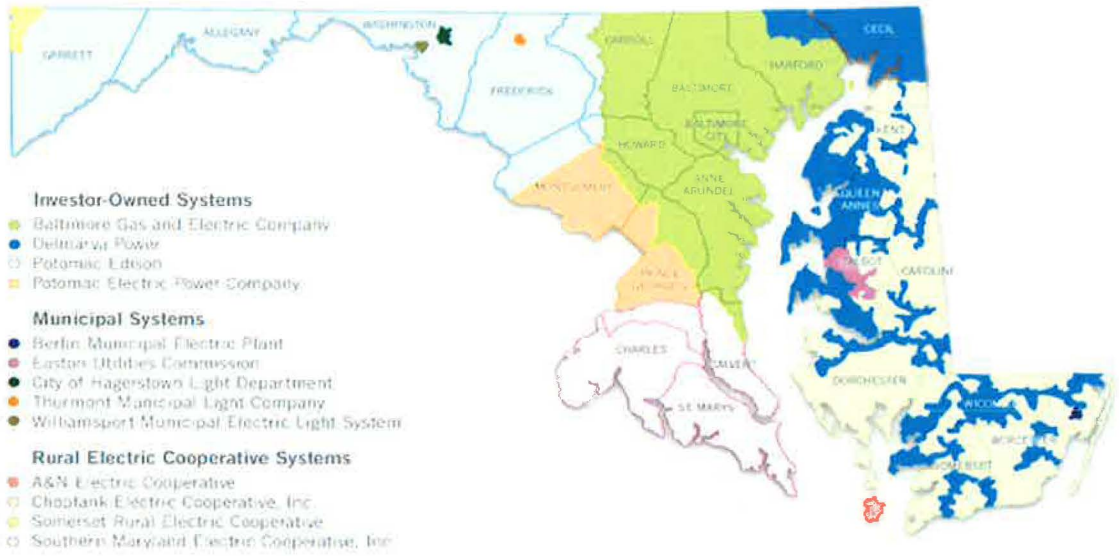
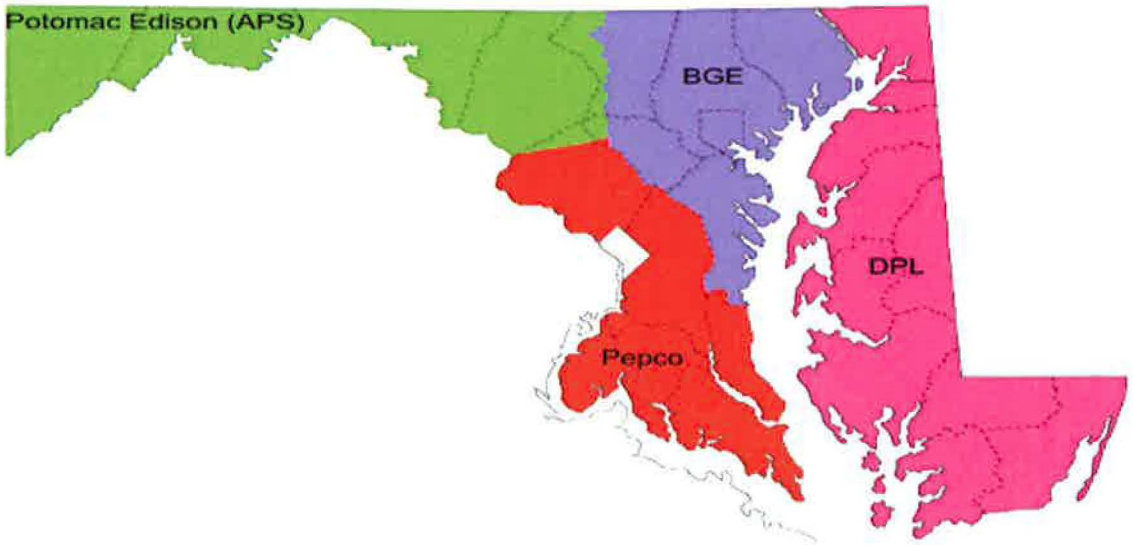


Figure 2: PJM Maryland Control Zones[5]



[3] Potomac Electric Power Company ("Pepco"), Delmarva Power & Light Company ("DPL"), and The Potomac Edison Company ("PE") are the three IOUs that extend into neighboring jurisdictions. The Baltimore Gas and Electric Company ("BGE") zone resides solely within the State of Maryland.

[4] *Cumulative Environmental Impact Report 18*, Maryland Department of Natural Resources, Figure 2-16, http://www.pprp.info/ceir18/HTML/Report-18-Chapter-2-4.html (last updated September 2018).

[5] *PJM Load Forecast Report,* PJM, (Jan. 2018), https://www.pjm.com/-/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx

III. Maryland Load Growth Forecasts

Each year, PJM presents a Load Forecast Report for each PJM zone, region, and locational deliverability area that is derived in part from an independent economic forecast prepared by Moody's Analytics. The economic analysis includes projections related to the expected annual growth of the gross domestic product ("GDP") and can provide insight into possible trends for regional population growth and household disposable income, which in turn can impact energy sector planning.

The PJM forecast contrasts GDP growth projections included in the current (*i.e.* September 2017) load forecast with that of the previous year (*i.e.* September 2016), as depicted below in Table 1. At the outset of the 2018 – 2027 planning period discussed in this Ten-Year Plan, the projected average GDP growth reflected in the current PJM load forecast is slightly lower than that projected by the previous year's forecast for roughly the same time period.[6] The primary reason cited by PJM includes the underperformance of job growth compared to the forecast in 2016.[7] This growth trend is slightly less than the national forecast. However, it is expected that the Washington D.C. and Virginia growth rates will outperform other areas in the PJM region and the United States, generally.[8]

Demand forecasts submitted by the Maryland utilities for the 2018 – 2027 planning period discussed in this Ten-Year Plan are comparable to the forecasts provided to the Commission over the last several years. The Maryland utilities' load forecasts indicate a modest amount of projected annual growth in the number of customers and demand throughout the State, while energy sales project a small decline due to less consumption.

Table 1: Comparison of Compound Annual Growth Rate Projections – 2015, 2016, 2017, and 2018[9]

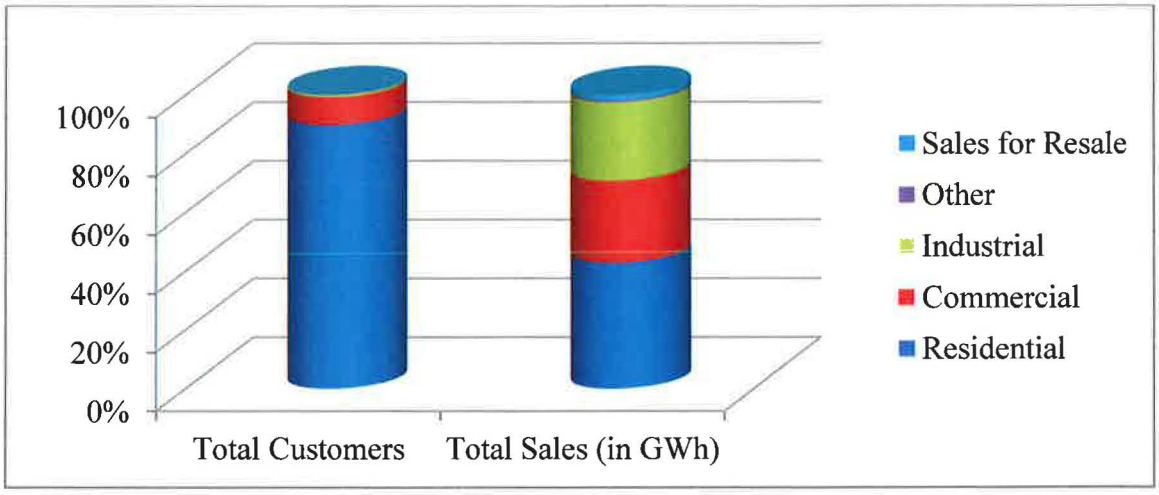
Forecasts	Ten-Year Plan 2015-2024	Ten-Year Plan 2016-2025	Ten-Year Plan 2017-2026	Ten-Year Plan 2018-2027
Customer Growth	0.5%	0.7%	0.8%	0.8%
Energy Sales	1.2%	0.8%	0.4%	-0.5%
Summer Peak Demand	0.9%	0.5%	0.4%	0.4%
Winter Peak Demand	0.8%	0.6%	0.3%	0.2%

[6] The Commission notes that the GDP projections included in the most recent PJM Load Forecast Report may not be reflective of current trends of the GDP which has continued to increase in 2018 due to several factors including the Tax Cuts and Jobs Act of 2017. The current GDP can be found at the Bureau of Economic Analysis. https://www.bea.gov/data/gdp/gross-domestic-product
[7] Id. at 12.
[8] Id. at 16.
[9] *See* Appendix Tables 1(a)(i), 2(a)(i), 3(a)(i), 3(a)(iii).

A. Customer Growth Forecasts[10]

At the close of 2017, approximately 90% of utility customers in Maryland reflected residential ratepayers; however, residential sales represented only 43% of the year's total retail energy sales, as illustrated in Figure 3 below.[11] Conversely, commercial and industrial ("C&I") customers represented just over 10% of utility customers, but corresponded to over half of the total retail energy sales for the State.

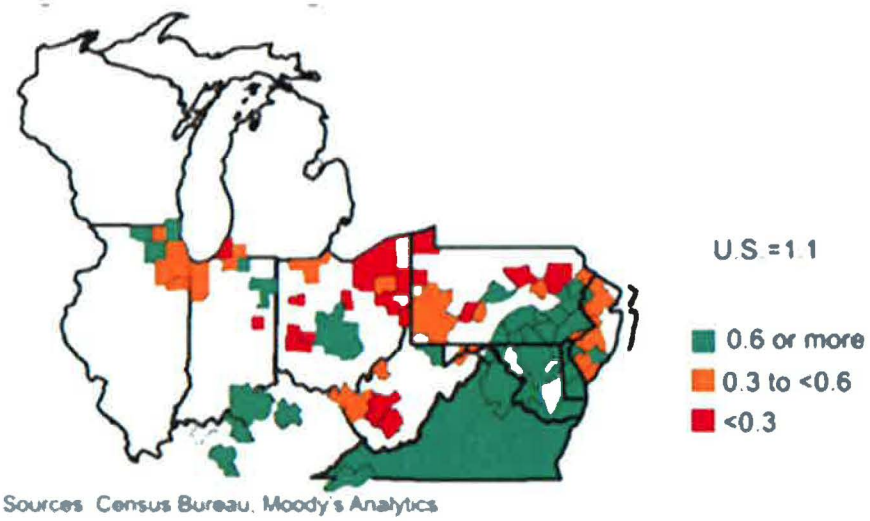
Figure 3 Total Customers and Energy Sales (in GWh) by Customer Class for 2017



Utility customer growth, particularly in the residential sector, is closely linked to household formation projections. The current PJM load forecast anticipates near-term slow growth in housing formation rates with increased growth over the longer-term.[12] Over the planning horizon, however, the projected housing formation rates differ widely across the PJM service territory, as evidenced by Figure 4 below.

[10] *See* Appendix Table 1(a) for a complete list of utility-by-utility customer growth forecasts.
[11] *See* Appendix Tables 1(b)(i) and 1(b)(ii).
[12] *PJM Load Forecast Report,* PJM, (Jan. 2018), http://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx

Figure 4 Average Annual Household Growth from 2017 to 2032 (%)[13]



As illustrated by Figure 4 above, Maryland, along with other southern PJM states, have higher household formation rates than in other regions, and thus higher utility customer growth projections. The PJM load forecast attributes this increase to expected growth in service-oriented industries in the applicable states, including Maryland.[14] This trend regarding population growth, near-term increases in housing formation and long-term stability, is mirrored by the Maryland utilities' forecasts regarding customer growth.

[13] *Id.* at 17.
[14] *Id.* at 17.

Table 2, below, represents the projected statewide customer growth rate by utility. The annual growth rate during the planning period is 0.78% for all customer classes, which translates into a 7.23% increase in the total number of customers by the end of this ten-year planning period.

Table 2: Maryland Customer Forecast (All Customer Classes)[15]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2018	2,538	1,291,378	54,249	205,862	10,681	17,529	268,517	575,039	166,934	2,858	998	**2,596,583**
2019	2,555	1,299,502	54,916	206,828	10,700	17,616	271,460	579,959	169,234	2,858	998	**2,616,626**
2020	2,568	1,308,455	55,480	207,732	10,719	17,704	274,316	584,804	171,564	2,858	998	**2,637,198**
2021	2,580	1,317,544	56,061	208,618	10,738	17,792	277,043	589,354	173,874	2,858	998	**2,657,460**
2022	2,593	1,327,501	56,647	209,513	10,757	17,880	279,790	593,655	176,274	2,858	998	**2,678,466**
2023	2,619	1,337,637	57,246	210,412	10,776	17,969	282,679	597,990	178,474	2,858	998	**2,699,659**
2024	2,645	1,346,607	57,861	211,315	10,795	18,058	285,616	602,362	180,864	2,858	998	**2,719,980**
2025	2,672	1,355,256	58,492	212,223	10,814	18,148	288,682	606,769	183,164	2,858	998	**2,740,075**
2026	2,699	1,365,125	59,107	213,134	10,833	18,238	291,805	611,212	186,064	2,858	998	**2,762,073**
2027	2,726	1,375,158	59,717	214,049	10,852	18,329	294,936	615,692	189,074	2,858	998	**2,784,389**
Change (2018-2027)	**188**	**83,780**	**5,468**	**8,186**	**171**	**800**	**26,419**	**40,653**	**22,140**	-	-	**187,806**
Percent Change (2018-2027)	**7.41%**	**6.49%**	**10.08%**	**3.98%**	**1.60%**	**4.56%**	**9.84%**	**7.07%**	**13.26%**	**0.00%**	**0.00%**	**7.23%**
Compound Annual Growth Rate	**0.80%**	**0.70%**	**1.07%**	**0.43%**	**0.18%**	**0.50%**	**1.05%**	**0.76%**	**1.39%**	**0.00%**	**0.00%**	**0.78%**

The customer forecasts provided by the utilities are comparable to the forecasts they provided for the 2017 – 2026 Ten-Year Plan. Overall, the increase in the number of customers across Maryland is primarily driven by growth in the residential class. Growth in the residential sector is projected to account for an additional 178,506 customers by 2026, or 95% of total new customers projected. The largest absolute increase in the number of customers is projected to come from BGE's residential customer base, with the addition of 81,023 residential customers forecasted during this planning period.[16] BGE's projected increase in its residential customer base accounts for 45% of the total number of new residential customers across all service territories during the ten-year planning period.[17] The increase in residential customers for BGE translates into a compound annual growth rate of 0.75%,[18] which is comparable to the "0.6% or more" average household formation rate projected by PJM for this zone.

Although several Maryland utilities are projecting an increase in their customer bases during this planning period, Table 3 below shows that the aggregated utilities' customer forecasts are just slightly (0.5%) lower than the projections provided during the previous planning period. The most significant percentage change observable in the aggregated statewide data between the previous and current Ten-Year Plan forecasts is

[15] *See* Appendix Table 1(a)(i). Note that A&N and Somerset did not provide the requested applicable information in response to the Commission's 2018 data request for the Ten-Year Plan.
[16] *See* Appendix Table 1(a)(ii).
[17] *Id.*
[18] *Id.*

within the Industrial customer class,[19] largely attributable to projections provided by BGE. Despite anticipated growth, BGE has lowered its ten-year projection.

