

PUBLIC SERVICE COMMISSION
OF MARYLAND

TEN-YEAR PLAN
(2019 – 2028)
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*
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State of Maryland
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I. Introduction

This report constitutes the Maryland Public Service Commission’s *Ten-Year Plan (2019-2028) 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 2019 – 2028 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.¹ A record of these proceedings is published in the Commission’s annual report.

II. Background

Maryland is geographically divided into 13 electric utility service territories.² The four largest, by number of Maryland customers, are served by investor-owned utilities (“IOUs”); four represent electric cooperatives (two of which serve mainly rural areas of Maryland); and five are served by electric municipal operations.³ PJM sub-regions,

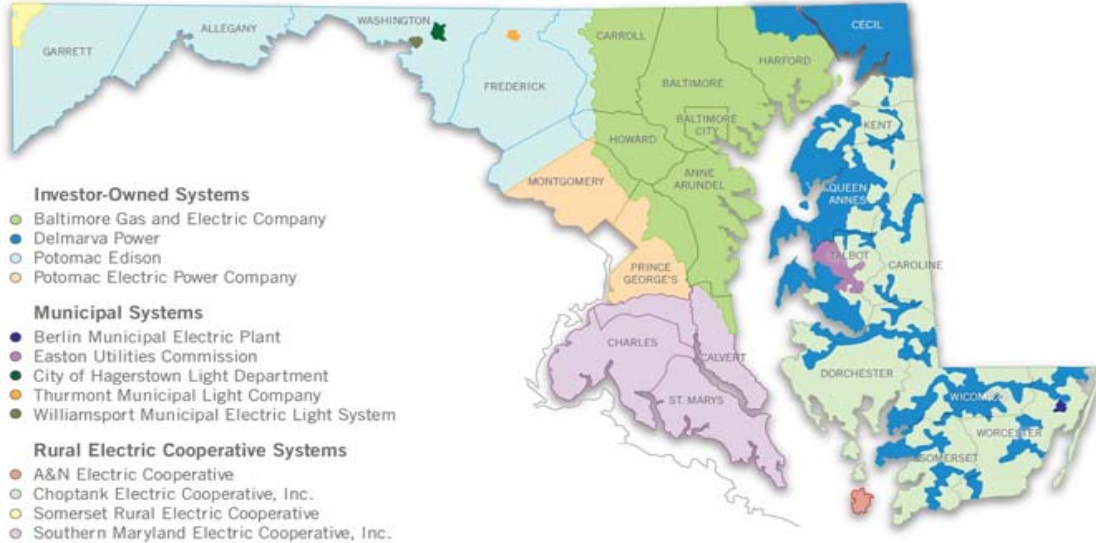
¹ The Maryland Public Service Commission and the Maryland Energy Administration currently represent Maryland on a 16-state Task Force on future distribution system planning. This Task Force started work in 2019 and is funded by the U.S. Department of Energy (“DOE”). The Task Force is being staffed and sponsored by the DOE, the National Association of Regulatory Utility Commissioners (“NARUC”) and the National Association of State Energy Officers (“NASEO”). This work will continue through 2020 and will produce a report of its findings and recommendations by 2021.

² 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”).

³ The Commission regulates all Maryland public service companies, as defined by §1-101(x) of the Public Utilities Article, *Annotated Code of Maryland*.

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 jurisdictions.⁴ Figure 1 provides a geographic picture of the Maryland utilities' service territories. Figure 2 depicts the PJM forecast zones of which Maryland is comprised.

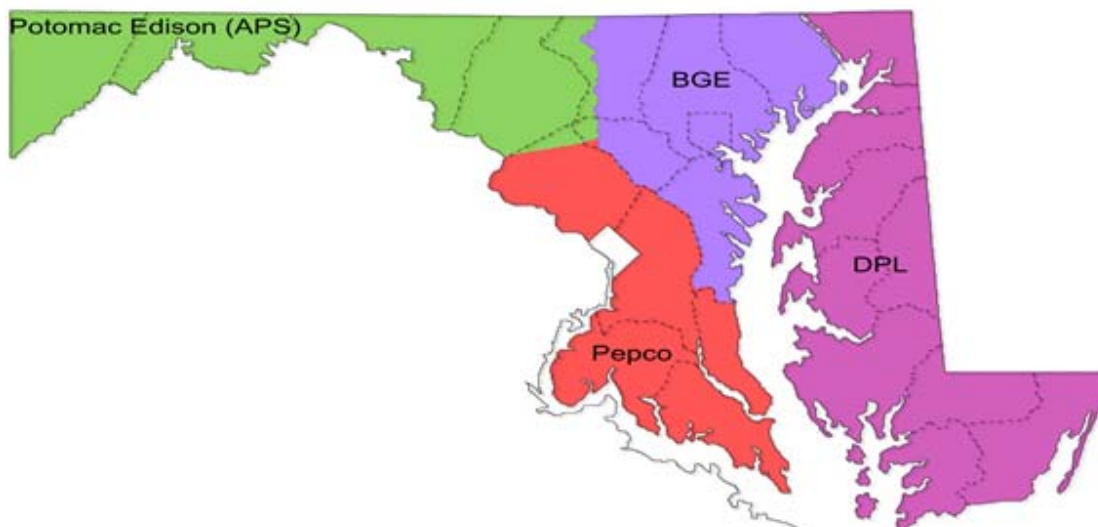
Figure 1: Maryland Utilities and their Service Territories in Maryland⁵



⁴ Potomac Electric Power Company, Delmarva Power & Light Company, and The Potomac Edison Company are the three IOUs that extend into other jurisdictions. Pepco, DPL, and PE data are a subset of the PJM zonal data, since PJM's zonal forecasts are not limited to Maryland. The Baltimore Gas and Electric Company zone, alone, resides solely within the State of Maryland.

⁵ *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).

Figure 2: PJM Maryland Forecast Zones⁶



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 2018) load forecast with that of the previous year (*i.e.* September 2017), as depicted below in Table 1. At the outset of the 2019 – 2028 planning period discussed in this Ten-Year Plan, the projected average GDP growth reflected in the current PJM load forecast is slightly higher than that projected by the previous year’s forecast for roughly the same time period.⁷ The primary reasons cited by PJM are the lower unemployment rate for 2018 compared to 2017 and the continued growth in jobs year over year.⁸ While the PJM territory is projected to slightly underperform the national average, Virginia, Washington D.C., and portions of Maryland are forecast to exceed both the PJM and national GDP growth rates. The local GDP growth is attributable to the available labor pool and demographic trends of the area.⁹

⁶ *PJM Load Forecast Report*, PJM, (Jan. 2019), <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2019-load-report.ashx>

⁷ 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 2019 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>

⁸ *Id.* at 9.

⁹ *Id.* at 11.

Demand forecasts submitted by the Maryland utilities for the 2019 – 2028 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 – 2016, 2017, 2018, and 2019¹⁰

Forecasts	Ten Year Plan 2016-2025	Ten Year Plan 2017-2026	Ten Year Plan 2018-2027	Ten Year Plan 2019-2028
Customer Growth	0.7%	0.8%	0.8%	0.8%
Energy Sales	0.8%	0.4%	-0.5%	-0.2%
Summer Peak Demand	0.5%	0.4%	0.4%	0.3%
Winter Peak Demand	0.6%	0.3%	0.2%	0.3%