Table 3: Projected Percentage Increase in the Number of Customers by Class, 2018 – 2027[20]

Class	2017 to 2026	2018 to 2027	Difference
Residential	8.2%	7.6%	-0.5%
Commercial	3.9%	3.4%	-0.5%
Industrial	13.5%	6.4%	-7.1%
Other	0.0%	-1.5%	-1.5%
Resale	0.0%	0.0%	0.0%
Total Customers	**7.8%**	**7.2%**	**-0.5%**

B. Energy Sales Forecast

The Maryland utilities provide forecasts for energy sales and peak load in terms of "Gross of Demand Side Management ("DSM")" and "Net of DSM."[21] In order to provide a more complete look at Maryland energy sales and peak demand forecasts, Sections III.B and III.C discuss the forecasts in "Gross of DSM" terms, which reflect the forecasts *before* the impact of DSM programs. Table 4 shows the energy sales forecast within Maryland (Gross of DSM) for the ten-year planning period, as provided by the utilities. The aggregated forecasts show a compound annual decline of 0.51% across all the Maryland service territories for 2018 – 2027, a decrease from the 0.4% annual growth rate reported in the 2017 – 2026 Ten-Year Plan.

[19] The "Other" rate class refers to customers that do not fall into one of the listed classes; street lighting is an example of a rate class included under "Other." The Resale class refers to Sales for Resale which is energy supplied to other electric utilities, cooperatives, municipalities, and Federal and State electric agencies for resale to end use consumers. PE is the only utility with any resale customers; these wholesale customers are PJM, Monongahela Power Company, West Penn Power Company, and Old Dominion Electric Cooperative.

[20] *See* Appendix Table 1(a)(i)-(vi) for more information.

[21] *See* Appendix Table 2(a)(ii) for the Maryland Energy Sales forecast, Net of DSM programs; Appendix Table 3(a)(ii) for the Maryland Summer Peak Demand Forecast, Net of DSM programs; and Appendix Table 3(a)(iv) for the Maryland Winter Peak Demand Forecast, Net of DSM programs.

Table 4: Maryland Energy Sales Forecast (GWh) (Gross of DSM) [22]

	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2018-2027)	3	(2,587)	32	(844)	13	14	885	(561)	143	(2,902)
Percent Change (2018-2027)	6.68%	-8.73%	3.18%	-18.45%	4.98%	4.59%	10.80%	-3.34%	3.99%	-4.50%
Compound Annual Growth Rate	0.72%	-1.01%	0.35%	-2.24%	0.54%	0.50%	1.15%	-0.38%	0.44%	-0.51%

The statewide energy sales growth rate derived from the utilities' 2018 – 2027 forecasts is 0.91% lower than the rate projected in last year's report, primarily due to BGE's revised projections of a lower energy sales growth rate than included in the 2017 – 2026 Ten-Year Plan.[23] The overall growth projected by BGE for this ten-year planning period is the lowest of any Maryland utility in absolute terms, with the Company projecting 2,587 GWh less in energy sales by 2027.

C. Peak Load Forecasts

PJM's 2018 Load Forecast Report includes long-term projections of peak loads for the entire wholesale market region and each PJM zone.[24,25] Due to the fact that the PJM zones can extend outside of Maryland, the utilities submit peak demand forecasts restricted to their Maryland service territories as part of the Ten-Year Plan.[26] According to PJM's 2018 Load Forecast Report, the PJM Regional Transmission Organization ("RTO") will continue to be summer peaking during the next 15 years.[27] In 2018, the four PJM zones of which Maryland is comprised are projected to experience their peak

[22] *See* Appendix Table 2(a) for utility-by-utility energy sales forecasts for the Maryland service territory, available by Gross and Net of DSM. *See* Appendix Table 2(b) for the same information on a system wide basis.
[23] Easton and PE projected larger growth rates for the 2018 - 2027 planning horizon than for the previous year's Plan.
[24] *PJM Load Forecast Report,* PJM, (Jan. 2018) at 51-54, Table B-1, https://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx
[25] The four PJM zones spanning the Maryland service territory include APS, BGE, DPL, and PEPCO. *See supra* Figure 2 for a map of the Maryland zones. "APS" represents the Allegheny Power Zone, of which PE is a sub-zone.
[26] *See* Appendix Table 3(a) for more information on in-State peak demand forecasts for Maryland utilities, available for summer and winter, and by gross and net of DSM programs. *See* Appendix Table 3(b) for the same information, presented as system wide data for utilities operating in Maryland.
[27] *PJM Load Forecast Report,* PJM, (Jan. 2018) at 2, https://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx.

demands during the month of July,[28] the same month as the broader PJM Mid-Atlantic Region.[29]

In contrast to PJM's forecasts, Berlin, Hagerstown, PE, Thurmont, and Williamsport are forecasting their peak demands to occur in the winter in most or all of the forecasted years. These utilities have generally peaked in the winter over the past few planning periods for reasons such as: higher concentrations of electric heating; geographical features; and colder temperatures. Figure 5 highlights the average February temperatures for Maryland.

Figure 5 Average February Temperatures for Maryland[30]

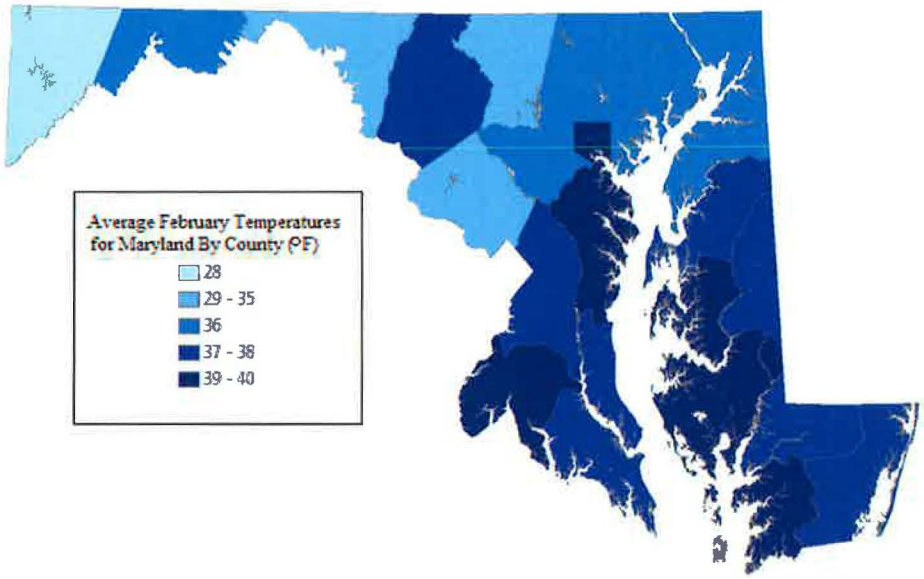
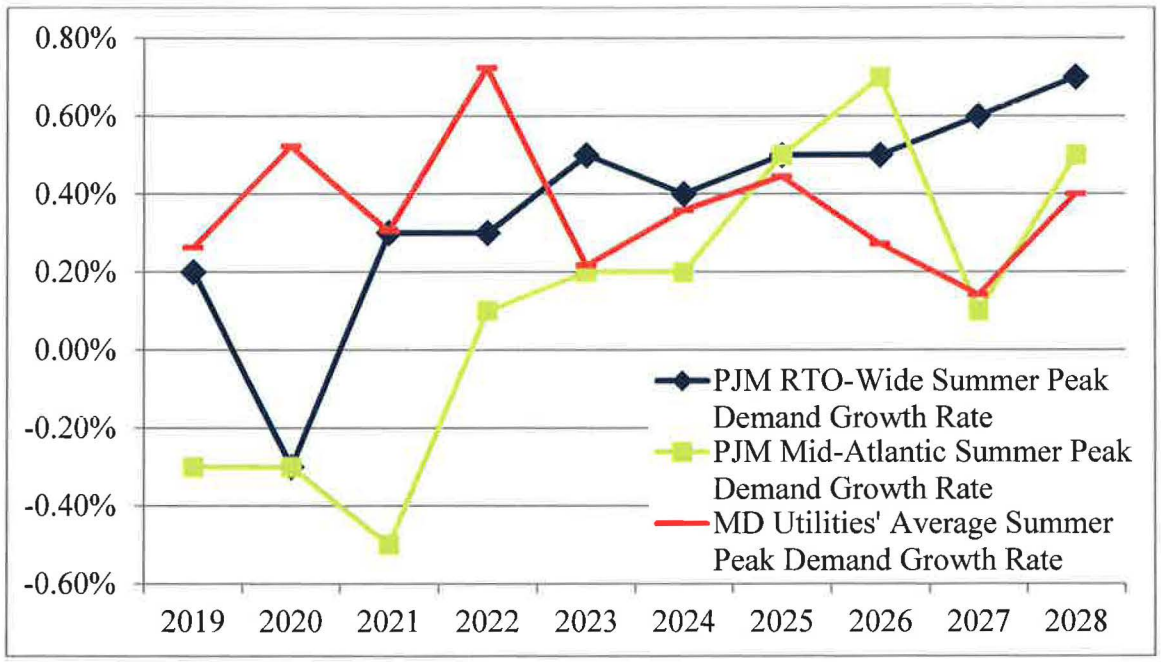


Figure 6 compares the average of the Maryland utilities' forecasted summer peak demands for their Maryland service territories with summer forecasts for the PJM Mid-Atlantic Region and for the PJM RTO as a whole. As illustrated below, the utilities' average summer peak demand growth rate follows a similar path to the PJM RTO and the PJM Mid-Atlantic Region. In the near-term, the Maryland utilities are showing stronger peak demand growth rate than the PJM RTO and the PJM Mid-Atlantic Region. Also reflected in Figure 6 is a brief dip in the summer peak demand growth rates for the Maryland utilities in 2020, after which time the growth rates generally level off through 2028.

[28] *Id.* at 63-64, Table B-5.
[29] *Id.* Three of the Maryland PJM zones (BGE, DPL, and Pepco) are considered to be part of the PJM Mid-Atlantic Region. The fourth Maryland PJM zone (APS) is presented as part of the PJM Western Region data set.
[30] Sources: http://www.usclimatedata.com/climate/, http://www.wunderground.com/history/

Figure 6 Average of Utilities' Projected Summer Peak Demand Growth Rates (Gross of DSM) Compared to Projected Summer Peak Demand Growth Rates for PJM Mid-Atlantic and PJM RTO[31,32]



The Maryland utilities also provided peak demand forecasts for the winter season in response to the Ten-Year Plan data request. Figure 7 below depicts an average of the Maryland utilities' forecasted winter peak demands, contrasted with winter peak demand forecasts for the PJM Mid-Atlantic Region and for the PJM RTO. A visual comparison of Figure 6 and Figure 7 illustrates that the aggregated Maryland utilities' winter peak demand forecast follows a trajectory comparable to the summer peak demand growth rate projections after 2019. Figure 8 shows that the Utilities' average gross summer peak growth rate is much more stable throughout the ten-year planning period than the average gross winter peak growth rate which rises substantially from 2019 to 2020.

[31] *PJM Load Forecast Report,* PJM, (Jan. 2018) at 51-54, Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-report.ashx.
[32] The Utilities' average summer peak demand growth rates were calculated using the Utilities' data responses to the Commission's 2018 data request for the Ten-Year Plan. *See* Appendix Table 3(a)(i).

Figure 7 Average of Utilities' Projected Winter Peak Demand Growth Rates (Gross of DSM) Compared to Projected Winter Peak Demand Growth Rates for PJM Mid-Atlantic and PJM RTO[33,34]

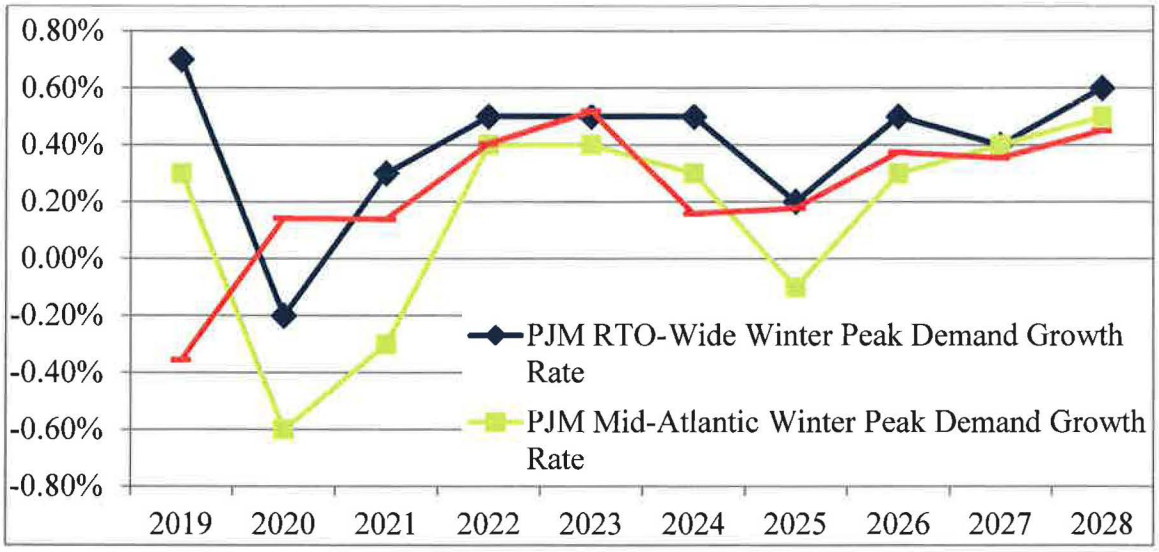
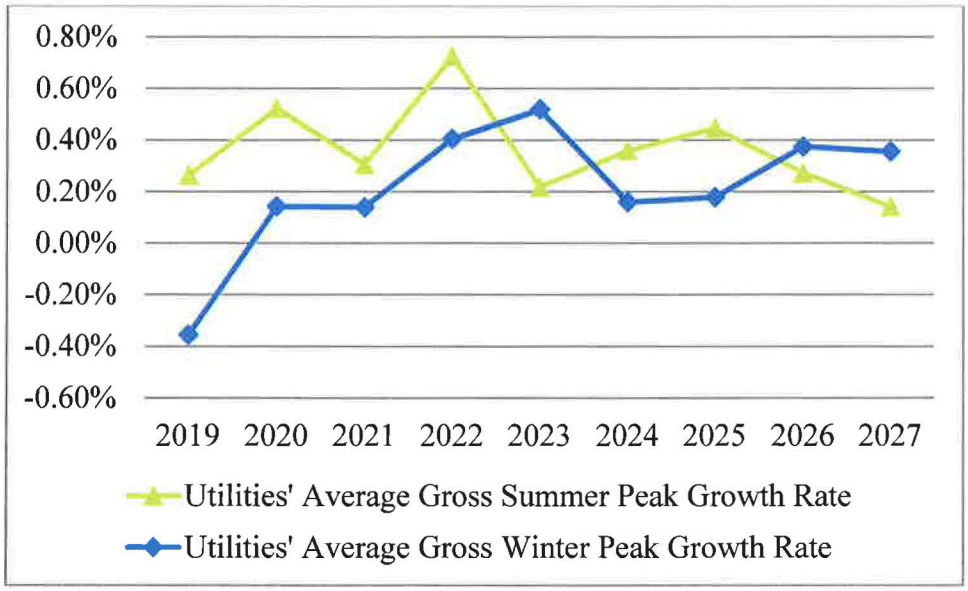


Figure 8 Utilities' Projected Summer Peak Demand Growth Rates (Gross of DSM) Compared to Utilities' Projected Winter Peak Demand Growth Rates (Gross of DSM)



[33] The Utilities' average winter peak demand growth rates were calculated using the Utilities' data responses to the Commission's 2018 data request for the Ten-Year Plan. *See* Appendix Table 3(a)(iii).
[34] *PJM Load Forecast Report,* PJM, (Jan. 2018) at 55-58, Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-report.ashx.