A. Customer Growth Forecasts¹¹

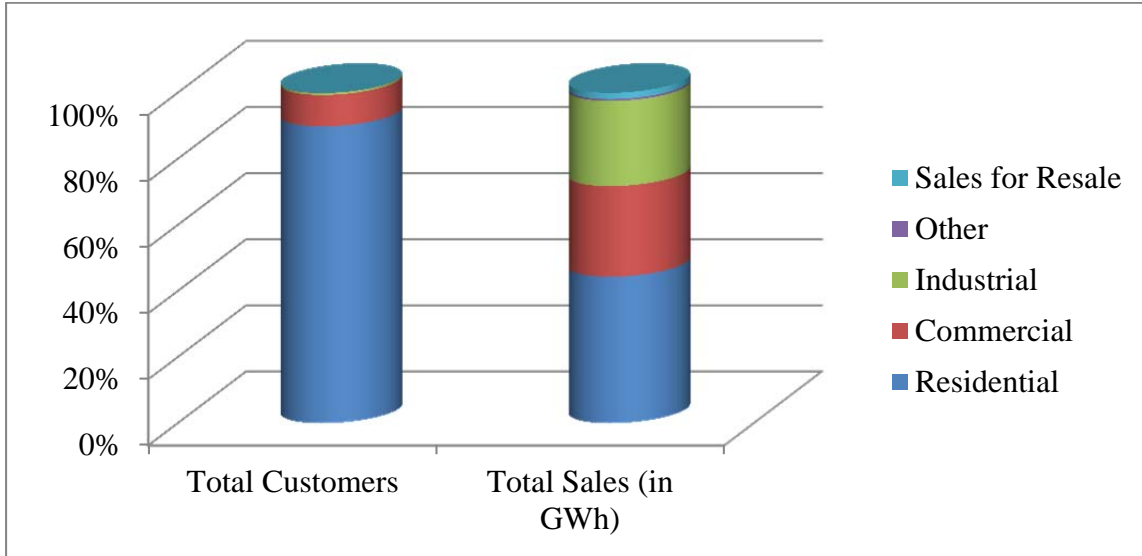
At the close of 2018, approximately 90% of utility customers in Maryland were categorized as residential ratepayers; however, residential sales represented only 44% of the year’s total retail energy sales, as illustrated in Figure 3 below.¹² Conversely, commercial and industrial (“C&I”) customers represented just over 10% of Maryland utility customers, but accounted for over half of the total retail energy sales for the state.

¹⁰ See Appendix Tables 1(a)(i), 2(a)(i), 3(a)(i), 3(a)(iii).

¹¹ See Appendix Table 1(a) for a complete list of utility-by-utility customer growth forecasts.

¹² See Appendix Tables 1(b)(i) and 1(b)(ii).

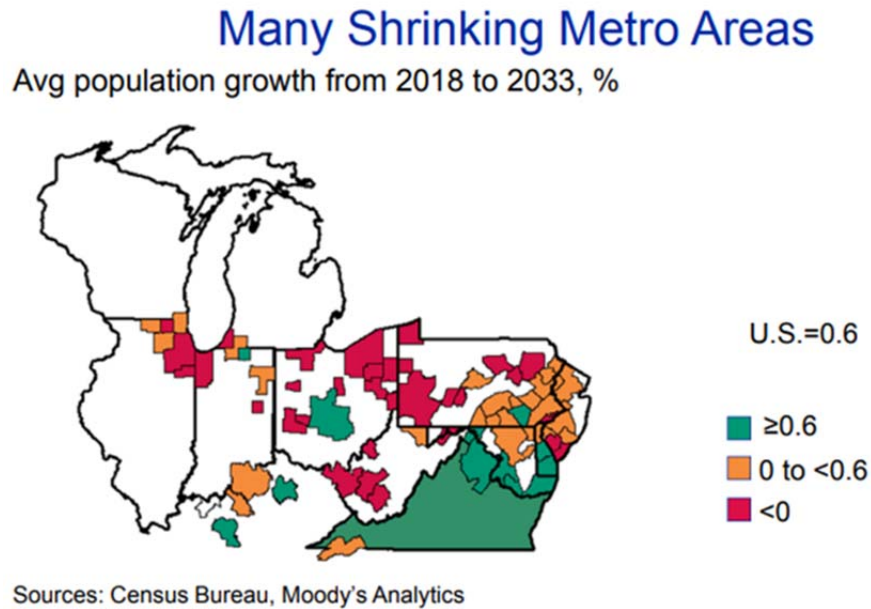
Figure 3 Total Customers and Energy Sales (in GWh) by Customer Class for 2018



Utility customer growth, particularly in the residential sector, is closely linked to household formation projections. The current PJM load forecast incorporates projections of a near-term slow growth in housing formation rates with a more positive long-term forecast.¹³ Over the planning horizon, however, the projected housing formation rates differ widely across the PJM service territory, as evidenced by Figure 4 below.

¹³ *PJM Load Forecast Report*, PJM, (Jan. 2019), <https://www.pjm.com/-/media/library/reports-notices/load-forecast/2019-load-report.ashx>.

Figure 4 Average Annual Household Growth from 2018 to 2033 (%)¹⁴



As illustrated by Figure 4 above, Maryland, along with other southern PJM states, has higher household formation rates than the remaining territory, and thus higher utility customer growth projections. The PJM load forecast attributes the increased household and customer projections to expected growth in service-oriented industries in the applicable states, including Maryland.¹⁵ 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. As reflected in Table 2 below, the statewide forecasted compound annual growth rate during the planning period is 0.78% for all customer classes, which translates into a 7.26% increase in the total number of Maryland customers by the end of this ten-year planning period.

¹⁴ *Id.* at 11.

¹⁵ *Id.*

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Table 2: Maryland Customer Forecast (All Customer Classes)¹⁶

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2019	2,589	1,298,053	54,577	207,259	10,770	17,465	272,224	579,389	169,144	2,872	1,006	2,615,348
2020	2,595	1,305,389	54,987	208,199	10,789	17,509	275,083	584,559	171,454	2,872	1,006	2,634,441
2021	2,608	1,312,904	55,324	209,151	10,808	17,552	277,853	589,035	173,854	2,872	1,006	2,652,968
2022	2,621	1,322,608	55,701	210,117	10,827	17,596	280,758	593,352	176,344	2,872	1,006	2,673,802
2023	2,634	1,333,381	56,075	211,057	10,846	17,640	283,804	597,615	178,824	2,872	1,006	2,695,753
2024	2,660	1,343,629	56,421	212,001	10,865	17,684	286,960	601,911	181,214	2,872	1,006	2,717,223
2025	2,687	1,353,830	56,754	212,949	10,884	17,728	290,279	606,240	183,704	2,872	1,006	2,738,933
2026	2,714	1,364,541	57,058	213,902	10,903	17,772	293,632	610,603	186,594	2,872	1,006	2,761,597
2027	2,741	1,374,695	57,341	214,860	10,922	17,816	296,971	615,000	189,394	2,872	1,006	2,783,618
2028	2,768	1,384,312	57,640	215,822	10,941	17,861	300,305	619,432	192,204	2,872	1,006	2,805,163
Change (2019-2028)	179	86,259	3,063	8,563	171	396	28,081	40,042	23,060	-	-	189,815
Percent Change (2019-2028)	6.93%	6.65%	5.61%	4.13%	1.59%	2.27%	10.32%	6.91%	13.63%	0.00%	0.00%	7.26%
Compound Annual Growth Rate	0.75%	0.72%	0.61%	0.45%	0.18%	0.25%	1.10%	0.75%	1.43%	0.00%	0.00%	0.78%

The customer forecasts provided by the utilities are comparable to the forecasts they provided for the 2018 – 2027 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 178,441 customers by 2028, or 94% of total new customers projected. The largest percentage increase in the number of customers is projected to occur in SMECO’s service territory with an increase of approximately 14%, or 21,300 new residential customers. The largest absolute increase in the number of customers is projected to come from BGE’s residential customer base, with the addition of 82,356 residential customers forecasted during this planning period.¹⁷ BGE’s projected increase in its residential customer base accounts for 46% of the total number of new residential customers across all service territories during the ten-year planning period.¹⁸ The increase in residential customers for BGE translates into a compound annual growth rate of 0.76%.¹⁹

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 0.02% higher than the projections provided during the previous planning period. The most significant percentage change observable in the

¹⁶ 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 2019 data request for the Ten-Year Plan.

¹⁷ See Appendix Table 1(a)(ii).

¹⁸ *Id.*

¹⁹ *Id.*

aggregated statewide data between the previous and current Ten-Year Plan forecasts is within the “Other” customer class,²⁰ largely attributable to an increased projection by PE.

Table 3: Projected Percentage Increase in the Number of Customers by Class, 2019 – 2028²¹

Class	All Utilities		
	2018 to 2027	2019 to 2028	Difference
Residential	7.65%	7.59%	-0.06%
Commercial	3.40%	4.17%	0.77%
Industrial	6.39%	6.74%	0.35%
Other	-1.46%	1.07%	2.54%
Resale	0.00%	0.00%	0.00%
Total Customers	7.23%	7.26%	0.02%

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.”²² 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.

²⁰ 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.

²¹ See Appendix Table 1(a)(i)-(vi) for more information.

²² 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)²³

	Berlin	BGE	Choptank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Total
Change (2019-2028)	3	(189)	26	(570)	13	7	886	(1,472)	220	(1,074)
Percent Change (2019-2028)	7.30%	-0.63%	2.47%	-11.81%	4.78%	2.27%	10.69%	-8.58%	6.12%	-1.64%
Compound Annual Growth Rate	0.79%	-0.07%	0.27%	-1.39%	0.52%	0.25%	1.13%	-0.99%	0.66%	-0.18%

The aggregated forecasts show a compound annual decline of -0.18% across all the Maryland service territories for 2019 – 2028, an increase from the -0.51% annual growth rate reported in the 2018 – 2027 Ten-Year Plan. This result is primarily due to BGE’s revised projections of a higher energy sales growth rate in the 2019 – 2028 Ten-Year Plan. The overall growth projected by Pepco for this ten-year planning period is the lowest of any Maryland utility in absolute terms, with the Company projecting 1,472 GWh less in energy sales by 2028.

C. Peak Load Forecasts

PJM’s 2019 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 2019 Load Forecast Report, the PJM Regional Transmission Organization (“RTO”) will continue to be summer peaking during the next 15 years.²⁷ In 2019, three of the PJM zones of which Maryland is comprised are projected to experience their peak demands during the month of July,²⁸ the same month as the broader PJM Mid-Atlantic Region.²⁹ The APS region is an exception which is projected to experience its peak demands during January.

²³ 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.

²⁴ *PJM Load Forecast Report*, PJM, (Jan. 2019) at 43-46, Table B-1, <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2019-load-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. 2019) at 2, <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2019-load-report.ashx>.

²⁸ *Id.* at 55-56, 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.

In contrast to PJM’s forecasts, Berlin, Easton, and SMECO 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 shows the breakdown of which fuels Maryland households use as a heating source.

Figure 5 Percentage of MD Households Using Fuel for Heating Source³⁰

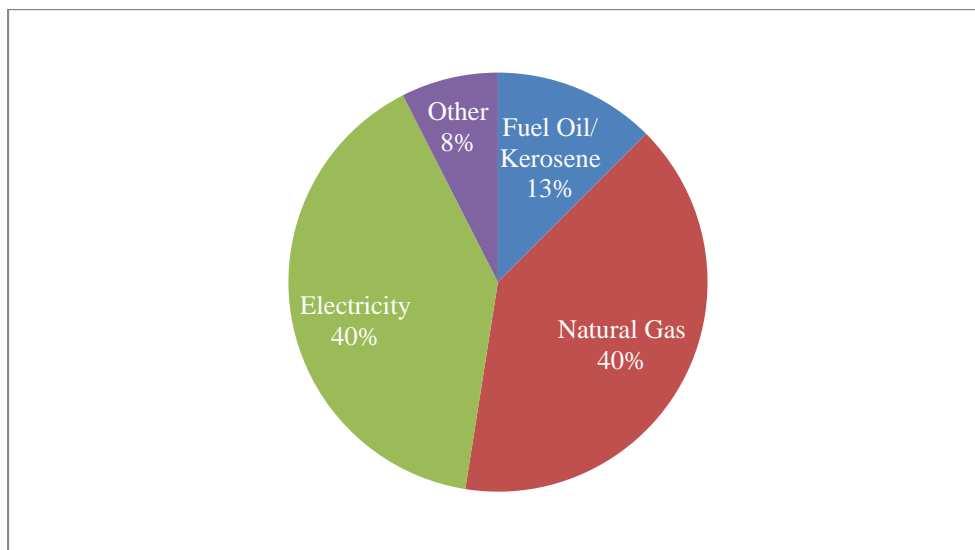
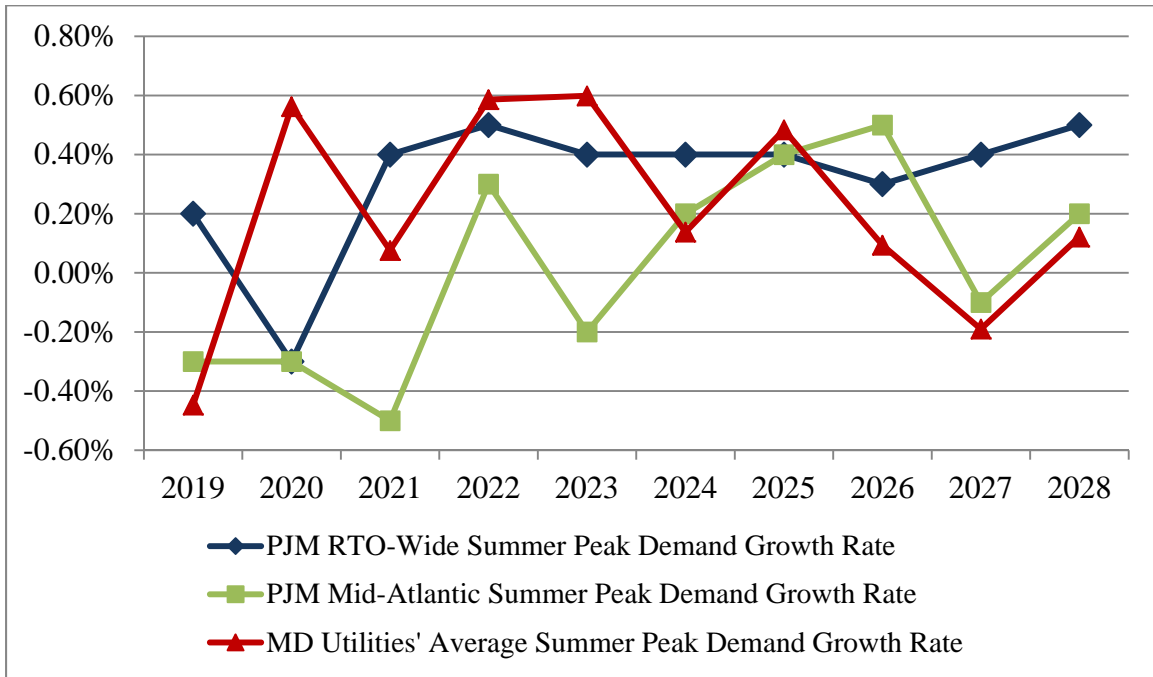


Figure 6 compares the average of the Maryland utilities’ forecasted summer peak demands for their Maryland service territories with summer forecasts for the PJM Mid-Atlantic Region and for the PJM RTO as a whole. As illustrated below, the utilities’ average summer peak demand growth rate follows a similar 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 dip in the summer peak demand growth rates for the Maryland utilities in 2021, after which time the growth rates generally level off through 2028.

³⁰ *Maryland State Energy Profile Analysis*, U.S. Energy Information Administration (September 19, 2019). <https://www.eia.gov/state/analysis.php?sid=MD>

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 2021.

Figure 8 shows that the Utilities’ average gross winter peak growth rate is more stable throughout the ten-year planning period than the average gross summer peak growth rate which rises substantially from 2019 to 2020.

³¹ *PJM Load Forecast Report*, PJM, (Jan. 2019) at 43-46, Table B-1, <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2019-load-report.ashx>.