As shown in Table 5 and Table 6 below, the ten-year forecasted Maryland growth rates of summer and winter peak demand (gross of DSM) are 0.36% and 0.21%, respectively.[35] In 2027, at the end of this planning timeframe, these growth rates translate into an expected summer peak demand load (gross of DSM) for the Maryland service territory of 15,283 MW and an expected winter peak demand load (gross of DSM) for Maryland of 12,893 MW.[36]

Table 5: Maryland Summer Peak Demand Forecast (MW) (Gross of DSM)[37,38]

	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2018-2027)	1	(103)	13	106	2	3	120	313	32	488
Percent Change (2018-2027)	6.69%	-1.50%	4.44%	10.15%	3.48%	4.59%	7.38%	7.91%	3.72%	3.30%
Compound Annual Growth Rate	0.72%	-0.17%	0.48%	1.08%	0.38%	0.50%	0.79%	0.85%	0.41%	0.36%

Table 6: Maryland Winter Peak Demand Forecast (MW) (Gross of DSM)[39, 40]

	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2018-2027)	6	57	12	30	3	3	135	64	(66)	244
Percent Change (2018-2027)	41.98%	0.97%	4.30%	3.34%	4.18%	4.59%	7.63%	2.43%	-6.51%	1.93%
Compound Annual Growth Rate	3.97%	0.11%	0.47%	0.37%	0.46%	0.50%	0.82%	0.27%	-0.75%	0.21%

Figure 9 and Figure 10 compare the current and historical peak demand growth rates for the four PJM zones of which Maryland is comprised. As illustrated below, this trend reflects PJM's generally falling peak energy use forecast in the last several years. Despite this trend, Figure 11 illustrates that both the summer and winter peak demand growth rates of the PJM RTO and the PJM Mid-Atlantic region have increased from the previous planning period.

[35] *See* Appendix Table 3(a).
[36] *See* Appendix Tables 3(a)(i) and 3(a)(iii).
[37] *Id.*
[38] Thurmont and Williamsport were not included in this table because the companies do not have any changes in their peak demand forecasts over the ten-year period.
[39] *See* Appendix Tables 3(a)(i) and 3(a)(iii).
[40] Thurmont and Williamsport were not included in this table because the companies do not have any changes in their peak demand forecasts over the ten-year period.

Figure 9 Comparison of Maryland PJM Zones' Ten-Year Summer Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2015 to 2018[41]

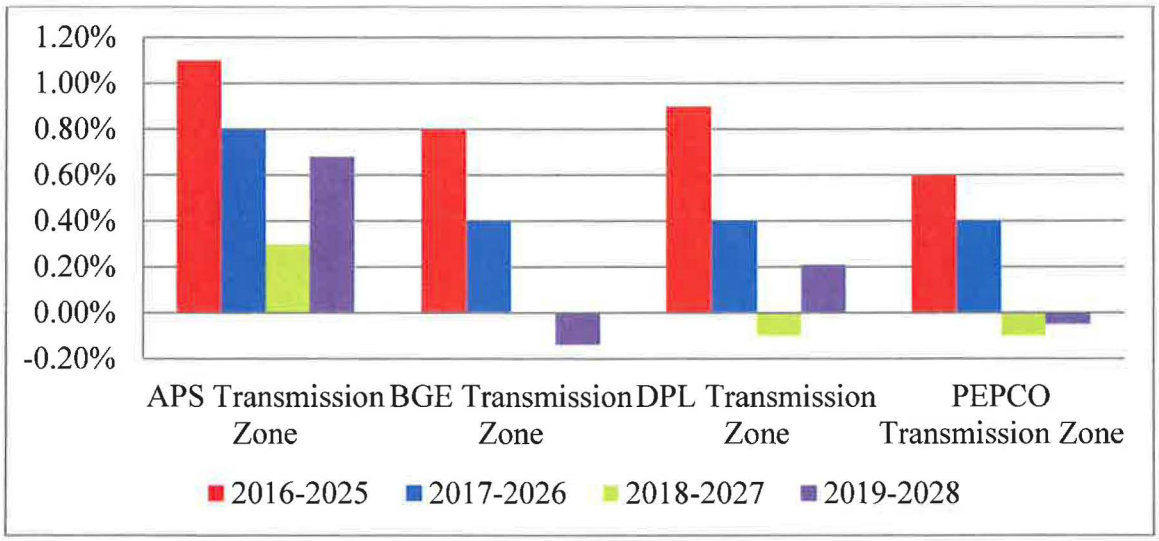
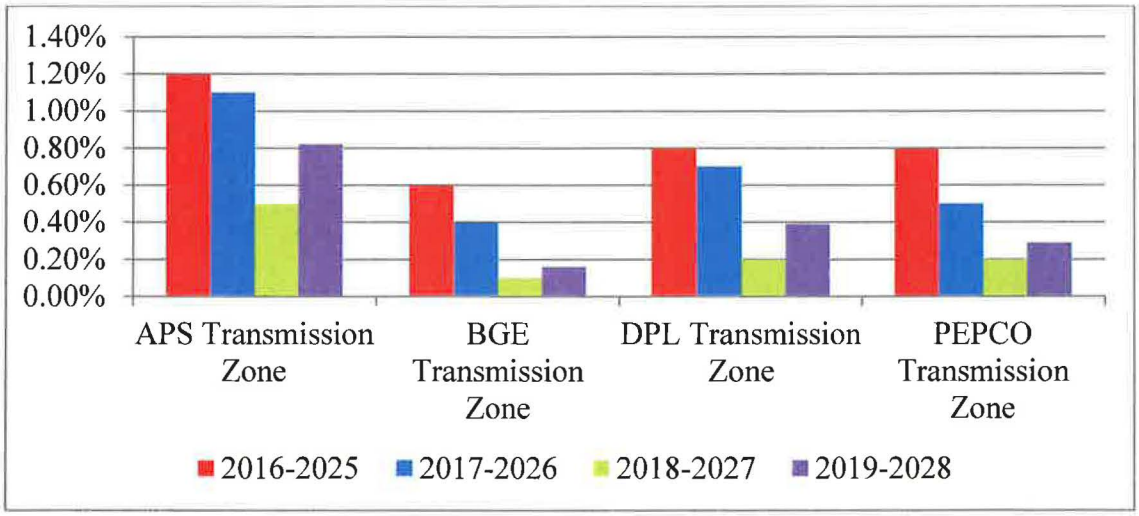


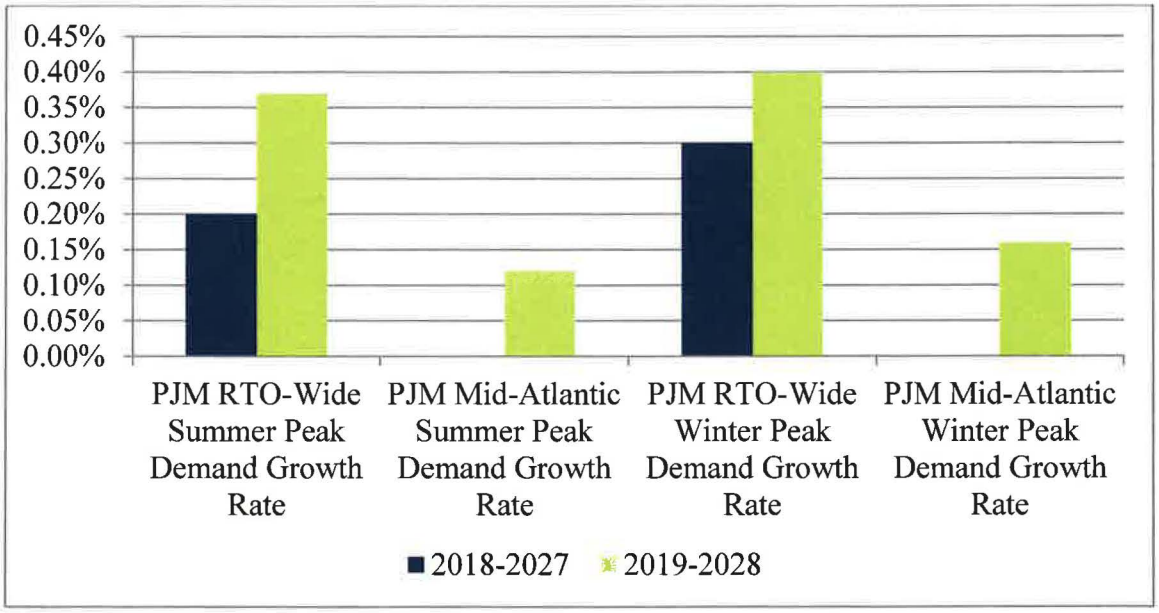
Figure 10 Comparison of Maryland PJM Zones' Ten-Year Winter Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2015 to 2018[42]



[41] *See PJM Load Forecast Report*, PJM, (Jan. 2015) at Table B, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2015-load-forecast-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2016) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2017) at Table B-1, https://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2018) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx.

[42] *Id.*

Figure 11 Comparison of PJM Ten-Year Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2017 and 2018[43]



D. Impact of Demand Side Management

DSM programs result in lower growth of both energy sales and peak demand. To evaluate the impact of DSM programs, this section reflects the Maryland utilities' energy sales forecasts *after* the benefits of DSM programs are included ("net of DSM"). For purposes of this section, only the five utilities participating in EmPOWER Maryland are evaluated: BGE, DPL, PE, Pepco, and SMECO ("the Participating Utilities").[44] According to the Participating Utilities' Ten-Year Plan forecasts, the DSM programs will save a total of 39,537 GWh over the planning period. These savings will be achieved by reducing the annual rate of growth in energy sales and peak demand.

The tables below compare the growth in DSM savings across the Participating Utilities from 2018 to 2021. The forecasted savings post-2020, however, fluctuate in derivation method and amount across the Participating Utilities given that Commission-approved plans for utility-implemented EE&C programs pertain to the 2018 – 2020 program cycle only at this time.[45] Table 7 shows the growth in demand savings from

[43] *PJM Load Forecast Report,* PJM, (Jan. 2017) at Table B, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2018) at Table B, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx.

[44] *See* The EmPOWER Maryland Report to the General Assembly for more information on the energy efficiency and demand response programs associated with EmPOWER Maryland, *available at:* https://www.psc.state.md.us/wp-content/uploads/Final-2018-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf.

[45] Because the Commission has only approved plans pertaining to the 2018 – 2020 program cycle at this date, BGE did not include any EE&C savings projections after 2020, with the exception of its Residential

DSM programs due to EE&C portfolios, while Table 8 shows the growth in total demand savings attributable to DSM programs as a whole. The variation in the magnitude of impact of the EE&C and DSM programs by utility are due to the different sizes of the programs offered and the way in which the data was forecasted by the Participating Utilities. Also, the Commission notes that demand savings projections later in the 2018 – 2027 planning horizon may be affected by future iterations of EmPOWER Maryland program cycle proposals, as well as pending changes to the capacity market as a result of PJM's Capacity Performance Proposal.

Table 7: Average Annual Increase in Demand Savings due to DSM Programs from 2018 to 2021 for EE&C Programs[46]

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-6.5%	16.0%	14.7%	12.2%	0.2%

Table 8: Average Annual Increase in Demand Savings due to DSM Programs from 2018 to 2021 for All DSM Programs[47]

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-2.5%	14.7%	13.1%	13.5%	0.2%

IV. Transmission, Supply, and Generation

In order to ensure a safe, reliable, and economic supply of electricity in Maryland, an appropriate balance of generation, DSM, imports, and transmission must be achieved. While importation and DSM offer ancillary benefits to managing the power supply, it is critical that local generation is established and maintained to mitigate the risk to Maryland's long-term reliability.

For purposes of the Ten-Year Plan, the congestion costs and the role of transmission infrastructure in planning processes are discussed in Section IV.A; Section IV.B focuses on the State-specific impact of Maryland's status as a net importer of electricity. Information related to the Commission's concerns about the capacity, composition, and advanced age of Maryland's current generation profile is discussed in Section IV.C.

Maryland depends on PJM to operate the regional transmission system and to schedule the flows of power around the state (including importing power from other areas

Demand Response Program and CVR, and Dynamic Pricing. The other Participating Utilities assume a level of savings post-2020.

[46] Responses to the Commission's Ten-Year Plan Data Requests.

[47] *Id.*

into Maryland). All load serving entities in PJM are required to ensure that they have sufficient capacity contracts to provide reliable electric service during periods of peak demand. As of 2016, Maryland's net summer generating capacity was 12,338 MW.[48] Maryland's peak demand forecast for 2018, net of utility demand-side management and energy conservation measures, is approximately 13,035 MW.[49] Although Maryland's summer peak demand has grown faster than the State's net summer generating capacity over the last several years, Maryland had the capability to meet over 99% of its summer peak demand with in-State generation in 2016.[50] Notwithstanding the ability to meet peak capacity, Maryland still imports a significant portion of its electricity needs as discussed in more detail in Part B of this section.

A. Regional Transmission [51]

PJM in its 2017 Regional Transmission Expansion Plan ("RTEP") authorized more than $397 million dollars in system transmission improvement projects. The development of the RTEP takes into account the total effects of system trends, which are often driven by federal and state policy decisions. The planning process applies the North American Electric Reliability Corporation ("NERC") Planning Standard through the application of a wide range of reliability analyses – including load and generation deliverability tests – over a 15-year planning horizon.[52]

1. Regional Transmission Congestion

This section of the Ten-Year Report discusses congestion in PJM and the Maryland Control Zones. Congestion reflects the underlying characteristics of the power system, including the nature and capability of transmission facilities as well as the cost and geographical distribution of facilities. Congestion occurs when available, least-cost energy cannot be delivered to all load because of inadequate transmission facilities, thereby causing the price of energy in the constrained area to be higher than in an unconstrained area.[53] PJM's Locational Marginal Pricing ("LMP") system is designed to reflect the value of energy at a specific location and time of delivery, thus measuring the impact of congestion throughout the PJM system. Total congestion costs for the PJM RTO decreased by 31.9% ($326.1 million) between 2016 and 2017.

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[48] The U.S. Energy Information Administration ("EIA"), State Electricity Profile: Maryland; http://www.eia.gov/electricity/state/Maryland/. The EIA's most recent data available is from 2016. The next anticipated release date is listed as December 2018.
[49] *See* Appendix Table 3(a)(ii).
[50] The peak demand net of DSM programs for the summer of 2016 was 12,392 according to the 2016-2025 Ten-Year Plan. 12,392/12,338 = 99.6%
[51] *See* Appendix Table 4 for a full list of transmission enhancements proposed by Maryland utilities.
[52] *2017 Regional Transmission Expansion Plan.* PJM, (February 28, 2018) at 45, https://www.pjm.com/-/media/library/reports-notices/2017-rtep/2017-rtep-book-1-3-web.ashx?la=en.
[53] Monitoring Analytics, *State of the Market Report for PJM - 2017*, PJM, (March 8, 2018) at 415, http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017/2017-som-pjm-volume2.pdf.

2. Regional Transmission Upgrades

The Commission recognizes the need to maintain and improve the transmission system within Maryland in order to ensure safe, reliable, and economic electric service to the State's ratepayers. As with increases in local generating capacity and the reduction of system load, transmission expansions and improvements can reduce congestion and LMP differences among zones; such improvements may also support reliability requirements and mitigate economic concerns. PJM's 2017 RTEP authorized four transmission upgrades for Maryland and none for the District of Columbia.[54] Together, the upgrades cost approximately $233 million.[55]

Appendix Table 4 lists all transmission enhancements identified by the Maryland utilities in response to data requests for the Ten-Year Plan. Together, the 34 identified transmission enhancements in Appendix Table 4 account for 124 miles of upgrades.