³² The Utilities’ average summer peak demand growth rates were calculated using the Utilities’ data responses to the Commission’s 2019 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}

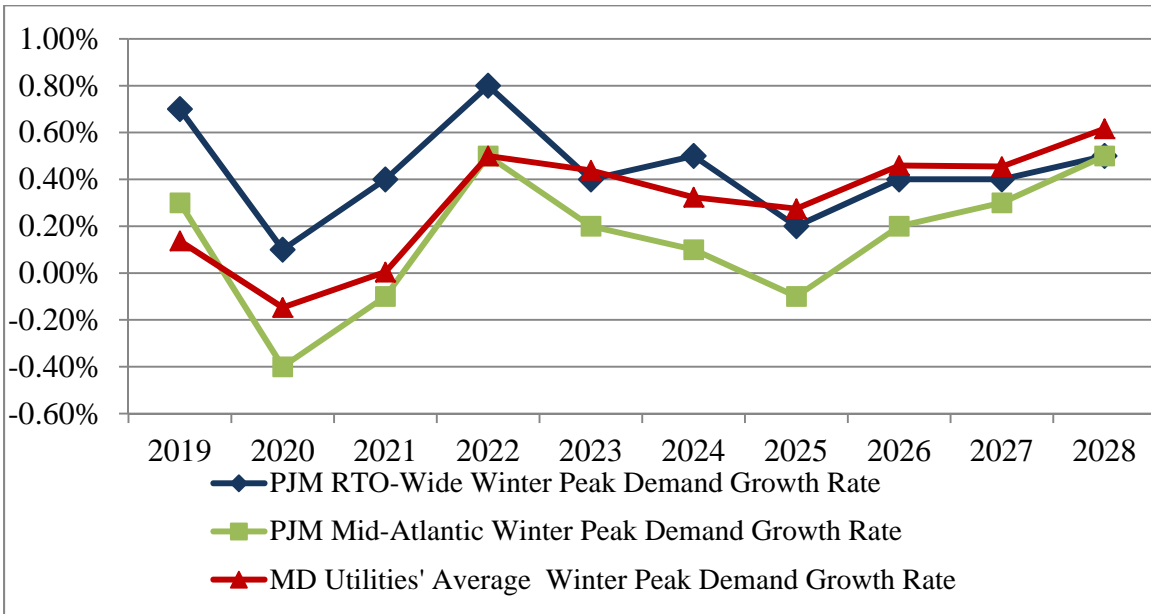
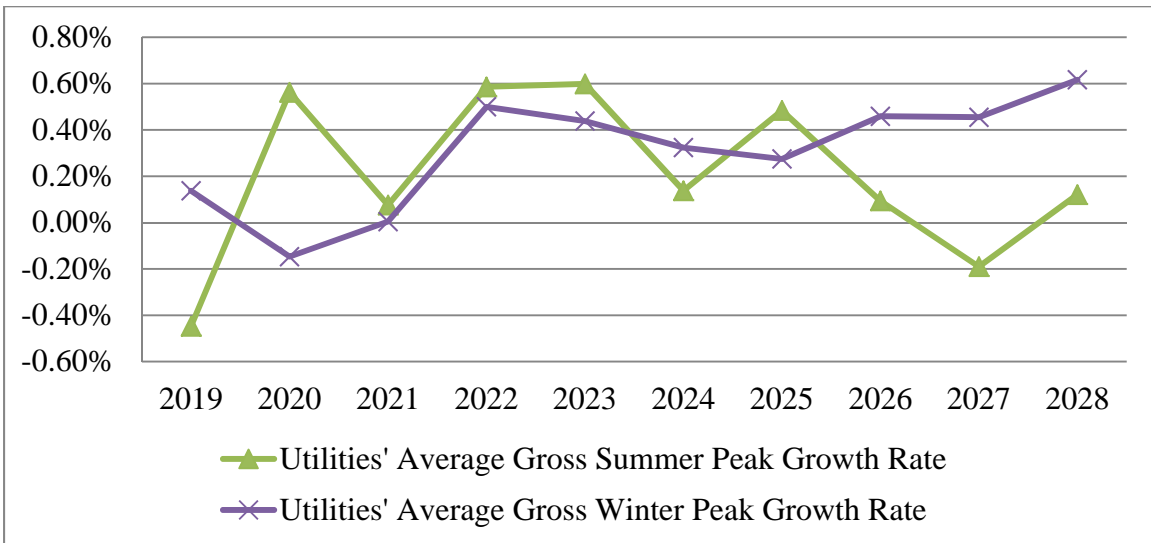


Figure 8 Utilities' Projected Summer Peak Demand Growth Rates (Gross of DSM) Compared to Utilities' Projected Winter Peak Demand Growth Rates (Gross of DSM)



³³ The Utilities' average winter peak demand growth rates were calculated using the Utilities' data responses to the Commission's 2019 data request for the Ten-Year Plan. See Appendix Table 3(a)(iii).

³⁴ PJM Load Forecast Report, PJM, (Jan. 2019) at 47-50, Table B-2, <https://www.pjm.com/-/media/library/reports-notices/load-forecast/2019-load-report.aspx>.

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 0.27% and 0.32%, respectively.³⁵ In 2028, 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 15,096 MW and an expected winter peak demand load (gross of DSM) for Maryland of 13,042 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 (2019-2028)	1	(102)	26	36	2	1	84	296	23	367
Percent Change (2019-2028)	6.69%	-1.52%	8.64%	3.55%	3.87%	2.27%	5.17%	7.28%	2.65%	2.49%
Compound Annual Growth Rate	0.72%	-0.17%	0.92%	0.39%	0.42%	0.25%	0.56%	0.78%	0.29%	0.27%

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 (2019-2028)	6	33	26	31	3	2	197	40	39	375
Percent Change (2019-2028)	40.58%	0.56%	8.78%	3.24%	3.89%	2.27%	11.33%	1.48%	4.11%	2.96%
Compound Annual Growth Rate	3.86%	0.06%	0.94%	0.35%	0.43%	0.25%	1.20%	0.16%	0.45%	0.32%

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

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.

evaluated: BGE, DPL, PE, Pepco, and SMECO (“the Participating Utilities”).⁴¹ According to the Participating Utilities’ Ten-Year Plan forecasts, the DSM programs will save a total of 65,739 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 2019 to 2022. 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 only to the 2018 – 2020 program cycle.⁴² Table 7 shows the growth in demand savings from 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 2019 – 2028 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 Construct.

Table 7: Average Annual Increase in Demand Savings due to DSM Programs from 2019 to 2022 for EE&C Programs⁴³

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-6.5%	10.2%	14.1%	11.9%	0.2%

Table 8: Average Annual Increase in Demand Savings due to DSM Programs from 2019 to 2022 for All DSM Programs⁴⁴

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-2.5%	7.6%	12.7%	11.1%	0.2%

⁴¹ 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/2019-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf>.

⁴² 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 Demand Response Program and CVR, and Dynamic Pricing. The other Participating Utilities assume a level of savings post-2020.

⁴³ Responses to the Commission’s Ten-Year Plan Data Requests.

⁴⁴ *Id.*

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 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 2017, Maryland’s net summer generating capacity was 13,090 MW.⁴⁵ Maryland’s peak demand forecast for 2019, net of utility demand-side management and energy conservation measures, is approximately 12,868 MW.⁴⁶ Maryland had the capability to meet over 101% of its summer peak demand with in-state generation in 2017.⁴⁷ 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 ⁴⁸

PJM in its 2018 Regional Transmission Expansion Plan (“RTEP”) authorized about \$3 billion 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.⁴⁹

⁴⁵ 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 2017. The next anticipated release date is listed as December 2019.

⁴⁶ See Appendix Table 3(a)(ii).

⁴⁷ The peak demand net of DSM programs for the summer of 2017 was 13,266 according to the 2017-2026 Ten-Year Plan. $13,266/13,090 = 101.3\%$

⁴⁸ See Appendix Table 4 for a full list of transmission enhancements proposed by Maryland utilities.

⁴⁹ 2018 Regional Transmission Expansion Plan. PJM, (February 28, 2019) at 2, <https://www.pjm.com/-/media/library/reports-notice/2018-rtep/2018-rtep-book-1.ashx?la=en>.

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. 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 increased by 87.8% (\$612.3 million) between 2017 and 2018.⁵⁰

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 2018 RTEP authorized 10 transmission upgrades for Maryland for approximately \$498 million.⁵¹

Appendix 4 lists all transmission enhancements identified by the Maryland utilities in response to data requests for the Ten-Year Plan. Together, the 17 identified transmission enhancements in Appendix Table 4 account for 44 miles of upgrades.

B. Electricity Imports

Maryland continues to be a net importer of electricity, similar to many other states in PJM.⁵² As of 2017, 47% of the electricity consumed in the state is imported from other states and internationally.⁵³ Nine of the 13 PJM states plus the District of Columbia are

⁵⁰ Monitoring Analytics, *State of the Market Report for PJM - 2018*, PJM, (March 14, 2019) at 512, https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2018/2018-som-pjm-sec11.pdf.

⁵¹ 2018 Maryland and District of Columbia Infrastructure Report, PJM, at 18-22, (May 2019), <https://www.pjm.com/-/media/library/reports-notice/state-specific-reports/2018/2018-maryland-dc-state-data.ashx?la=en>.

⁵² 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.

⁵³ *State Electricity Profiles 2017*, U.S. Energy Information Administration, (January 8, 2019) at Table 10, <https://www.eia.gov/electricity/state/maryland/xls/md.xlsx>.

net importers of electricity. In a nationwide comparison, Maryland is the third largest electricity importer based on percentage of electricity sales, importing 47% of its electricity in 2017.⁵⁴ Only the District of Columbia and Vermont exceed Maryland in the percentage of electricity sales that are imported. In contrast, as of 2017, the states within the PJM region that exported more electricity in aggregate than consumed within each state are: Illinois, Pennsylvania, Michigan, and West Virginia.⁵⁵

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. By 2017, however, in-state resources generated slightly over 34 million MWh.⁵⁶ 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. According to EIA, Maryland is ranked 42nd in the country for per capita energy consumption.⁵⁷

C. Maryland Capacity and Generation Profiles

The capacity and generation profiles of in-state resources must be comprehensively analyzed for both short-term and long-term reliability planning purposes, due to the uncertain future of coal-fired generation.⁵⁸ 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.⁵⁹

1. Conventional Capacity and Generation Profiles, 2018

Coal-fired power plants represent 29% of the electric generating capacity in Maryland, of which 86% of such capacity is aged 31 years or older. Within this category, 38% is considered “at-risk,” as defined by PJM.⁶⁰ Table 9 and Table 10 below depict the electric generating capacity in Maryland, as well as the age of plants by fuel type.⁶¹

⁵⁴ *State Electricity Profiles 2017*, U.S. Energy Information Administration, (January 8, 2019), at Table 10 (for each state, <https://www.eia.gov/electricity/state/index.php>).

⁵⁵ *Id.*

⁵⁶ *Electricity Power Industry Generation by Primary Energy Source, 1990-2016 Maryland*, U.S. Energy Information Administration, (September 2018) at: https://www.eia.gov/electricity/data/state/annual_generation_state.xls.

⁵⁷ *Maryland State Energy Profile*, U.S. Energy Information Administration (September 19, 2019), <https://www.eia.gov/state/print.php?sid=MD>

⁵⁸ 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.

⁵⁹ 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.

⁶⁰ 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.

⁶¹ See Appendix Table 5 for a complete list of Maryland generation capacity in 2018.

Table 9: Maryland Summer Peak Capacity Profile, 2018⁶²

Primary Fuel Type	Capacity	
	Summer (MW)	Percent of Total
Coal	4,327.0	29.3%
Oil	1,276.9	8.6%
Natural Gas	6,243.2	42.3%
Nuclear	1,725.8	11.7%
Hydroelectric	590.0	4.0%
Other and Renewables	607.4	4.1%
Total	14,770.3	100.0%

Table 10: Age of Maryland Generation by Fuel Type, 2018⁶³

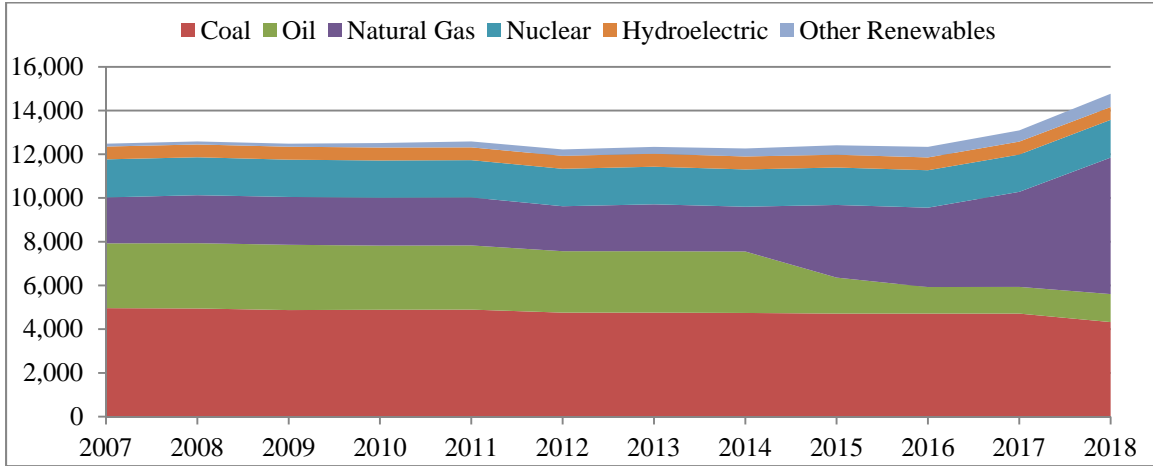
Primary Fuel Type	Age of Plants, By Percent			
	1-10 Years	11-20 Years	21-30 Years	31+ Years
Coal	0%	7%	7%	86%
Oil	5%	10%	16%	69%
Natural Gas	37%	19%	16%	29%
Nuclear	0%	0%	0%	100%
Hydroelectric	0%	0%	0%	100%
Other and Renewables	69%	25%	1%	6%

Maryland’s summer peak capacity profile increased by 1,261 MW in 2018 compared to 2017, as illustrated in Figure 9. The new capacity added in 2018 can be largely attributed to increases in natural gas. While renewables accounted for a small part of the increase, the amount of renewable capacity increased by over 18% from 2017 to 2018.

⁶² Report EIA-860: “3_1_Generator_Y2018” Excel, U.S. Energy Information Administration (September 3, 2019), <https://www.eia.gov/electricity/data/eia860/>.

⁶³ *Id.*

Figure 9 Maryland Summer Capacity Profile (MW), 2007 – 2018⁶⁴



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.⁶⁵ Conversely, oil and certain natural gas facilities, which operate as mid-merit or peaking units that come on-line when needed, generate 20% of the electric energy produced in Maryland while representing 51% of in-state capacity. Table 11 summarizes Maryland’s 2017 in-state generation profile according to fuel source.

Table 11: Maryland Generation Profile, 2017⁶⁶

Primary Fuel Source	Generation	
	Annual (MWh)	Percent of Total
Coal	8,514,009	25.0%
Oil	102,181	0.3%
Gas	6,729,174	19.7%
Nuclear	15,106,988	44.3%
Hydroelectric	1,965,459	5.8%
Other & Renewables	1,686,429	4.9%
Total	34,104,240	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

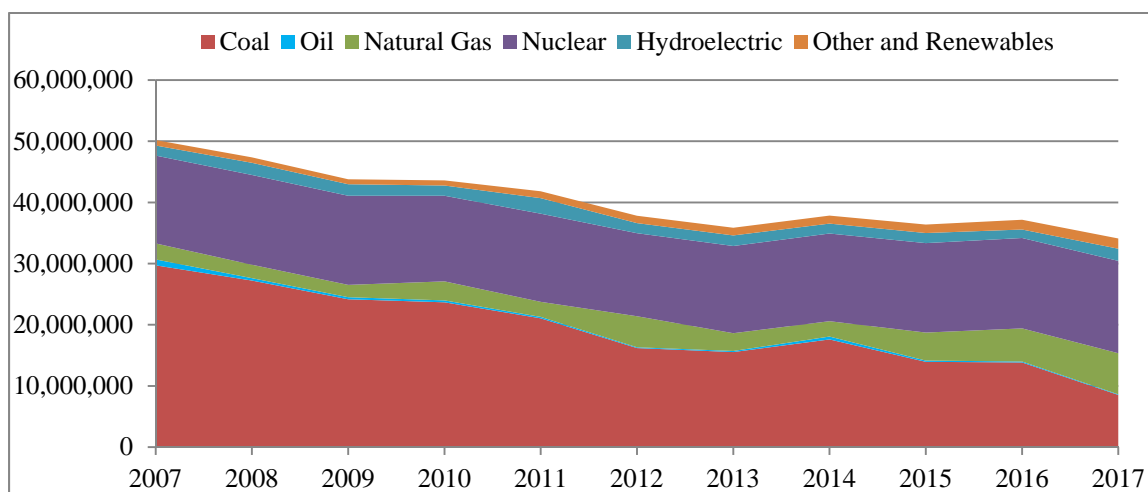
⁶⁴ U.S. Energy Information Administration, Form EIA-923, “Power Plant Operations Report.”