B. Electricity Imports

Maryland continues to be a net importer of electricity, similar to many other states in PJM.[56] As of 2016, 44% of the electricity consumed in the State is imported from other states and internationally.[57] Nine of the 13 PJM states plus the District of Columbia are net importers of electricity. In a nationwide comparison, Maryland is the fourth largest electricity importer based on percentage of electricity sales, importing 44% of its electricity in 2016.[58] Only the District of Columbia, Vermont, and Massachusetts exceed Maryland in the percentage of electricity sales that are imported. In contrast, as of 2016, the states within the PJM region that exported more electricity in aggregate than consumed within each state are: Illinois, Kentucky, Pennsylvania, Michigan, and West Virginia.[59]

Maryland continues to be a net importer as in-State generation has declined in recent years. In 2007, Maryland resources generated over 50 million MWh in electricity.

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[54] 2017 Maryland and District of Columbia Infrastructure Report, PJM, at 17-19, (May 2018), *https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2017/2017-maryland-and-dc-state-infrastructure-report.ashx?la=en.*

[55] *Id.*

[56] PJM operates, but does not own, the transmission systems in: (1) Maryland; (2) all or part of 12 other states; and (3) the District of Columbia. With FERC approval, PJM undertakes the task of coordinating the movement of wholesale electricity and provides access to the transmission grid for utility and non-utility users alike. Within the PJM region, power plants are dispatched to meet load requirements without regard to operating company boundaries. Generally, adjacent utility service territories import or export wholesale electricity as needed to reduce the total amount of capacity required by balancing retail load and generation capacity.

[57] *State Electricity Profiles 2016*, U.S. Energy Information Administration, (January 25, 2018) at Table 10, http://www.eia.gov/electricity/state/maryland/xls/sept10md.xls.

[58] *State Electricity Profiles 2016*, U.S. Energy Information Administration, (January 25, 2018), at Table 10 (for each state, https://www.eia.gov/electricity/state/index.php).

[59] *Id.*

By 2016, however, in-State resources generated slightly over 37 million MWh.[60] The EmPOWER Maryland program, together with other energy efficiency efforts across the State, contributes to a decrease in the peak demand, which reduces the need to increase capacity and generation capabilities both in Maryland and throughout the PJM region. On a per capita basis, Maryland's estimated peak demand in 2018 is 14.3% below the per capita peak demand in 2007.[61]

C. Maryland Capacity and Generation Profiles

The capacity and generation profiles of in-State resources must be comprehensively analyzed for both short- and long-term reliability planning purposes, due to the uncertain future of coal-fired generation.[62] In Case No. 9214, the Commission observed the State's reliability risk is further heightened because neighboring states that export electricity into Maryland also have at-risk coal-fired generation.[63]

1. Conventional Capacity and Generation Profiles, 2016

Coal-fired power plants represent 36% of the electric generating capacity in Maryland, of which 86% of such capacity is aged 31 years or older. Within this category, 43% is considered "at-risk," as defined by PJM.[64] Table 9 and Table 10 below depict the electric generating capacity in Maryland, as well as the age of plants by fuel type.[65]

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[60] *Electricity Power Industry Generation by Primary Energy Source, 1990-2016 Maryland*, U.S. Energy Information Administration, (March 9, 2018) at: https://www.eia.gov/electricity/data/state/annual_generation_state.xls.

[61] *Per Capita Peak Electricity Consumption*, Maryland State Stat, Per Capita Peak Electricity Demand Line Chart (2015), at D13. https://dbm.maryland.gov/Documents/MFR_documents/2019/Maryland-Energy-Administration.pdf.

[62] The uncertainty stems from the economic pressure on coal as a result of decreasing natural gas prices, as well as from regulations promulgated by the U.S. Environmental Protection Agency.

[63] Case No. 9214, *In the Matter of Whether New Generating Facilities Are Needed to Meet Long-Term Demand for Standard Offer Service.* Order No. 84815 (April 12, 2012) at 19.

[64] PJM categorizes coal generation more than 40 years old and less than 400 MW as at "high-risk" of retirement. Case No. 9214, *In the Matter of Whether New Generating Facilities Are Needed to Meet Long-Term Demand for Standard Offer Service*, PJM Comments (January 13, 2012) at 11-12.

[65] *See* Appendix Table 5 for a complete list of Maryland generation capacity in 2017.

Table 9: Maryland Summer Peak Capacity Profile, 2016[66]

Primary Fuel Type	Capacity	
	Summer (MW)	Percent of Total
Coal	4,712.0	36.0%
Oil	1,218.9	9.3%
Natural Gas	4,347.8	33.2%
Nuclear	1,707.8	13.1%
Hydroelectric	590.0	4.5%
Other and Renewables	500.1	3.8%
Total	**13,076.6**	**100.0%**

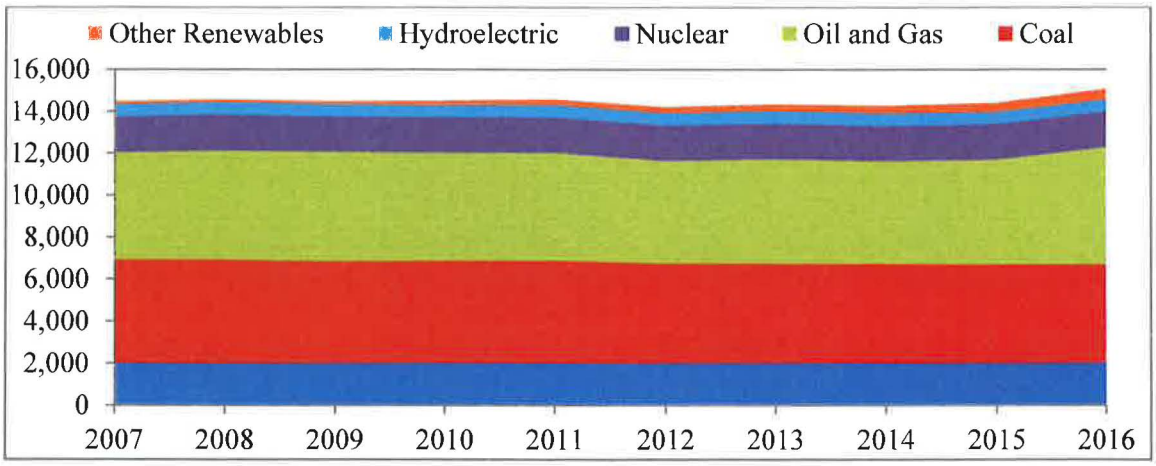
Table 10: Age of Maryland Generation by Fuel Type, 2016[67]

Primary Fuel Type	Age of Plants, By Percent			
	1-10 Years	11-20 Years	21-30 Years	31+ Years
Coal	0%	7%	7%	86%
Oil	4%	20%	22%	33%
Natural Gas	27%	21%	20%	32%
Nuclear	0%	0%	0%	100%
Hydroelectric	0%	0%	0%	100%
Other and Renewables	66%	27%	1%	6%

Maryland's summer peak capacity profile increased by 668 MW in 2016 compared to 2015, as illustrated in Figure 12. The new capacity added in 2016 can be attributed to increases in renewable generation and oil and gas.

[66] *Report EIA-860: "3_1_Generator_Y2017"* Excel, U.S. Energy Information Administration (September 13, 2018), http://www.eia.gov/cneaf/electricity/page/eia860.html.
[67] *Id.*

Figure 12 Maryland Summer Capacity Profile (MW), 2007 – 2016[68]



Maryland's generating profile differs from its capacity profile. Coal and nuclear facilities typically generate an overwhelming majority of all electricity produced in Maryland, even though these resources represent a little under half of in-State capacity.[69] Conversely, oil and natural gas facilities, which operate as mid-merit or peaking units that come on-line when needed, generate 15% of the electric energy produced in Maryland while representing over 42% of in-State capacity. Table 11 summarizes Maryland's 2016 in-State generation profile according to fuel source.

Table 11: Maryland Generation Profile, 2016[70]

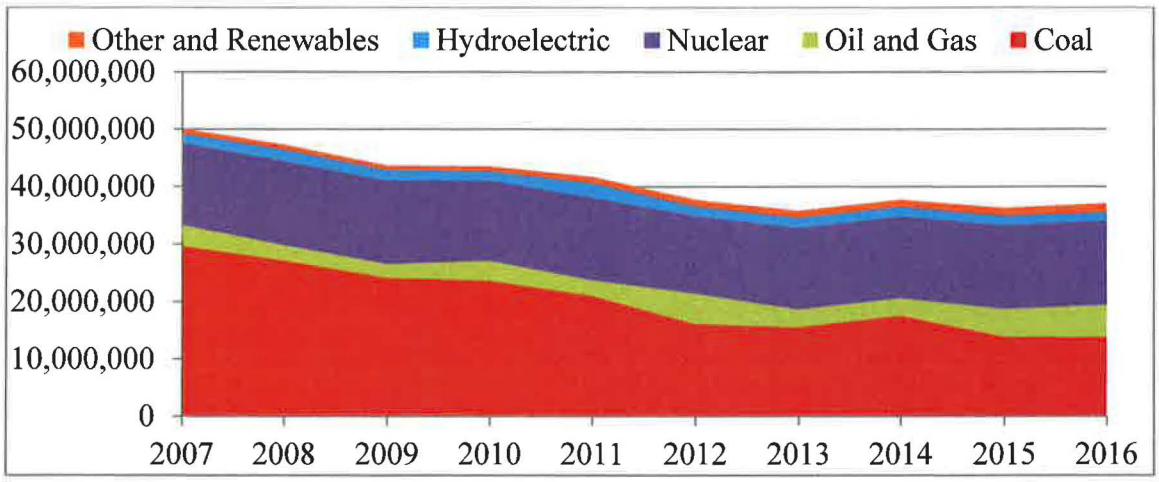
Primary Fuel Source	Generation	
	Annual (MWh)	Percent of Total
Coal	13,826,213	37.2%
Oil	160,550	0.4%
Gas	5,423,046	14.6%
Nuclear	14,760,177	39.7%
Hydroelectric	1,392,187	3.7%
Other & Renewables	1,604,513	4.3%
Total	**37,166,686**	**100.0%**

Unlike the stability historically exhibited by Maryland's summer capacity profile, the percentage of in-State generation derived from various fuel sources continues to evolve as illustrated in Figure 13 below. Between 2007 and 2016, in-state coal generation

[68] U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report".
[69] *See supra* Table 11. Coal facilities represented 36% of the in-State capacity in 2016, while nuclear facilities represented 13.1% of capacity. Therefore, coal and nuclear facilities combined for 49% of Maryland's generating capacity profile in 2016.
[70] *State Electricity Profiles 2016*, U.S. Energy Information Administration, (January 25, 2018) at Table 5, https://www.eia.gov/electricity/state/maryland/state_tables.php.

decreased by 15,873 GWhs, causing the percentage of in-state generation derived from coal to decrease from 59.2% in 2007, to roughly 37.2% in 2016.

Figure 13 Maryland Generation Profile, 2007 – 2016[71]



The standard life expectancy for coal generation facilities is approximately 40 years. However, unit owners can request operating extensions for up to 60 years. This ten-year assessment notes that a significant percentage of Maryland's existing coal generation capacity is at or near the end of its expected life. Since coal generation facilities provided 37% of the in-State generation in 2016, it is possible that if operational extensions for Maryland coal generation units are not requested, additional in-State resources may be needed to meet demand and maintain reliability.

PJM lists just one plant retired in 2017, a landfill gas generator of less than 1 MW in capacity.[72] There are pending deactivation requests in the BGE service territory for the Crane 1, Crane 2, and Crane GT1 units with a combined capacity of 399 MWs; while PJM currently registers 12.7 GW of capacity resources requesting deactivation within the RTO.[73] PJM completed a reliability analysis and identified no reliability impacts associated with these deactivation request.

[71] *Electricity Power Industry Generation by Primary Energy Source, 1990-2016* Maryland, U.S. Energy Information Administration, (January 25, 2018) at Table 5, https://www.eia.gov/electricity/state/maryland/xls/md.xlsx.
[72] 2017 Maryland and District of Columbia Infrastructure Report, PJM, at 17-19, (May 2018), *https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2017/2017-maryland-and-dc-state-infrastructure-report.ashx?la=en.*
[73] *Future Deactivations,* PJM (as of May 21, 2018), http://www.pjm.com/~/media/planning/gen-retire/pending-deactivation-requests.ashx.

2. Proposed Conventional Generation Additions[74]

The construction of new generation, both conventional and renewable, is a way to address the in-State capacity and electricity import issues discussed in previous sections. As of the date of this report, there were 820 MWs of proposed new generation active in the PJM queue, with almost 60% consisting of solar projects. [75]

3. Renewable Generation and Proposed Additions[76]

The Commission recognizes the importance renewable generation plays in meeting Maryland's energy needs while also addressing environmental concerns. Based on the PJM queue, Maryland's renewable generation capacity is planned to increase by an estimated 497 MW over the next several years as shown in Table 12 below. This does not, however, account for smaller renewable generators, notably residential solar; these smaller renewable generators are not required to obtain PJM interconnection status, but simply require interconnection with the local utility.

Table 12: Proposed New Renewable Generation in Maryland

Utility	Fuel Type	In-Service Date Range	Total Capacity (MW)
APS	Solar	2019	7.6
	Hydro	2019	15.0
DPL	Solar	2016-2019	442.3
	Biomass	2019	4.0
Pepco	Solar	2018-2020	5.67
SMECO	Solar	2018-2019	22.8
		Total (MW):	**497.3**

Additionally, the amount of solar resources in Maryland will continue to increase due to a suite of State policy initiatives: the requirement that the RPS solar carve-out be interconnected to the distribution network serving Maryland; net metering incentives; tax incentives; the community solar pilot program; and grants administered by the Maryland Energy Administration. The increasing renewable generation penetration may have the potential to impact the grid, and the Commission will continue to monitor the successful

[74] *See* Appendix Table 6 for a complete list of new renewable generation proposed in Maryland.
[75] *Generation Queues: Active (Maryland)*, PJM (September, 2018) https://www.pjm.com/planning/services-requests/interconnection-queues.aspx.
[76] Maryland's Renewable Portfolio Standard has helped incent new renewable generation capacity in Maryland, particularly solar generation, via Renewable Energy Credits ("RECs") and the Alternative Compliance Payments. However, approximately 80% of RECs retired for Maryland's Renewable Portfolio Standard are for generation located outside of the state. RECs are the environmental attributes of renewable generation, and are separate from the actual electricity generation from Maryland's renewable resources. More details can be found at the *Renewable Energy Standard Report;* available at: *http://www.psc.state.md.us/wp-content/uploads/CY16-RPS-Annual-Report-1.pdf.*

integration of these renewables. The Maryland Department of Natural Resources was directed by HB1414 in 2017 to conduct a study on the Renewable Portfolio Standard in Maryland. The Power Plant Research Program has been conducting the study through a work group process. An interim report will be submitted to the General Assembly by December 1, 2018. The Commission will continue to monitor the status of the report and work group.

4. Nuclear Generation

The Commission also recognizes the important role nuclear generation plays in meeting Maryland's energy needs. Nuclear energy provides reliability and resiliency to the grid while assisting Maryland in reaching its Regional Greenhouse Gas Initiative ("RGGI") commitments and its goals under the Greenhouse Gas Emissions Reduction Act as the largest carbon-emission free energy generation source in the state at 84.3% of Maryland's emission-free electricity.[77]

D. PJM's Reliability Pricing Model

As a means of ensuring reliability of the electric system in the RTO, PJM annually conducts a long-term planning process that compares the potential available generation capacity located within the RTO and the import capability of the RTO against the estimated demand of customers within the RTO. Consequently, the model projects the amount of generation and transmission required to maintain the reliability of the electric grid within PJM. The amount of capacity procured in PJM's Reliability Pricing Model ("RPM") is roughly based upon a forecast of the peak load projected by PJM for a particular year, plus a reserve margin. The RPM works in conjunction with PJM's RTEP to ensure reliability in the PJM region for future years. Locational Constraints are also identified for a delivery year in the PJM Regional Transmission Expansion Planning Process ("RTEPP") prior to each Base Residual Auction. Locational Constraints are capacity import capability limitations that are caused by transmission facility limitations or voltage limitations. Resources in the unconstrained Locational Deliverability Areas ("LDA") (and capacity imported into constrained LDAs) are paid the Unconstrained (lower) Resource Clearing Price.