⁶⁵ 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.

⁶⁶ *State Electricity Profiles 2017*, U.S. Energy Information Administration, (January 8, 2019) at Table 5, https://www.eia.gov/electricity/state/maryland/state_tables.php.

evolve as illustrated in Figure 10 below. Between 2007 and 2017, in-state coal generation decreased by 21,185 GWhs, a percentage drop of 59.2% in 2007, to roughly 25% in 2017.

Figure 10 Maryland Generation Profile, 2007 – 2017⁶⁷



The standard life expectancy for coal generation facilities is approximately 40 years, though extensions can often be granted for up to 60 years. This assessment places a significant percentage of total Maryland coal generation capacity at or near the end of its normal operational life, a fact made especially concerning considering that coal generation facilities provided 25% of the in-state generation in 2017. If operational extensions for Maryland coal generation units are not requested, the need for additional in-state resources will be further necessitated to avoid potential reliability concerns.

PJM lists four plants retired in 2018—two coal powered plants, one oil-fired combustion turbine, and one landfill gas generator,— totaling just over 400 MW in capacity.⁶⁸ There are 12 pending deactivation requests in the BGE service territory with a combined capacity of 403 MWs; while PJM currently registers 9.0 GW of capacity resources requesting deactivation within the RTO.⁶⁹ PJM completed a reliability analysis and identified no reliability impacts associated with these deactivation requests in Maryland.

2. Proposed Conventional Generation Additions⁷⁰

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.

⁶⁷ *Electricity Power Industry Generation by Primary Energy Source, 1990-2017* Maryland, U.S. Energy Information Administration, (January 8, 2019) at Table 5, <https://www.eia.gov/electricity/state/maryland/xls/md.xlsx>.

⁶⁸ Generation Deactivations, PJM, <https://www.pjm.com/planning/services-requests/gen-deactivations.aspx>.

⁶⁹ *Id.*

⁷⁰ See Appendix Table 6 for a complete list of new renewable generation proposed in Maryland.

As of the date of this report, there were 942 MWs of proposed new generation active in the PJM queue, with over 58% consisting of solar projects.⁷¹

3. Renewable Generation and Proposed Additions⁷²

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 641 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

Transmission Owner	Fuel Type	In-Service Date Range	Total Capacity (MW)
APS	Solar	2020-2022	90.72
	Hydro	2019	15
DPL	Wind	2021	1.9
	Solar	2019	475.22
Pepco	Solar	2019-2020	13.0054
SMECO	Solar	2020-2021	45.6
Total (MW):			641.4

The amount of solar resources in Maryland will continue to increase due to a suite of state policy initiatives: the requirement that the Renewable Portfolio Standard (“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. Additionally, the Clean Energy Jobs Act of 2019, enacted in May 2019, increases the RPS requirements from 25% by 2020 to 50% by 2030. This includes increasing the solar carve-out to 14.5%.

⁷¹ New Services Queue, PJM (August, 2019), <https://www.pjm.com/planning/services-requests/interconnection-queues.aspx>.

⁷² Maryland’s Renewable Portfolio Standard has helped incent new renewable generation capacity in Maryland via Renewable Energy Credits (“RECs”) and the Alternative Compliance Payments submitted to the Strategic Energy Investment Fund. RECs are the environmental attributes of renewable generation, and are separate from the actual electricity generation from Maryland’s renewable resources. Approximately 20% of the new capacity is located within Maryland and 80% is located in other states. More details can be found at the *Renewable Energy Standard Report*; available at: <https://www.psc.state.md.us/wp-content/uploads/FINAL-Renewable-Energy-Portfolio-Standard-Report-with-data-for-CY-2017.pdf>.

On May 11, 2017, the Commission approved two offshore wind projects in compliance with the Maryland Offshore Wind Energy Act of 2013.⁷³ The two projects total 368 MW in capacity and are projected to be producing energy within the 2019-2028 planning period. Both projects are currently working with the Bureau of Ocean Energy Management (“BOEM”), the federal agency responsible for overseeing the development of energy projects located offshore in federal waters, for approval to begin construction. The Clean Energy and Jobs Act of 2019 requires the Commission to begin accepting applications for additional offshore wind projects in 2020, 2021, and 2022 for at least 1,200 MW of additional capacity.

The increasing renewable generation penetration may have the potential to impact the grid, and the Commission will continue to monitor the successful integration of these renewables. The Maryland Department of Natural Resources (“DNR”) 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. A final report will be submitted to the General Assembly by December 1, 2019. Additionally, with the passage of the Clean Energy Jobs Act of 2019, DNR is required to perform a supplemental study to assess the overall costs and benefits of increasing the renewable energy portfolio standard to a goal of 100% renewable energy by 2040. The Commission will continue to monitor the status of the reports.

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 79.7% of Maryland’s emission-free electricity.⁷⁴ The Clean Energy and Jobs Act of 2019 also required DNR to conduct an additional study on the relevancy and outlook for nuclear capacity on Maryland’s generating portfolio both currently and in the future.

5. Storage

The Energy Storage Pilot Project Act was passed in 2019 and requires the Commission to establish an energy storage pilot program. The investor-owned electric companies are required to seek Commission approval for two storage pilot projects in 2020, and the Commission is required to decide on the pilots by 2021. There are also several storage projects in the PJM queue that are projected to begin operating in the near future as illustrated in Table 13 below.

⁷³ Case No. 9431, *In the Matter of the Applications of US Wind, Inc. and Skipjack Offshore Energy, LLC for a Proposed Offshore Wind Project(s) Pursuant to the Maryland Offshore Wind Energy Act of 2013*. Order No. 88192 (May 17, 2017).

⁷⁴ *Maryland Fact Sheet*, NEI, <https://www.nei.org/resources/fact-sheets/maryland>.

**Table 13 Proposed New Storage Generation in Maryland PJM Queue Effective
Date: August 2019**

Transmission Owner	Project Name	County Location	PJM Queue Status	PJM Queue #	Project Capacity (MW)	Projected In-Service Date
DPL	Todd 69 kV	Dorchester	Active	AE1-087	16	12/31/2021
SMECO	Hughesville 69 kV	Charles	Active	AE1-231	9.4	7/31/2020
APS	Carlos Junction-Lonaconing 34.5 kV	Allegany	Active	AE2-309	16.66	10/30/2020
BGE	C.P. Crane 115 kV	Baltimore	Active	AF1-037	200	6/1/2021
				Total	242.06	

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 (“BRA”). 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 BRA.⁷⁵ Once PJM completes its RTEP and conducts the RPM BRA, PJM is in a 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.

⁷⁵ PJM Manual 18: PJM Capacity Market, Section 1: Overview of the PJM Capacity Market Reliability Pricing Model, PJM Markets & Operations (last visited October 1, 2019), <https://www.pjm.com/directory/manuals/m18/index.html#Sections/Section%201%20Overview%20of%20the%20PJM%20Capacity%20Market.html>.