Using this information, PJM evaluates offers from generators and other resources three years in advance to be available for a one year delivery period running from June through May (up to three years for new generation) through the Base Residual Auction ("BRA").[78] Once PJM completes its RTEP and conducts the RPM BRA, PJM is in a

[77] *Maryland Fact Sheet*, NEI, https://www.nei.org/resources/fact-sheets/maryland

[78] PJM Manual 18: PJM Capacity Market, Section 1: Overview of the PJM Capacity Market Reliability Pricing Model, PJM Markets & Operations (last visited October 19, 2018), https://www.pjm.com/directory/manuals/m18/index.html#Sections/Section%201%20Overview%20of%20the%20PJM%20Capacity%20Market.html

position to evaluate the reliability of its system. PJM must operate the transmission system to meet reliability criteria established by the Federal Energy Regulatory Commission ("FERC") and administered by NERC.

The Mid-Atlantic Advisory Council ("MAAC") LDA, which includes SWMAAC, has experienced significant volatility in Net Zonal Load[79] capacity prices as a result of the past ten BRAs. The historical pattern suggests that future BRA results could vary significantly from year to year and must be closely monitored by PJM.

Table 13 PJM BRA Capacity Prices by Zone[80]

Delivery Year	APS ($/MW-day)	BGE ($/MW-day)	DPL ($/MW-day)	PEPCO ($/MW-day)	RTO Price ($/MW-day)
2012/2013	$16.74	$133.42	$171.27	$133.42	$16.46
2013/2014	$27.73	$226.15	$245.09	$247.14	$27.73
2014/2015	$125.94	$135.25	$142.99	$135.25	$125.94
2015/2016	$134.62	$165.78	$165.78	$165.78	$136.00
2016/2017	$59.37	$119.13	$119.13	$119.13	$59.37
2017/2018	$120.00	$120.00	$120.00	$120.00	$120.00
2018/2019	$164.77	$164.77	$225.42	$164.77	$164.77
2019/2020	$100.00	$100.30	$119.77	$100.00	$100.00
2020/2021	$76.53	$86.04	$187.87	$86.04	$76.53
2021/2022	$140.00	$200.30	$165.73	$140.00	$140.00

V. Conclusion

Electricity sector planning will continue to be effected by several different issues over the next ten years, including projections regarding Maryland utility customers, energy sales, and in-State capacity and generation profiles. Other factors that will play a significant role in the planning process will be Maryland's median income, the State's population, and its housing stock. The Maryland utilities' load forecasts indicate a modest amount of projected annual growth in the number of customers and peak demand throughout the State during the 2018 – 2027 planning horizon, while energy sales are expected to drop through this period. In response to these, and other developments, the next Ten-Year Plan (for 2019 – 2028) will review the impacts that the above-mentioned issues will have on Maryland's long-term electricity resource planning.

[79] The Zonal Net Load capacity price reflects the BRA resource clearing price and credits from any transmission capacity transfer rights.

[80] *PJM RPM Auction User Information: Delivery Year*, PJM Markets & Operations (Delivery Years 2012-2022), https://www.pjm.com/markets-and-operations/rpm.aspx.

VI. Appendices to the Public Service Commission of Maryland's Ten-Year Plan (2018 – 2027) of Electric Companies in Maryland

*Data in Appendices 1-4 was derived from the Utilities' responses to Staff's Data Request

Appendix 1(a): Maryland Customer Forecasts

Appendix Table 1(a)(i): All Customer Classes (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2018	2,538	1,291,378	54,249	205,862	10,681	17,529	268,517	575,039	166,934	2,858	998	**2,596,583**
2019	2,555	1,299,502	54,916	206,828	10,700	17,616	271,460	579,959	169,234	2,858	998	**2,616,626**
2020	2,568	1,308,455	55,480	207,732	10,719	17,704	274,316	584,804	171,564	2,858	998	**2,637,198**
2021	2,580	1,317,544	56,061	208,618	10,738	17,792	277,043	589,354	173,874	2,858	998	**2,657,460**
2022	2,593	1,327,501	56,647	209,513	10,757	17,880	279,790	593,655	176,274	2,858	998	**2,678,466**
2023	2,619	1,337,637	57,246	210,412	10,776	17,969	282,679	597,990	178,474	2,858	998	**2,699,659**
2024	2,645	1,346,607	57,861	211,315	10,795	18,058	285,616	602,362	180,864	2,858	998	**2,719,980**
2025	2,672	1,355,256	58,492	212,223	10,814	18,148	288,682	606,769	183,164	2,858	998	**2,740,075**
2026	2,699	1,365,125	59,107	213,134	10,833	18,238	291,805	611,212	186,064	2,858	998	**2,762,073**
2027	2,726	1,375,158	59,717	214,049	10,852	18,329	294,936	615,692	189,074	2,858	998	**2,784,389**
Change (2018-2027)	**188**	**83,780**	**5,468**	**8,186**	**171**	**800**	**26,419**	**40,653**	**22,140**	**-**	**-**	**187,806**
Percent Change (2018-2027)	**7.41%**	**6.49%**	**10.08 %**	**3.98%**	**1.60%**	**4.56%**	**9.84%**	**7.07%**	**13.26%**	**0.00%**	**0.00%**	**7.23%**
Compound Annual Growth Rate	**0.80%**	**0.70%**	**1.07%**	**0.43%**	**0.18%**	**0.50%**	**1.05%**	**0.76%**	**1.39%**	**0.00%**	**0.00%**	**0.78%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix Table 1(a)(ii): Residential (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2018	2,080	1,165,445	48,935	178,489	8,303	14,877	235,725	525,930	151,400	2,479	841	**2,334,504**
2019	2,101	1,173,263	49,537	179,291	8,316	14,951	238,321	530,865	153,500	2,479	841	**2,353,464**
2020	2,111	1,181,911	50,045	180,039	8,329	15,026	240,873	535,726	155,600	2,479	841	**2,372,980**
2021	2,122	1,190,694	50,569	180,774	8,342	15,101	243,292	540,308	157,700	2,479	841	**2,392,222**
2022	2,132	1,200,345	51,098	181,520	8,355	15,177	245,710	544,671	159,900	2,479	841	**2,412,228**
2023	2,153	1,210,175	51,638	182,269	8,368	15,252	248,252	549,070	161,900	2,479	841	**2,432,398**
2024	2,175	1,218,838	52,194	183,021	8,381	15,329	250,855	553,504	164,100	2,479	841	**2,451,717**
2025	2,197	1,227,180	52,762	183,776	8,394	15,405	253,575	557,974	166,200	2,479	841	**2,470,784**
2026	2,219	1,236,742	53,317	184,535	8,407	15,482	256,342	562,480	168,900	2,479	841	**2,491,744**
2027	2,241	1,246,468	53,868	185,296	8,420	15,560	259,115	567,023	171,700	2,479	841	**2,513,010**
Change (2018-2027)	**161**	**81,023**	**4,933**	**6,807**	**117**	**683**	**23,390**	**41,093**	**20,300**	**-**	**-**	**178,506**
Percent Change (2018-2027)	**7.72%**	**6.95%**	**10.08 %**	**3.81%**	**1.41%**	**4.59%**	**9.92%**	**7.81%**	**13.41%**	**0.00%**	**0.00%**	**7.65%**
Compound Annual Growth Rate	**0.83%**	**0.75%**	**1.07%**	**0.42%**	**0.16%**	**0.50%**	**1.06%**	**0.84%**	**1.41%**	**0.00%**	**0.00%**	**0.82%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix 1(a) (Continued): Maryland Customer Forecasts

Appendix Table 1(a)(iii): Commercial (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	316	113,438	5,059	26,909	2,378	2,541	29,794	49,010	15,530	332	134	**245,442**
2019	315	113,634	5,121	27,073	2,384	2,553	30,149	48,996	15,730	332	134	**246,421**
2020	317	113,829	5,175	27,229	2,390	2,566	30,462	48,979	15,960	332	134	**247,373**
2021	318	114,025	5,228	27,377	2,396	2,579	30,778	48,949	16,170	332	134	**248,285**
2022	320	114,221	5,283	27,526	2,402	2,592	31,115	48,886	16,370	332	134	**249,180**
2023	323	114,416	5,339	27,675	2,408	2,605	31,470	48,823	16,570	332	134	**250,095**
2024	326	114,612	5,396	27,826	2,414	2,618	31,812	48,760	16,760	332	134	**250,989**
2025	329	114,807	5,455	27,977	2,420	2,631	32,164	48,697	16,960	332	134	**251,907**
2026	333	115,003	5,513	28,129	2,426	2,644	32,527	48,635	17,160	332	134	**252,835**
2027	336	115,198	5,569	28,282	2,432	2,657	32,893	48,572	17,370	332	134	**253,775**
Change (2018-2027)	**20**	**1,760**	**510**	**1,372**	**54**	**117**	**3,098**	**(438)**	**1,840**	**-**	**-**	**8,333**
Percent Change (2018-2027)	**6.29%**	**1.55%**	**10.08 %**	**5.10%**	**2.27%**	**4.59%**	**10.40%**	**-0.89%**	**11.85%**	**0.00%**	**0.00%**	**3.40%**
Compound Annual Growth Rate	**0.68%**	**0.17%**	**1.07%**	**0.55%**	**0.25%**	**0.50%**	**1.11%**	**-0.10%**	**1.25%**	**0.00%**	**0.00%**	**0.37%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix Table 1(a)(iv): Industrial (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	120	12,227	27	186	0	112	2,699	0	4	9	15	**15,398**
2019	118	12,341	27	186	0	112	2,693	0	4	9	15	**15,506**
2020	119	12,456	27	186	0	112	2,687	0	4	9	15	**15,614**
2021	120	12,570	28	186	0	112	2,681	0	4	9	15	**15,724**
2022	120	12,684	28	186	0	112	2,675	0	4	9	15	**15,833**
2023	121	12,798	28	186	0	112	2,670	0	4	9	15	**15,943**
2024	123	12,912	28	186	0	112	2,664	0	4	9	15	**16,053**
2025	124	13,026	29	186	0	112	2,658	0	4	9	15	**16,163**
2026	125	13,140	29	186	0	112	2,653	0	4	9	15	**16,273**
2027	126	13,255	29	186	0	112	2,647	0	4	9	15	**16,383**
Change (2018-2027)	**7**	**1,027**	**2**	**-**	**-**	**0**	**(52)**	**-**	**-**	**-**	**-**	**985**
Percent Change (2018-2027)	**5.57%**	**8.40%**	**7.41%**	**0.00%**	**N/A**	**0.15%**	**-1.91%**	**N/A**	**0.00%**	**0.00%**	**0.00%**	**6.39%**
Compound Annual Growth Rate	**0.60%**	**0.90%**	**0.80%**	**0.00%**	**N/A**	**0.02%**	**-0.21%**	**N/A**	**0.00%**	**0.00%**	**0.00%**	**0.69%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix 1(a) (Continued): Maryland Customer Forecasts

Appendix Table 1(a)(v): Other (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	21	268	228	278	0	0	296	99	0	38	8	**1,236**
2019	21	263	231	278	0	0	294	99	0	38	8	**1,232**
2020	21	259	233	279	0	0	291	98	0	38	8	**1,228**
2021	21	255	236	280	0	0	289	98	0	38	8	**1,225**
2022	21	252	238	281	0	0	287	98	0	38	8	**1,222**
2023	22	248	241	282	0	0	285	98	0	38	8	**1,220**
2024	22	245	243	282	0	0	283	98	0	38	8	**1,219**
2025	22	242	246	283	0	0	281	98	0	38	8	**1,218**
2026	22	240	248	284	0	0	280	98	0	38	8	**1,217**
2027	22	237	251	285	0	0	279	98	0	38	8	**1,218**
Change (2018-2027)	**1**	**(30)**	**23**	**7**	**-**	**-**	**(18)**	**(2)**	**-**	**-**	**-**	**(18)**
Percent Change (2018-2027)	**5.02%**	**-11.37%**	**10.09 %**	**2.64%**	**N/A**	**N/A**	**-5.91%**	**-1.58%**	**N/A**	**0.00%**	**0.00%**	**-1.46%**
Compound Annual Growth Rate	**0.55%**	**-1.33%**	**1.07%**	**0.29%**	**N/A**	**N/A**	**-0.67%**	**-0.18%**	**N/A**	**0.00%**	**0.00%**	**-0.16%**

Note: A&N and Somerset did not report applicable information for this table.
Note: The "Other" rate class refers to customers that do not fall into one of the listed classes; street lighting is an example of a rate class included under "Other."

Appendix Table 1(a)(vi): Resale (number of customers)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	0	0	0	0	0	0	3	0	0	0	0	**3**
2019	0	0	0	0	0	0	3	0	0	0	0	**3**
2020	0	0	0	0	0	0	3	0	0	0	0	**3**
2021	0	0	0	0	0	0	3	0	0	0	0	**3**
2022	0	0	0	0	0	0	3	0	0	0	0	**3**
2023	0	0	0	0	0	0	3	0	0	0	0	**3**
2024	0	0	0	0	0	0	3	0	0	0	0	**3**
2025	0	0	0	0	0	0	3	0	0	0	0	**3**
2026	0	0	0	0	0	0	3	0	0	0	0	**3**
2027	0	0	0	0	0	0	3	0	0	0	0	**3**
Change (2018-2027)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Percent Change (2018-2027)	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00%**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00%**
Compound Annual Growth Rate	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00%**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00%**

Note: A&N and Somerset did not report applicable information for this table.
Note: The "Resale" class refers to "Sales for Resale," which is energy supplied to other electric utilities, cooperatives, municipalities, and federal and state electric agencies for resale to end-use consumers. PE is the only utility with any resale customers; these wholesale customers are PJM, Monongahela Power Company, West Penn Power Company and Old Dominion Electric Cooperative.

Appendix 1(b): 2016 Customer Numbers and Energy Sales

Appendix Table 1(b)(i): Customer Class Breakdown as of December 31, 2017 (number of customers)

	System Wide						Maryland					
Utility	Residential	Com-mercial	In-dustrial	Other	Sales for Resale	Total	Resi-dential	Com-mercial	In-dustrial	Other	Sales for Resale	Total
Berlin	2,073	316	117	21	-	**2,527**	2,073	316	117	21	-	**2,527**
BGE	1,160,783	113,594	12,155	272	-	**1,286,804**	1,160,783	113,594	12,155	272	-	**1,286,804**
Chop-tank	48,414	5,160	26	225	-	**53,825**	48,414	5,160	26	225	-	**53,825**
DPL	459,389	61,721	376	629	-	**522,115**	177,922	26,792	184	269	-	**205,167**
Easton	8,290	2,372	-	-	-	**10,662**	8,290	2,372	-	-	-	**10,662**
Hagers-town	14,873	2,556	110	-	-	**17,539**	14,873	2,556	110	-	-	**17,539**
PE	357,055	46,492	4,553	629	4	**408,733**	234,760	29,183	2,671	321	2	**266,937**
PEPCO	792,783	76,676	-	146	-	**869,605**	522,540	50,324	-	115	-	**572,979**
SMECO	149,170	15,637	4	385	-	**165,196**	149,170	15,637	4	385	-	**165,196**
Thur-mont	2,479	332	9	38	-	**2,858**	2,479	332	9	38	-	**2,858**
William-sport	841	134	15	8	-	**998**	841	134	15	8	-	**998**
Total	**2,996,150**	**324,990**	**17,365**	**2,353**	**4**	**3,340,862**	**2,322,145**	**246,400**	**15,291**	**1,654**	**2**	**2,585,492**

Note: A&N and Somerset did not report applicable information for this table.

Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix Table 1(b)(ii): Utilities' 2017 Energy Sales by Customer Class (GWh)

	System Wide						Maryland					
Utility	Resi-dential	Com-mercial	In-dustrial	Other	Sales for Resale	Total	Resi-dential	Com-mercial	In-dustrial	Other	Sales for Resale	Total
Berlin	25	3	14	0	-	**43**	25	3	14	0	-	**43**
BGE	12,111	2,946	13,688	268	-	**29,013**	12,111	2,946	13,688	268	-	**29,013**
Chop-tank	657	218	91	1	-	**967**	657	218	91	1	-	**967**
DPL	2,928	3,347	1,382	35	-	**7,692**	2,020	1,639	366	12	-	**4,037**
Easton	104	148	-	-	-	**252**	104	148	-	-	-	**252**
Hagers-town	150	67	79	-	-	**296**	150	67	79	-	-	**296**
PE	4,823	2,872	2,431	22	1,149	**11,298**	3,084	2,047	1,611	16	1,149	**7,907**
PEPCO	7,797	16,829	-	146	-	**24,771**	5,413	8,400	-	66	-	**13,879**
SMECO	2,057	1,264	43	12	-	**3,375**	2,057	1,264	43	12	-	**3,375**
Thur-mont	35	16	25	1	-	**76**	35	16	25	1	-	**76**
William-sport	9	3	7	0	-	**19**	9	3	7	0	-	**19**
Total	**30,695**	**27,712**	**17,760**	**485**	**1,149**	**77,801**	**25,665**	**16,750**	**15,923**	**376**	**1,149**	**59,864**

Note: A&N and Somerset did not report applicable information for this table.

Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix 2(a): Energy Sales Forecast by Utility (Maryland Service Territory Only)

Appendix Table 2(a)(i): Maryland Energy Sales Forecast, Gross of DSM (GWh)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	45	29,638	1,005	4,577	253	296	8,199	16,799	3,597	76	19	**64,505**
2019	45	29,318	1,011	4,592	255	297	8,274	17,098	3,613	76	19	**64,598**
2020	46	29,208	1,014	4,550	256	299	8,375	17,286	3,630	76	19	**64,760**
2021	46	28,421	1,016	4,511	258	300	8,510	17,407	3,632	76	19	**64,196**
2022	46	28,237	1,020	4,376	259	302	8,656	17,502	3,642	76	19	**64,135**
2023	47	28,014	1,025	4,236	260	303	8,849	17,239	3,654	76	19	**63,723**
2024	47	27,869	1,028	4,102	262	305	8,897	16,982	3,668	76	19	**63,256**
2025	47	27,540	1,031	3,974	263	307	8,955	16,729	3,683	76	19	**62,625**
2026	48	27,301	1,034	3,850	265	308	9,012	16,481	3,710	76	19	**62,104**
2027	48	27,051	1,037	3,732	266	310	9,085	16,238	3,740	76	19	**61,603**
Change (2018-2027)	**3**	**(2,587)**	**32**	**(844)**	**13**	**14**	**885**	**(561)**	**143**	**-**	**-**	**(2,902)**
Percent Change (2018-2027)	**6.68%**	**-8.73%**	**3.18%**	**-18.45%**	**4.98%**	**4.59%**	**10.80%**	**-3.34%**	**3.99%**	**0.00%**	**0.00%**	**-4.50%**
Compound Annual Growth Rate	**0.72%**	**-1.01%**	**0.35%**	**-2.24%**	**0.54%**	**0.50%**	**1.15%**	**-0.38%**	**0.44%**	**0.00%**	**0.00%**	**-0.51%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix Table 2(a)(ii): Maryland Energy Sales Forecast, Net of DSM (GWh)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	45	28,973	1,004	3,999	253	296	7,494	14,263	3,532	76	19	**59,955**
2019	45	28,627	1,010	3,919	255	297	7,475	14,162	3,545	76	19	**59,432**
2020	46	28,493	1,013	3,784	256	299	7,466	13,955	3,559	76	19	**58,967**
2021	46	28,181	1,015	3,628	258	300	7,488	13,711	3,560	76	19	**58,282**
2022	46	27,989	1,019	3,374	259	302	7,520	13,443	3,570	76	19	**57,618**
2023	47	27,766	1,024	3,234	260	303	7,599	13,180	3,583	76	19	**57,092**
2024	47	27,621	1,027	3,100	262	305	7,672	12,923	3,597	76	19	**56,649**
2025	47	27,292	1,030	2,972	263	307	7,729	12,670	3,612	76	19	**56,017**
2026	48	27,052	1,033	2,849	265	308	7,785	12,422	3,638	76	19	**55,496**
2027	48	26,803	1,036	2,731	266	310	7,857	12,179	3,669	76	19	**54,994**
Change (2018-2027)	**3**	**(2,170)**	**32**	**(1,268)**	**13**	**14**	**362**	**(2,084)**	**137**	**-**	**-**	**(4,962)**
Percent Change (2018-2027)	**6.68%**	**-7.49%**	**3.16%**	**-31.71%**	**4.98%**	**4.59%**	**4.84%**	**-14.61%**	**3.88%**	**0.00%**	**0.00%**	**-8.28%**
Compound Annual Growth Rate	**0.72%**	**-0.86%**	**0.35%**	**-4.15%**	**0.54%**	**0.50%**	**0.53%**	**-1.74%**	**0.42%**	**0.00%**	**0.00%**	**-0.96%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix 2(b): Energy Sales Forecast by Utility (System Wide)

Appendix Table 2(b)(i): System Wide Energy Sales Forecast, Gross of DSM (GWh)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	45	29,638	1,005	12,493	253	296	15,520	28,380	3,597	76	19	**91,322**
2019	45	29,318	1,011	12,546	255	297	15,757	28,674	3,613	76	19	**91,612**
2020	46	29,208	1,014	12,656	256	299	15,946	28,954	3,630	76	19	**92,104**
2021	46	28,421	1,016	12,769	258	300	16,147	29,124	3,632	76	19	**91,808**
2022	46	28,237	1,020	12,776	259	302	16,345	29,263	3,642	76	19	**91,986**
2023	47	28,014	1,025	12,741	260	303	16,591	28,992	3,654	76	19	**91,723**
2024	47	27,869	1,028	12,713	262	305	16,696	28,725	3,668	76	19	**91,410**
2025	47	27,540	1,031	12,692	263	307	16,808	28,464	3,683	76	19	**90,931**
2026	48	27,301	1,034	12,678	265	308	16,922	28,207	3,710	76	19	**90,568**
2027	48	27,051	1,037	12,670	266	310	17,053	27,956	3,740	76	19	**90,227**
Change (2018-2027)	**3**	**(2,587)**	**32**	**178**	**13**	**14**	**1,533**	**(424)**	**143**	**-**	**-**	**(1,095)**
Percent Change (2018-2027)	**6.68%**	**-8.73%**	**3.18%**	**1.42%**	**4.98%**	**4.59%**	**9.88%**	**-1.50%**	**3.99%**	**0.00%**	**0.00%**	**-1.20%**
Compound Annual Growth Rate	**0.72%**	**-1.01%**	**0.35%**	**0.16%**	**0.54%**	**0.50%**	**1.05%**	**-0.17%**	**0.44%**	**0.00%**	**0.00%**	**-0.13%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C., Delaware, and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix Table 2(b)(ii): System Wide Energy Sales Forecast, Net of DSM (GWh)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	45	28,973	1,004	11,833	253	296	14,771	25,471	3,532	76	19	**86,274**
2019	45	28,627	1,010	11,756	255	297	14,913	25,312	3,545	76	19	**85,857**
2020	46	28,493	1,013	11,732	256	299	14,993	25,144	3,559	76	19	**85,630**
2021	46	28,181	1,015	11,689	258	300	15,080	24,898	3,560	76	19	**85,123**
2022	46	27,989	1,019	11,539	259	302	15,165	24,621	3,570	76	19	**84,606**
2023	47	27,766	1,024	11,503	260	303	15,297	24,350	3,583	76	19	**84,228**
2024	47	27,621	1,027	11,476	262	305	15,426	24,083	3,597	76	19	**83,939**
2025	47	27,292	1,030	11,455	263	307	15,537	23,822	3,612	76	19	**83,460**
2026	48	27,052	1,033	11,440	265	308	15,650	23,565	3,638	76	19	**83,096**
2027	48	26,803	1,036	11,432	266	310	15,781	23,314	3,669	76	19	**82,754**
Change (2018-2027)	**3**	**(2,170)**	**32**	**(401)**	**13**	**14**	**1,009**	**(2,157)**	**137**	**-**	**-**	**(3,521)**
Percent Change (2018-2027)	**6.68%**	**-7.49%**	**3.16%**	**-3.39%**	**4.98%**	**4.59%**	**6.83%**	**-8.47%**	**3.88%**	**0.00%**	**0.00%**	**-4.08%**
Compound Annual Growth Rate	**0.72%**	**-0.86%**	**0.35%**	**-0.38%**	**0.54%**	**0.50%**	**0.74%**	**-0.98%**	**0.42%**	**0.00%**	**0.00%**	**-0.46%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix 3(a): Peak Demand Forecasts (Maryland Service Territory Only)

Appendix Table 3(a)(i): Maryland Summer, Gross of DSM Programs (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	11	6,848	293	1,044	60	58	1,629	3,963	871	14	4	**14,795**
2019	11	6,771	297	1,061	60	59	1,644	4,039	874	14	4	**14,834**
2020	11	6,753	297	1,076	61	59	1,660	4,099	878	14	4	**14,912**
2021	11	6,685	298	1,100	61	59	1,681	4,166	878	14	4	**14,957**
2022	11	6,656	300	1,131	61	59	1,704	4,244	880	14	4	**15,065**
2023	11	6,653	302	1,134	61	60	1,730	4,245	883	14	4	**15,098**
2024	11	6,691	303	1,138	62	60	1,732	4,251	886	14	4	**15,152**
2025	11	6,735	304	1,143	62	60	1,737	4,258	890	14	4	**15,220**
2026	11	6,751	305	1,147	62	61	1,743	4,267	896	14	4	**15,261**
2027	11	6,745	306	1,150	62	61	1,749	4,276	903	14	4	**15,283**
Change (2018-2027)	**1**	**(103)**	**13**	**106**	**2**	**3**	**120**	**313**	**32**	**-**	**-**	**488**
Percent Change (2018-2027)	**6.69%**	**-1.50%**	**4.44%**	**10.15 %**	**3.48%**	**4.59%**	**7.38%**	**7.91%**	**3.72%**	**0.00%**	**0.00%**	**3.30%**
Compound Annual Growth Rate	**0.72%**	**-0.17%**	**0.48%**	**1.08%**	**0.38%**	**0.50%**	**0.79%**	**0.85%**	**0.41%**	**0.00%**	**0.00%**	**0.36%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix Table 3(a)(ii): Maryland Summer, Net of DSM Programs (MW) [81, 82]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	4	5,985	285	919	60	58	1,513	3,394	798	14	4	**13,035**
2019	4	5,898	289	918	60	59	1,512	3,378	801	14	4	**12,937**
2020	4	5,873	289	914	61	59	1,511	3,348	805	14	4	**12,882**
2021	4	5,888	290	912	61	59	1,514	3,335	805	14	4	**12,886**
2022	4	5,857	292	914	61	59	1,517	3,335	807	14	4	**12,864**
2023	4	5,855	294	916	61	60	1,524	3,336	810	14	4	**12,878**
2024	4	5,893	295	920	62	60	1,531	3,341	813	14	4	**12,937**
2025	4	5,937	296	925	62	60	1,536	3,349	817	14	4	**13,004**
2026	5	5,953	297	929	62	61	1,541	3,357	823	14	4	**13,046**
2027	5	5,947	298	932	62	61	1,548	3,366	830	14	4	**13,067**
Change (2018-2027)	**1**	**(39)**	**13**	**13**	**2**	**3**	**35**	**(27)**	**32**	**-**	**-**	**32**
Percent Change (2018-2027)	**18.41%**	**-0.64%**	**4.56%**	**1.40%**	**3.48%**	**4.59%**	**2.28%**	**-0.80%**	**4.01%**	**0.00%**	**0.00%**	**0.25%**
Compound Annual Growth Rate	**1.90%**	**-0.07%**	**0.50%**	**0.15%**	**0.38%**	**0.50%**	**0.25%**	**-0.09%**	**0.44%**	**0.00%**	**0.00%**	**0.03%**

Note: A&N and Somerset did not report applicable information for this table.

[81] Berlin reported to Staff 6.9 MW of DSM savings per year. This was attributed to the town generating 6.9 MW of fossil fuel generation from generators that they own, operate, and dispatch - independent of PJM.

[82] Choptank's DSM programs include: a voluntary program among the consumers to drop load during "beat-the-peak" alerts; a legacy A/C & water heater switch program; and the availability of experimental interruptible rates, in which a few consumers are still enrolled.

Appendix 3(a) (Continued): Peak Demand Forecasts (Maryland Service Territory Only)

Appendix Table 3(a)(iii): Maryland Winter, Gross of DSM Programs (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	14	5,883	279	910	64	61	1,768	2,633	1,014	19	5	**12,649**
2019	14	5,901	280	914	64	62	1,784	2,645	916	19	5	**12,604**
2020	15	5,897	282	913	64	62	1,799	2,646	919	19	5	**12,622**
2021	16	5,892	282	914	64	62	1,820	2,645	920	19	5	**12,640**
2022	16	5,901	284	917	65	63	1,847	2,652	922	19	5	**12,691**
2023	17	5,916	286	923	65	63	1,874	2,662	926	19	5	**12,756**
2024	18	5,917	287	927	65	63	1,878	2,668	929	19	5	**12,777**
2025	18	5,917	288	930	66	63	1,884	2,675	933	19	5	**12,799**
2026	19	5,930	290	935	66	64	1,893	2,686	940	19	5	**12,847**
2027	20	5,940	291	940	66	64	1,903	2,697	948	19	5	**12,893**
Change (2018-2027)	**6**	**57**	**12**	**30**	**3**	**3**	**135**	**64**	**(66)**	**-**	**-**	**244**
Percent Change (2018-2027)	**41.98%**	**0.97%**	**4.30%**	**3.34%**	**4.18%**	**4.59%**	**7.63%**	**2.43%**	**-6.51%**	**0.00%**	**0.00%**	**1.93%**
Compound Annual Growth Rate	**3.97%**	**0.11%**	**0.47%**	**0.37%**	**0.46%**	**0.50%**	**0.82%**	**0.27%**	**-0.75%**	**0.00%**	**0.00%**	**0.21%**

Note: A&N and Somerset did not report applicable information for this table.