The Mid-Atlantic Advisory Council (“MAAC”) LDA⁷⁶ has experienced significant volatility in Net Zonal Load⁷⁷ 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 14 PJM BRA Capacity Prices by Zone⁷⁸

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	\$79.53	\$86.04	\$187.87	\$86.04	\$76.53
2021/2022	\$140.00	\$200.30	\$165.73	\$140.00	\$140.00

On July 25, 2019, FERC issued an Order⁷⁹ directing PJM not to run the BRA in August 2019 as FERC had found PJM’s Tariff unduly discriminatory because it fails to protect the capacity market from certain resources. As a result, PJM has suspended all auction activities and deadlines relating to the BRAs for the 2022/2023 and 2023/2024 Delivery Years. PJM is awaiting a FERC Order approving PJM’s proposal addressing the discriminatory practices. Once the tariff is approved, PJM will work with the stakeholder community to develop a timeline for future BRAs in accordance with the new rules.

⁷⁶ MAAC includes the South-West MAAC (“SWMAAC”) which is the zone serving central Maryland.

⁷⁷ The Zonal Net Load capacity price reflects the BRA resource clearing price and credits from any transmission capacity transfer rights.

⁷⁸ *PJM RPM Auction User Information: Delivery Year*, PJM Markets & Operations (Delivery Years 2012-2022), <https://www.pjm.com/markets-and-operations/rpm.aspx>.

⁷⁹ Docket Nos. EL16-49-000.

V. Conclusion

Electricity sector planning will continue to be effected by several different issues over the next 10 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 2019 – 2028 planning horizon, while energy sales are expected to drop through this period. In response to these and other developments, the 2020 – 2029 Ten-Year Plan will enable continued review and assessment of the impacts that the above-mentioned issues will have on Maryland's long-term electricity resource planning.

VI. Appendices to the Public Service Commission of Maryland's Ten-Year Plan (2019 – 2028) 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
2019	2,589	1,298,053	54,577	207,259	10,770	17,465	272,224	579,389	169,144	2,872	1,006	2,615,348
2020	2,595	1,305,389	54,987	208,199	10,789	17,509	275,083	584,559	171,454	2,872	1,006	2,634,441
2021	2,608	1,312,904	55,324	209,151	10,808	17,552	277,853	589,035	173,854	2,872	1,006	2,652,968
2022	2,621	1,322,608	55,701	210,117	10,827	17,596	280,758	593,352	176,344	2,872	1,006	2,673,802
2023	2,634	1,333,381	56,075	211,057	10,846	17,640	283,804	597,615	178,824	2,872	1,006	2,695,753
2024	2,660	1,343,629	56,421	212,001	10,865	17,684	286,960	601,911	181,214	2,872	1,006	2,717,223
2025	2,687	1,353,830	56,754	212,949	10,884	17,728	290,279	606,240	183,704	2,872	1,006	2,738,933
2026	2,714	1,364,541	57,058	213,902	10,903	17,772	293,632	610,603	186,594	2,872	1,006	2,761,597
2027	2,741	1,374,695	57,341	214,860	10,922	17,816	296,971	615,000	189,394	2,872	1,006	2,783,618
2028	2,768	1,384,312	57,640	215,822	10,941	17,861	300,305	619,432	192,204	2,872	1,006	2,805,163
Change (2019-2028)	179	86,259	3,063	8,563	171	396	28,081	40,042	23,060	-	-	189,815
Percent Change (2019-2028)	6.93%	6.65%	5.61%	4.13%	1.59%	2.27%	10.32%	6.91%	13.63%	0.00%	0.00%	7.26%
Compound Annual Growth Rate	0.75%	0.72%	0.61%	0.45%	0.18%	0.25%	1.10%	0.75%	1.43%	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
2019	2,122	1,171,328	49,024	179,529	8,403	14,863	239,008	530,035	153,500	2,488	846	2,351,145
2020	2,127	1,178,231	49,393	180,238	8,416	14,900	241,560	535,200	155,600	2,488	846	2,368,999
2021	2,138	1,185,313	49,695	180,975	8,429	14,937	243,995	539,711	157,800	2,488	846	2,386,327
2022	2,148	1,194,584	50,034	181,711	8,442	14,975	246,549	544,015	160,100	2,488	846	2,405,893
2023	2,159	1,204,924	50,371	182,445	8,455	15,012	249,237	548,261	162,400	2,488	846	2,426,598
2024	2,181	1,214,738	50,680	183,183	8,468	15,050	252,027	552,540	164,600	2,488	846	2,446,800
2025	2,202	1,224,505	50,979	183,923	8,481	15,087	254,966	556,852	166,900	2,488	846	2,467,230
2026	2,224	1,234,782	51,253	184,667	8,494	15,125	257,939	561,198	169,600	2,488	846	2,488,616
2027	2,247	1,244,501	51,508	185,413	8,507	15,163	260,899	565,578	172,200	2,488	846	2,509,350
2028	2,269	1,253,684	51,776	186,163	8,520	15,201	263,848	569,992	174,800	2,488	846	2,529,587
Change (2019-2028)	147	82,356	2,752	6,634	117	338	24,840	39,958	21,300	-	-	178,441
Percent Change (2019-2028)	6.94%	7.03%	5.61%	3.70%	1.39%	2.27%	10.39%	7.54%	13.88%	0.00%	0.00%	7.59%
Compound Annual Growth Rate	0.75%	0.76%	0.61%	0.40%	0.15%	0.25%	1.10%	0.81%	1.45%	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
2019	320	114,142	5,299	27,281	2,367	2,554	30,208	49,237	15,640	337	138	247,522
2020	321	114,456	5,338	27,511	2,373	2,560	30,521	49,241	15,850	337	138	248,646
2021	323	114,770	5,372	27,728	2,379	2,566	30,862	49,206	16,050	337	138	249,731
2022	324	115,084	5,408	27,957	2,385	2,573	31,220	49,219	16,240	337	138	250,884
2023	326	115,397	5,444	28,162	2,391	2,579	31,583	49,236	16,420	337	138	252,014
2024	329	115,711	5,478	28,369	2,397	2,586	31,955	49,253	16,610	337	138	253,163
2025	332	116,025	5,511	28,577	2,403	2,592	32,339	49,270	16,800	337	138	254,325
2026	336	116,339	5,540	28,786	2,409	2,599	32,724	49,287	16,990	337	138	255,485
2027	339	116,653	5,567	28,998	2,415	2,605	33,107	49,304	17,190	337	138	256,653
2028	342	116,967	5,596	29,210	2,421	2,612	33,498	49,321	17,400	337	138	257,842
Change (2019-2028)	22	2,825	297	1,929	54	58	3,291	84	1,760	-	-	10,320
Percent Change (2019-2028)	7.02%	2.47%	5.60%	7.07%	2.28%	2.27%	10.89%	0.17%	11.25%	0.00%	0.00%	4.17%
Compound Annual Growth Rate	0.76%	0.27%	0.61%	0.76%	0.25%	0.25%	1.16%	0.02%	1.19%	0.00%	0.00%	0.45%

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
2019	125	12,325	27	182	0	48	2,674	0	4	9	14	15,409
2020	125	12,449	27	182	0	48	2,666	0	4	9	14	15,524
2021	126	12,572	27	182	0	48	2,656	0	4	9	14	15,638
2022	126	12,695	27	182	0	48	2,647	0	4	9	14	15,753
2023	127	12,819	27	182	0	48	2,638	0	4	9	14	15,868
2024	128	12,942	28	182	0	48	2,629	0	4	9	14	15,985
2025	129	13,065	28	182	0	48	2,621	0	4	9	14	16,101
2026	131	13,189	28	182	0	48	2,612	0	4	9	14	16,217
2027	132	13,312	28	182	0	48	2,603	0	4	9	14	16,332
2028	133	13,435	28	182	0	48	2,594	0	4	9	14	16,448
Change (2019-2028)	8	1,110	1	-	-	-	(80)	-	-	-	-	1,039
Percent Change (2019-2028)	6.69%	9.01%	3.70%	0.00%	N/A	0.00%	-3.00%	N/A	0.00%	0.00%	0.00%	6.74%
Compound Annual Growth Rate	0.72%	0.96%	0.40%	0.00%	N/A	0.00%	-0.34%	N/A	0.00%	0.00%	0.00%	0.73%