Appendix Table 3(a)(iv): Maryland Winter, Net of DSM Programs (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	14	5,808	271	910	64	61	1,659	2,633	1,011	19	5	**12,454**
2019	14	5,817	272	914	64	62	1,660	2,645	913	19	5	**12,385**
2020	15	5,807	274	913	64	62	1,661	2,646	916	19	5	**12,382**
2021	16	5,821	274	914	64	62	1,665	2,645	917	19	5	**12,402**
2022	16	5,826	276	917	65	63	1,674	2,652	919	19	5	**12,432**
2023	17	5,841	278	923	65	63	1,685	2,662	923	19	5	**12,481**
2024	18	5,842	279	927	65	63	1,693	2,668	926	19	5	**12,506**
2025	18	5,842	280	930	66	63	1,699	2,675	930	19	5	**12,529**
2026	19	5,855	282	935	66	64	1,708	2,686	937	19	5	**12,576**
2027	20	5,865	283	940	66	64	1,718	2,697	945	19	5	**12,622**
Change (2018-2027)	**6**	**57**	**12**	**30**	**3**	**3**	**59**	**64**	**(66)**	**-**	**-**	**169**
Percent Change (2018-2027)	**41.98%**	**0.99%**	**4.43%**	**3.34%**	**4.18%**	**4.59%**	**3.57%**	**2.43%**	**-6.53%**	**0.00%**	**0.00%**	**1.35%**
Compound Annual Growth Rate	**3.97%**	**0.11%**	**0.48%**	**0.37%**	**0.46%**	**0.50%**	**0.39%**	**0.27%**	**-0.75%**	**0.00%**	**0.00%**	**0.15%**

Note: A&N and Somerset did not report applicable information for this table

Appendix 3(b): Peak Demand Forecasts (System Wide)

Appendix Table 3(b)(i): System Wide Summer, Gross of DSM (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	11	6,848	293	4,064	60	58	3,001	6,493	871	14	4	**21,718**
2019	11	6,771	297	4,080	60	59	3,039	6,463	874	14	4	**21,673**
2020	11	6,753	297	4,088	61	59	3,064	6,405	878	14	4	**21,634**
2021	11	6,685	298	4,109	61	59	3,090	6,381	878	14	4	**21,591**
2022	11	6,656	300	4,153	61	59	3,115	6,380	880	14	4	**21,634**
2023	11	6,653	302	4,164	61	60	3,145	6,382	883	14	4	**21,680**
2024	11	6,691	303	4,179	62	60	3,151	6,393	886	14	4	**21,754**
2025	11	6,735	304	4,202	62	60	3,158	6,407	890	14	4	**21,849**
2026	11	6,751	305	4,220	62	61	3,167	6,423	896	14	4	**21,915**
2027	11	6,745	306	4,233	62	61	3,177	6,441	903	14	4	**21,958**
Change (2018-2027)	**1**	**(103)**	**13**	**169**	**2**	**3**	**176**	**(52)**	**32**	**-**	**-**	**241**
Percent Change (2018-2027)	**6.69%**	**-1.50%**	**4.44%**	**4.16%**	**3.48%**	**4.59%**	**5.85%**	**-0.80%**	**3.72%**	**0.00%**	**0.00%**	**1.11%**
Compound Annual Growth Rate	**0.72%**	**-0.17%**	**0.48%**	**0.45%**	**0.38%**	**0.50%**	**0.63%**	**-0.09%**	**0.41%**	**0.00%**	**0.00%**	**0.12%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix Table 3(b)(ii): System Wide Summer, Net of DSM (MW)[83, 84]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2018	4	5,985	285	3,937	60	58	2,880	7,106	798	14	4	**21,131**
2019	4	5,898	289	3,930	60	59	2,902	7,173	801	14	4	**21,134**
2020	4	5,873	289	3,914	61	59	2,909	7,212	805	14	4	**21,145**
2021	4	5,888	290	3,903	61	59	2,917	7,274	805	14	4	**21,219**
2022	4	5,857	292	3,912	61	59	2,923	7,358	807	14	4	**21,291**
2023	4	5,855	294	3,923	61	60	2,933	7,360	810	14	4	**21,318**
2024	4	5,893	295	3,938	62	60	2,943	7,371	813	14	4	**21,397**
2025	4	5,937	296	3,961	62	60	2,951	7,385	817	14	4	**21,491**
2026	5	5,953	297	3,979	62	61	2,960	7,401	823	14	4	**21,557**
2027	5	5,947	298	3,992	62	61	2,970	7,419	830	14	4	**21,601**
Change (2018-2027)	**1**	**(39)**	**13**	**55**	**2**	**3**	**90**	**313**	**32**	**-**	**-**	**470**
Percent Change (2018-2027)	**18.41%**	**-0.64%**	**4.56%**	**1.40%**	**3.48%**	**4.59%**	**3.12%**	**4.41%**	**4.01%**	**0.00%**	**0.00%**	**2.22%**
Compound Annual Growth Rate	**1.90%**	**-0.07%**	**0.50%**	**0.15%**	**0.38%**	**0.50%**	**0.34%**	**0.48%**	**0.44%**	**0.00%**	**0.00%**	**0.24%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

[83] Berlin reported to Staff 6.9 MW of DSM savings per year. This was attributed to the town generating 6.9 MW of fossil fuel generation from generators that they own, operate, and dispatch, independent of PJM.
[84] Choptank's DSM programs include: a voluntary program among the consumers to drop load during "beat-the-peak" alerts; a legacy A/C & water heater switch program; and the availability of experimental interruptible rates, in which a few consumers are still enrolled.

Appendix 3(b) (Continued): Peak Demand Forecasts (System Wide)

Appendix Table 3(b)(iii): System Wide Winter, Gross of DSM (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2018	14	5,883	279	3,443	64	61	3,465	5,383	1,014	19	5	**19,630**
2019	14	5,901	280	3,460	64	62	3,508	5,408	916	19	5	**19,637**
2020	15	5,897	282	3,455	64	62	3,522	5,411	919	19	5	**19,651**
2021	16	5,892	282	3,457	64	62	3,550	5,408	920	19	5	**19,676**
2022	16	5,901	284	3,469	65	63	3,581	5,423	922	19	5	**19,748**
2023	17	5,916	286	3,492	65	63	3,617	5,443	926	19	5	**19,849**
2024	18	5,917	287	3,509	65	63	3,622	5,456	929	19	5	**19,891**
2025	18	5,917	288	3,520	66	63	3,633	5,470	933	19	5	**19,933**
2026	19	5,930	290	3,539	66	64	3,647	5,492	940	19	5	**20,011**
2027	20	5,940	291	3,558	66	64	3,664	5,514	948	19	5	**20,090**
Change (2018-2027)	**6**	**57**	**12**	**115**	**3**	**3**	**199**	**131**	**(66)**	**-**	**-**	**459**
Percent Change (2018-2027)	**41.98%**	**0.97%**	**4.30%**	**3.34%**	**4.18%**	**4.59%**	**5.74%**	**2.43%**	**-6.51%**	**0.00%**	**0.00%**	**2.34%**
Compound Annual Growth Rate	**3.97%**	**0.11%**	**0.47%**	**0.37%**	**0.46%**	**0.50%**	**0.62%**	**0.27%**	**-0.75%**	**0.00%**	**0.00%**	**0.26%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix Table 3(b)(iv): System Wide Winter, Net of DSM (MW)

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2018	14	5,808	271	3,443	64	61	3,350	5,383	1,011	19	5	**19,429**
2019	14	5,817	272	3,460	64	62	3,379	5,408	913	19	5	**19,413**
2020	15	5,807	274	3,455	64	62	3,378	5,411	916	19	5	**19,405**
2021	16	5,821	274	3,457	64	62	3,390	5,408	917	19	5	**19,433**
2022	16	5,826	276	3,469	65	63	3,403	5,423	919	19	5	**19,484**
2023	17	5,841	278	3,492	65	63	3,422	5,443	923	19	5	**19,568**
2024	18	5,842	279	3,509	65	63	3,432	5,456	926	19	5	**19,614**
2025	18	5,842	280	3,520	66	63	3,443	5,470	930	19	5	**19,656**
2026	19	5,855	282	3,539	66	64	3,457	5,492	937	19	5	**19,734**
2027	20	5,865	283	3,558	66	64	3,474	5,514	945	19	5	**19,813**
Change (2018-2027)	**6**	**57**	**12**	**115**	**3**	**3**	**123**	**131**	**(66)**	**-**	**-**	**384**
Percent Change (2018-2027)	**41.98%**	**0.99%**	**4.43%**	**3.34%**	**4.18%**	**4.59%**	**3.68%**	**2.43%**	**-6.53%**	**0.00%**	**0.00%**	**1.98%**
Compound Annual Growth Rate	**3.97%**	**0.11%**	**0.48%**	**0.37%**	**0.46%**	**0.50%**	**0.40%**	**0.27%**	**-0.75%**	**0.00%**	**0.00%**	**0.22%**

Note: A&N and Somerset did not report applicable information for this table.
Note: "System wide" includes the entire distribution system of a utility, which may extend beyond the Maryland service territory into Washington, D.C.; Delaware; and parts of West Virginia. The affected utilities include DPL, PE, and Pepco.

Appendix 4: Transmission Enhancements, by Service Territory

Appendix Table 4: Transmission Enhancements, by Service Territory

								Start location		End Location	
Transmission Owner	Voltage (kV)	Length (miles)	No. of Circuits	Start Date	Comp. Date	In-Service Date	Purpose	County	Terminal	County	Terminal
BGE	115	2	1	Oct, 2014		Dec, 2018	Baseline Transmission Reliability	Anne Arundel	Waugh Chapel	Anne Arundel	Bestgate
DPL	69	8.74	1	Feb-13	Dec-17	Dec-17	Supplemental Transmission Reliability	Worcester	Worcester	Worcester	Ocean City
DPL	69	23.49	1	Oct-12	May-17	May-17	Baseline Transmission Reliability	Wicomico	North Salisbury	Worcester	Worcester
DPL	138	26	1	Aug-13	Dec-17	Dec-17	Supplemental Transmission Reliability	Queen Annes	Church	Caroline	Steele
DPL	69	4.51	1	Feb-14	Dec-17	Dec-17	Supplemental Transmission Reliability	Wicomico	Mt. Hermon	Wicomico	Chesapeake
DPL	69	-	1	Nov-15	Sep-17	Sep-17	Network Transmission Upgrade	Dorchester	New Substation		
DPL	69	7.02	1	Apr-14	Dec-17	Dec-17	Supplemental Transmission Reliability	Wicomico	North Salisbury	Wicomico	Fruitland
DPL	69	-	1	1/14/2015	7/31/2017	7/31/2017	Network Transmission Upgrade	Somerset	Kings creek		
DPL	138	30.91	1	5/17/2013	5/31/2018	5/31/2018	Baseline Transmission Reliability	Wicomico	Piney Grove	Accomack (VA)	Wattsville
DPL	230	-	1	9/1/2014	5/31/2018	5/31/2018	Supplemental Transmission Reliability	Cecil	Crest		
DPL	138	-	1	5/29/2015	12/31/2018	12/31/2018	Maryland Corrective Action Plan	Queen Annes	Carville		
DPL	69	-	1	5/29/2015	12/31/2018	12/31/2018	Maryland Corrective Action Plan	Wicomico	Hebron		
DPL	69	-	1	5/29/2015	12/31/2019	12/31/2019	Maryland Corrective Action Plan	Wicomico	Beaglin		
DPL	69	6	1	3/30/2017	12/31/2019	12/31/2019	Maryland Corrective Action Plan	Wicomico	N. Salisbury	Wicomico	Hebron
DPL	69	-	1	9/15/2017	5/31/2019	5/31/2019	Supplemental Transmission Reliability	Queen Annes	Stevensville		
PE	138	0	1	7/8/1905	4/28/2017	4/28/2017	Baseline Transmission Reliability	Berkeley, WV	Marlowe	Washington	Halfway
PE	138	0	1	7/9/1905	Suspended	7/9/1905	Accommodate for Generator Interconnection	Cumberland	Cumberland	Cumberland	Ridgeley
PE	138	0.1	1	7/8/1905	Suspended	7/9/1905	Accommodate for Generator Interconnection	Garrett	Hazelton	Garrett	AA1-047
PE	138	0.1	1	7/8/1905	Suspended	7/9/1905	Accommodate for Generator Interconnection	Garrett	AA1-047	Garrett	Jennings
PE	138	0	1	7/10/1905	7/11/1905	7/11/1905	Baseline Transmission Reliability	Carroll	Carroll	Montgomery	Germantown
PE	230	0	1	7/8/1905	5/26/2017	5/26/2017	Baseline Transmission Reliability	Montgomery	Damascus	Montgomery	Damascus
PE	138	0.1	1	7/8/1905	7/10/1905	7/10/1905	Distribution Adequacy	Washington	Ringgold	Frederick	Garfield (new)
PE	138	0.1	1	2016	2018	2018	Distribution Adequacy	Frederick	Garfield (new)	Frederick	Catoctin
PE	230	0.1	1	2018	7/12/1905	7/12/1905	Distribution Adequacy	Frederick	Doubs	Frederick	Jefferson (New)
PE	230	0.1	1	2018	7/12/1905	7/12/1905	Distribution Adequacy	Frederick	Jefferson (New)	Frederick	Monocacy
PE	230	0	1	2017	7/12/1905	7/12/1905	Baseline Transmission Reliability	Washington	Ringgold	Washington	Ringgold
PE	230	0	1	2017	7/12/1905	7/12/1905	Baseline Transmission Reliability	Frederick	Catoctin	Frederick	Catoctin
PE	230	9.7	1	2017	7/12/1905	7/12/1905	Baseline Transmission Reliability	Washington	Ringgold	Frederick	Catoctin
Pepco	230	n/a	n/a	9/2014	Suspended	TBD	Generation Interconnection	Prince George's	(New) Mattawoman	Prince George's	(New) Mattawoman
Pepco	230	n/a	1	9/2014	Suspended	TBD	Generation Interconnection	Prince George's	Burches Hill	Prince George's	(New) Mattawoman
Pepco	230	n/a	n/a	9/2014	Suspended	TBD	Generation Interconnection	Prince George's	Burches Hill	Prince George's	Burches Hill
Pepco	500	n/a	n/a	9/2014	6/2018	6/2018	Generation Interconnection	Prince George's	(New) Cheltenham	Prince George's	(New) Cheltenham
SMECO	69	4.2	1	2nd Qtr 2017	7/1/2018	7/1/2018	Reliability	Calvert	Huntingtown	Calvert	Sunderland
SMECO	69	0.8	2	2nd Qtr 2018	4th Qtr 2018	4th Qtr 2018	Capacity / Reliability	Prince George	West Brandywine tap GOAB switch	Prince George	West Brandywine

Appendix 5: List of Maryland Generators, as of December 31, 2017

Appendix Table 5: List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
A & N Electric Coop	Smith Island	Somerset	0.5	0.4	0.0%
A & N Electric Coop	Smith Island	Somerset	1.2	1.2	0.0%
AES Tait LLC	AES Warrior Run Energy Storage Project	Allegany	11.0	11.0	0.1%
AES WR Ltd Partnership	AES Warrior Run Cogeneration Facility	Allegany	229.0	180.0	1.5%
Altus Power America Management, LLC	MEBA	Talbot	1.5	1.5	0.0%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	5.0	5.0	0.0%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	2.5	2.5	0.0%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	10.0	10.0	0.1%
BP Piney & Deep Creek LLC	Deep Creek	Garrett	10.0	9.0	0.1%
BP Piney & Deep Creek LLC	Deep Creek	Garrett	10.0	9.0	0.1%
Brandon Shores LLC	Brandon Shores	Anne Arundel	685.0	635.0	5.1%
Brandon Shores LLC	Brandon Shores	Anne Arundel	685.0	638.0	5.2%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	0.0%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	0.0%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	0.0%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	0.0%
CB&I	Montgomery County Oaks LFGE Plant	Montgomery	1.6	1.5	0.0%
CB&I	Montgomery County Oaks LFGE Plant	Montgomery	0.8	0.8	0.0%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	1.1	0.9	0.0%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	1.1	0.9	0.0%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	0.8	0.8	0.0%
Consolidated Edison Solutions Inc.	CES VMT Solar	Washington	1.1	1.1	0.0%
Constellation New Energy Inc.	Archdiocese of Baltimore J	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Archdiocese of Baltimore L	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Baltimore City B	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Baltimore City D	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Baltimore City F	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Baltimore City G	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	City of Havre De Grace C	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Sod Run WTP A	Harford	2.0	2.0	0.0%
Constellation New Energy Inc.	Havre de Grace II - E at Perryman	Harford	1.4	1.4	0.0%
Constellation Power Source Gen	Gould Street	Baltimore City	103.5	97.0	0.8%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	0.1%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.6	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	15.6	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.5	0.1%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	16.0	0.1%
Constellation Power Source Gen	Perryman	Harford	53.1	52.0	0.4%
Constellation Power Source Gen	Perryman	Harford	53.1	51.0	0.4%
Constellation Power Source Gen	Perryman	Harford	53.1	52.0	0.4%
Constellation Power Source Gen	Perryman	Harford	192.0	147.6	1.2%
Constellation Power Source Gen	Perryman	Harford	141.0	109.8	0.9%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	15.3	0.1%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	16.0	0.1%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	14.8	0.1%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	14.8	0.1%
Constellation Power Source Gen	Riverside (MD)	Baltimore	25.0	19.0	0.2%
Constellation Power Source Gen	Riverside (MD)	Baltimore	25.0	20.0	0.2%
Constellation Power Source Gen	Westport	Baltimore City	121.5	115.8	0.9%
Constellation Solar Holding, LLC	CCBC-Catonsville	Howard	1.6	1.6	0.0%
Constellation Solar Horizons LLC	Mount Saint Mary's	Frederick	13.7	13.7	0.1%
Constellation Solar Maryland II LLC	UMMS at Pocomoke	Somerset	2.8	2.8	0.0%
Constellation Solar Maryland II LLC	CNE at Cambridge MD	Dorchester	3.2	3.2	0.0%
Constellation Solar Maryland, LLC	McCormick & Co. Inc. at Belcamp	Harford	1.4	1.4	0.0%
Constellation Solar Maryland, LLC	General Motors Corp at White Marsh MD	Baltimore	1.0	1.0	0.0%
Covanta Montgomery, Inc.	Montgomery County Resource Recovery	Montgomery	67.8	54.0	0.4%
CP Crane Power, LLC	CP Crane Power, LLC	Baltimore	190.4	190.0	1.5%
CP Crane Power, LLC	CP Crane Power, LLC	Baltimore	209.4	195.0	1.6%
CP Crane Power, LLC	CP Crane Power, LLC	Baltimore	16.0	14.0	0.1%
Criterion Power Partners LLC	Criterion	GARRETT	70.0	70.0	0.6%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	0.1%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	0.1%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	0.1%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	23.9	21.7	0.2%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	23.9	21.7	0.2%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	15.6	12.9	0.1%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	0.0%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	0.0%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	0.0%
Easton Utilities Comm	Easton	Talbot	3.5	3.5	0.0%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Easton Utilities Comm	Easton	Talbot	1.5	1.5	0.0%
Easton Utilities Comm	Easton	Talbot	1.5	1.5	0.0%
Easton Utilities Comm	Easton	Talbot	3.8	3.6	0.0%
Easton Utilities Comm	Easton	Talbot	4.1	4.1	0.0%
Easton Utilities Comm	Easton	Talbot	5.6	5.6	0.0%
Easton Utilities Comm	Easton	Talbot	5.6	5.6	0.0%
Easton Utilities Comm	Easton	Talbot	2.5	2.0	0.0%
Easton Utilities Comm	Easton	Talbot	2.5	2.0	0.0%
Easton Utilities Comm	Easton	Talbot	3.0	2.5	0.0%
Easton Utilities Comm	Easton 2	Talbot	1.5	1.5	0.0%
Easton Utilities Comm	Easton 2	Talbot	1.5	1.5	0.0%
Easton Utilities Comm	Easton 2	Talbot	5.4	4.5	0.0%
Easton Utilities Comm	Easton 2	Talbot	5.4	4.5	0.0%
Easton Utilities Comm	Easton 2	Talbot	6.2	6.2	0.1%
Easton Utilities Comm	Easton 2	Talbot	6.2	6.2	0.1%
Easton Utilities Comm	Easton 2	Talbot	6.3	6.3	0.1%
Easton Utilities Comm	Easton 2	Talbot	6.3	6.3	0.1%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	162.1	1.3%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	175.9	161.4	1.3%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	163.6	1.3%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	166.4	1.3%
Exelon Nuclear	Calvert Cliffs Nuclear Power Plant	Calvert	918.0	866.0	7.0%
Exelon Nuclear	Calvert Cliffs Nuclear Power Plant	Calvert	910.7	841.8	6.8%
Exelon Power	Conowingo	Harford	45.0	48.0	0.4%
Exelon Power	Conowingo	Harford	55.6	65.0	0.5%
Exelon Power	Conowingo	Harford	55.6	65.0	0.5%
Exelon Power	Conowingo	Harford	36.0	36.0	0.3%
Exelon Power	Conowingo	Harford	48.0	48.0	0.4%
Exelon Power	Conowingo	Harford	47.7	48.0	0.4%
Exelon Power	Conowingo	Harford	36.0	36.0	0.3%
Exelon Power	Conowingo	Harford	47.7	48.0	0.4%
Exelon Power	Conowingo	Harford	48.0	48.0	0.4%
Exelon Power	Conowingo	Harford	55.6	65.0	0.5%
Exelon Power	Conowingo	Harford	55.6	65.0	0.5%
Fair Wind Power Partners, LLC	Fair Wind	Garrett	30.0	30.0	0.2%
FC Landfill Energy	FC Landfill Energy	Frederick	1.1	1.0	0.0%
FC Landfill Energy	FC Landfill Energy	Frederick	1.1	1.0	0.0%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
First Solar Asset Management	Maryland Solar	Washington	27.0	20.9	0.2%
Fourmile Wind Energy, LLC	Fourmile Ridge	Garrett	40.0	40.0	0.3%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	1.4%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	1.4%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	19.0	18.0	0.1%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	163.0	147.0	1.2%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	163.0	147.0	1.2%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	1.4%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	0.4%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	0.4%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	0.4%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	0.4%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	18.0	13.0	0.1%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	18.0	13.0	0.1%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	626.0	596.0	4.8%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	626.0	609.0	4.9%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	5.7	5.6	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	5.0	5.0	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	0.0%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	7.5	7.5	0.1%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	7.5	7.5	0.1%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.5	4.5	0.0%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	132.8	126.0	1.0%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	136.0	118.0	1.0%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	359.0	305.0	2.5%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	414.7	397.0	3.2%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	16.0	12.9	0.1%
Howard County - Maryland	Alpha Ridge LFG	Howard	1.0	1.0	0.0%
IGS Solar I, LLC	IGS Solar I - BWI5	Baltimore	1.1	1.1	0.0%
IKEA Property Inc.	IKEA Perryville 460	Cecil	2.1	2.0	0.0%
IKEA Property Inc.	IKEA College Park 411	Prince Georges	1.0	1.0	0.0%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	0.0%
KMC Thermo, LLC	Brandywine Power Facility	Prince Georges	98.7	0.0	0.0%
KMC Thermo, LLC	Brandywine Power Facility	Prince Georges	98.7	0.0	0.0%
KMC Thermo, LLC	Brandywine Power Facility	Prince Georges	91.4	230.0	1.9%
LES Operations Services LLC	Millersville LFG	Anne Arundel	1.6	1.5	0.0%
LES Operations Services LLC	Millersville LFG	Anne Arundel	1.6	1.5	0.0%
Marina Energy LLC	Longview Solar	Wicomico	13.6	13.6	0.1%
Marina Energy LLC	Church Hill	Queen Anne's	6.0	6.0	0.0%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.9	1.3	0.0%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.9	1.3	0.0%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.0	1.0	0.0%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.0	1.0	0.0%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	659.0	582.0	4.7%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	659.0	582.0	4.7%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	16.0	16.0	0.1%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	35.0	22.0	0.2%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	103.0	73.0	0.6%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	103.0	73.0	0.6%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	125.0	81.0	0.7%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	125.0	81.0	0.7%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	125.0	81.0	0.7%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	94.0	71.0	0.6%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	364.0	331.0	2.7%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	364.0	336.0	2.7%
NRG Solar Arrowhead LLC	FedEx Field Solar Facility	Prince Georges	2.0	2.0	0.0%
NRG Vienna Operations Inc.	Vienna Operations	Dorchester	18.6	14.3	0.1%
NRG Vienna Operations Inc.	Vienna Operations	Dorchester	162.0	153.0	1.2%
NVT LICENSES, LLC	UMES (MD) - Princess Anne	Somerset	2.2	2.1	0.0%
Power Choice/Pepco Energy Serv	NIH Cogeneration Facility	Montgomery	22.0	21.3	0.2%
Prince George's County	Brown Station Road Plant I	Prince Georges	0.9	0.8	0.0%
Prince George's County	Brown Station Road Plant I	Prince Georges	0.9	0.8	0.0%
Prince George's County	Brown Station Road Plant I	Prince Georges	0.9	0.8	0.0%
Prince George's County	Brown Station Road Plant II	Prince Georges	1.0	0.8	0.0%
Prince George's County	Brown Station Road Plant II	Prince Georges	1.0	0.8	0.0%
Prince George's County	Brown Station Road Plant II	Prince Georges	1.0	0.8	0.0%
Prince George's County	Brown Station Road Plant II	Prince Georges	1.0	0.8	0.0%
Rockfish Solar LLC	Rockfish Solar LLC	Charles	10.3	10.3	0.1%
Roth Rock Wind Farm LLC	Roth Rock Wind Farm LLC	Garrett	40.0	40.0	0.3%
Roth Rock Wind Farm LLC	Roth Rock North Wind Farm, LLC	Garrett	10.0	10.0	0.1%
SMECO Solar LLC	Herbert Farm Solar	Charles	5.5	5.5	0.0%
SunE DB27, LLC	Elkton Solar	Cecil	1.6	1.6	0.0%
SunE DB42, LLC	Cecil County CCVT HS	Cecil	2.0	2.0	0.0%
SunE SEM 1, LLC	Chimes West Friendship (Nixon Farms)	Howard	1.5	1.2	0.0%
Tesla Inc.	Queen Anne's County	Queen Anne's	2.0	2.0	0.0%
Tesla Inc.	Town of Chestertown- Chestertown WWTP	Kent	1.0	1.0	0.0%
Tesla Inc.	The Clorox Company	Harford	1.6	1.6	0.0%
Tesla Inc.	Chesapeake College	Queen Anne's	1.5	1.5	0.01%
Tesla Inc.	Wye Mills VNEM	Queen Anne's	10	10.0	0.08%
Town of Berlin - (MD)	Berlin	Worcester	1.1	1.1	0.01%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	0.01%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	0.01%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	0.01%
Town of Berlin - (MD)	Berlin	Worcester	2.5	2.5	0.02%
Trigen Inner Harbor East, LLC	Inner Harbor East Heating	Baltimore City	2.1	2.1	0.02%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince Georges	11	9.4	0.08%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2017

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince Georges	11.0	9.4	0.1%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince Georges	5.4	2	0.02%
UGI Energy Services, LLC	Emmitsburg Solar Arrays	Frederick	1.7	1.7	0.01%
US Dept of Army, Garrison, APG	APG Combined Heat and Power Plant	Harford	7.9	6.2	0.05%
Verso Luke LLC	Luke Mill	Allegany	35	32	0.26%
Verso Luke LLC	Luke Mill	Allegany	30	28	0.23%
WGL Energy Systems, Inc	Perdue Salisbury Photovoltaic	Wicomico	1	1	0.01%
WGL Energy Systems, Inc	Kent County-Kennedyville	Kent	1	1	0.01%
WGL Energy Systems, Inc	Rock Hall	Kent	1	1	0.01%
WGL Energy Systems, Inc	Kent County - Worton Complex	Kent	1	1	0.01%
WGL Energy Systems, Inc	Presbyterian Senior Living Service	Baltimore	1.2	1.2	0.01%
WGL Energy Systems, Inc	Pfeffers	Baltimore	1	1	0.01%
Wheelabrator Environmental Systems	Wheelabrator Baltimore Refuse	Baltimore City	60.2	57	0.46%
Wheelabrator Environmental Systems	Wheelabrator Baltimore Refuse	Baltimore City	4.3	4.3	0.03%
			13,709	12,339.9	100.00%

Appendix 6: Proposed New Renewable Generation in Maryland PJM Queue

Appendix Table 6: Proposed New Renewable Generation in Maryland PJM Queue
Effective Date: August 2018

Transmission Owner	Project Name	County Location	PJM Queue Status	PJM Queue #	Fuel Type	Project Capacity (MW)	Projected In-Service Date
APS	Mt. Zion-Cross School 138kV	Garrett	Active	AC2-021	Hydro	15.0	1/15/2019
APS	Carlos Jct - Plaza 34 kV	Allegany	Active	AD1-018	Solar	7.6	12/15/2019
DPL	Kings Creek 25kV	Queen Anne's	Active	AC1-177	Biomass	4.0	1/1/2019
DPL	Centreville 69 kV	Queen Anne's	Active	AD2-076	Solar	18.6	11/30/2021
DPL	Chestertown-Church 69kV	Kent	Active	AB2-133	Solar	24.6	9/30/2018
DPL	Church-Kent 69kV	Queen Anne's	Active	AB2-135	Solar	29.9	5/1/2018
DPL	Church-Price 69kV III	Queen Anne's	Active	AB2-032	Solar	13.6	11/1/2017
DPL	Church-Price 69kV IV	Queen Anne's	Active	AB2-153	Solar	7.6	11/1/2017
DPL	Church-Steele 138kV	Caroline	Active	AB2-036	Solar	34.9	11/30/2018
DPL	Church-Wye Mills 138 kV I	Queen Anne's	Active	AB1-141	Solar	13.5	11/1/2017
DPL	Church-Wye Mills 138 kV II	Queen Anne's	Active	AB1-142	Solar	13.5	11/1/2017
DPL	East New Market 69kV	Dorchester	Active	AC1-190	Solar	35.0	12/31/2017
DPL	Hebron 69kV	Wicomico	Active	AC2-023	Solar	26.5	9/30/2019
DPL	Keeney-Steele 230kV	Caroline	Active	AB2-037	Solar	76.7	10/31/2019
DPL	North Salisbury 25kV	Somerset	Active	AC1-213	Solar	3.2	9/30/2017
DPL	Perch 34.5kV	Cecil	Active	AB2-168	Solar	3.8	1/1/2018
DPL	Piney Grove-New Church 138kV	Worcester	Active	AB2-120	Solar	38.0	12/14/2018
DPL	Price 25kV	Queen Anne's	Active	AB1-162	Solar	6.3	7/1/2017
DPL	Price 25kV II	Queen Anne's	Active	AB1-176	Solar	3.4	12/31/2016
DPL	Price 69kV	Queen Anne's	Active	AB2-063	Solar	7.6	12/31/2018
DPL	Price-Centreville 69kV	Queen Anne's	Active	AD2-045	Solar	12.2	10/1/2019
DPL	Rockawalkin 69kV	Wicomico	Active	AB2-180	Solar	14.0	6/30/2017
DPL	Todd 69kV	Dorchester	Active	AB2-172	Solar	19.0	12/31/2018
DPL	West Cambridge-Vienna 69kV	Dorchester	Active	AB2-136	Solar	24.8	5/1/2018
DPL	Worcester 25kV	Worcester	Active	AC1-049	Solar	1.5	5/1/2018
DPL	Wye Mills 25kV	Queen Anne's	Active	AB2-185	Solar	14.0	6/30/2017
PEPCO	Canada Street 13kV	Prince George's	Active	AE1-014	Solar	0.0	3/31/2019
PEPCO	Livingston Road 13kV	Prince George's	Active	AE1-011	Solar	0.0	3/31/2019
PEPCO	St. Barnabas 13 kV	Prince George's	Active	AD2-058	Solar	3.4	9/30/2019
PEPCO	St. Barnabas 13kV II	Prince George's	Active	AD2-199	Solar	1.3	12/31/2020
PEPCO	Walker Mill 12 kV	Prince George's	Active	AD1-153	Solar	1.0	9/1/2018
SMECO	Ripley 69kV	Charles	Active	AC2-120	Solar	10.5	11/30/2018
SMECO	Ripley-Nanjemoy 69kV	Charles	Active	AC2-101	Solar	12.4	11/30/2018
					Total	**497.3**	