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
2019	22	258	227	267	0	0	332	118	0	38	8	1,269
2020	22	253	229	267	0	0	334	118	0	38	8	1,269
2021	22	249	230	267	0	0	336	118	0	38	8	1,268
2022	22	245	232	267	0	0	339	118	0	38	8	1,269
2023	22	241	233	267	0	0	342	118	0	38	8	1,270
2024	23	238	235	267	0	0	346	118	0	38	8	1,272
2025	23	234	236	267	0	0	350	118	0	38	8	1,274
2026	23	231	237	267	0	0	354	118	0	38	8	1,277
2027	23	229	238	267	0	0	358	118	0	38	8	1,279
2028	23	226	240	267	0	0	363	118	0	38	8	1,283
Change (2019-2028)	1	(32)	13	-	-	-	31	-	-	-	-	14
Percent Change (2019-2028)	6.69%	-12.29%	5.73%	0.00%	N/A	N/A	9.30%	0.00%	N/A	0.00%	0.00%	1.07%
Compound Annual Growth Rate	0.72%	-1.45%	0.62%	0.00%	N/A	N/A	0.99%	0.00%	N/A	0.00%	0.00%	0.12%

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
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
2028	0	0	0	0	0	0	3	0	0	0	0	3
Change (2019-2028)	-	-	-	-	-	-	-	-	-	-	-	-
Percent Change (2019-2028)	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, 2018 (number of customers)

Utility	System Wide						Maryland					
	Residential	Commercial	Industrial	Other	Sales for Resale	Total	Residential	Commercial	Industrial	Other	Sales for Resale	Total
Berlin	2,091	316	123	22	0	2,552	2,091	316	123	22	0	2,552
BGE	1,164,646	113,822	12,196	266	0	1,290,931	1,164,646	113,822	12,196	266	0	1,290,931
Choptank	48,505	5,243	26	225	0	53,998	48,505	5,243	26	225	0	53,998
DPL	462,040	62,167	364	623	0	525,194	178,457	26,941	183	268	0	205,848
Easton	8,355	2,370	0	0	0	10,725	8,355	2,370	0	0	0	10,725
Hagerstown	14,863	2,554	48	0	0	17,465	14,863	2,554	48	0	0	17,465
PE	358,828	46,752	4,536	625	0	410,741	235,944	29,323	2,662	319	2	268,250
PEPCO	801,755	76,956	0	145	0	878,856	526,069	50,463	-	117	0	576,649
SMECO	150,168	15,273	6	393	0	165,840	150,168	15,273	6	393	0	165,840
Thurmont	2,490	334	9	38	0	2,871	2,490	334	9	38	0	2,871
William-sport	844	136	15	8	0	1,003	844	136	15	8	0	1,003
Total	3,014,584	325,923	17,324	2,346	-0	3,360,176	2,332,431	246,774	15,268	1,656	2	2,596,130

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' 2018 Energy Sales by Customer Class (GWh)

Utility	System Wide						Maryland					
	Residential	Commercial	Industrial	Other	Sales for Resale	Total	Residential	Commercial	Industrial	Other	Sales for Resale	Total
Berlin	28	3	16	0	0	47	28	3	16	0	0	47
BGE	13,017	3,031	13,916	268	0	30,232	13,017	3,031	13,916	268	0	30,232
Choptank	718	237	94	1	0	1,051	718	237	94	1	0	1,051
DPL	5,469	5,210	1,835	45	0	12,559	2,245	1,686	375	12	0	4,318
Easton	115	148	0	0	0	263	115	148	0	0	0	263
Hagerstown	167	96	60	-	0	323	167	96	60	-	0	323
PE	5,312	2,963	2,539	22	1,214	12,050	3,372	2,115	1,660	16	1,179	8,342
PEPCO	8,473	17,266	-	145	0	25,883	5,888	8,611	-	66	0	14,565
SMECO	2,277	1,286	51	7	0	3,621	2,277	1,286	51	7	0	3,621
Thurmont	39	16	24	1	0	81	39	16	24	1	0	81
William-sport	10	3	7	0	0	20	10	3	7	0	0	20
Total	35,625	30,260	18,543	490	1,214	86,131	27,876	17,233	16,204	371	1,179	62,863

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
2019	46	29,993	1,061	4,824	264	323	8,287	17,162	3,604	80	20	65,663
2020	46	30,030	1,047	4,866	265	324	8,327	17,480	3,666	80	20	66,152
2021	46	29,440	1,040	4,801	267	325	8,402	17,664	3,658	80	20	65,743
2022	47	29,448	1,043	4,760	268	325	8,530	17,802	3,683	80	20	66,007
2023	47	29,441	1,040	4,730	270	326	8,652	17,739	3,694	80	20	66,040
2024	47	29,530	1,040	4,630	271	327	8,767	17,301	3,711	80	20	65,724
2025	48	29,527	1,047	4,532	272	328	8,852	16,878	3,727	80	20	65,312
2026	48	29,614	1,060	4,437	274	329	8,938	16,468	3,757	80	20	65,026
2027	49	29,723	1,077	4,344	275	330	9,043	16,073	3,788	80	20	64,801
2028	49	29,804	1,088	4,254	277	330	9,172	15,690	3,824	80	20	64,589
Change (2019-2028)	3	(189)	26	(570)	13	7	886	(1,472)	220	-	-	(1,074)
Percent Change (2019-2028)	7.30%	-0.63%	2.47%	-11.81%	4.78%	2.27%	10.69%	-8.58%	6.12%	0.00%	0.00%	-1.64%
Compound Annual Growth Rate	0.79%	-0.07%	0.27%	-1.39%	0.52%	0.25%	1.13%	-0.99%	0.66%	0.00%	0.00%	-0.18%

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
2019	46	29,313	1,060	4,130	264	323	7,494	14,213	3,536	80	20	60,480
2020	46	29,299	1,046	4,099	265	324	7,426	14,135	3,595	80	20	60,335
2021	46	29,193	1,039	3,960	267	325	7,388	13,930	3,587	80	20	59,833
2022	47	29,189	1,042	3,845	268	325	7,401	13,679	3,612	80	20	59,508
2023	47	29,182	1,040	3,742	270	326	7,410	13,226	3,622	80	20	58,964
2024	47	29,271	1,039	3,641	271	327	7,548	12,788	3,639	80	20	58,672
2025	48	29,268	1,046	3,544	272	328	7,633	12,365	3,655	80	20	58,259
2026	48	29,355	1,059	3,448	274	329	7,718	11,955	3,686	80	20	57,973
2027	49	29,464	1,076	3,356	275	330	7,823	11,559	3,716	80	20	57,747
2028	49	29,545	1,087	3,266	277	330	7,951	11,177	3,753	80	20	57,534
Change (2019-2028)	3	232	26	(864)	13	7	456	(3,036)	216	-	-	(2,946)
Percent Change (2019-2028)	7.30%	0.79%	2.49%	-20.93%	4.78%	2.27%	6.09%	-21.36%	6.12%	0.00%	0.00%	-4.87%
Compound Annual Growth Rate	0.79%	0.09%	0.27%	-2.58%	0.52%	0.25%	0.66%	-2.63%	0.66%	0.00%	0.00%	-0.55%

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
2019	46	29,993	1,061	12,895	264	323	15,729	28,699	3,604	80	20	92,713
2020	46	30,030	1,047	13,035	265	324	15,920	29,071	3,666	80	20	93,505
2021	46	29,440	1,040	13,107	267	325	16,090	29,273	3,658	80	20	93,344
2022	47	29,448	1,043	13,169	268	325	16,285	29,425	3,683	80	20	93,794
2023	47	29,441	1,040	13,252	270	326	16,511	29,368	3,694	80	20	94,048
2024	47	29,530	1,040	13,224	271	327	16,690	28,827	3,711	80	20	93,766
2025	48	29,527	1,047	13,200	272	328	16,828	28,301	3,727	80	20	93,379
2026	48	29,614	1,060	13,180	274	329	16,966	27,790	3,757	80	20	93,118
2027	49	29,723	1,077	13,162	275	330	17,127	27,294	3,788	80	20	92,924
2028	49	29,804	1,088	13,148	277	330	17,315	26,812	3,824	80	20	92,748
Change (2019-2028)	3	(189)	26	253	13	7	1,587	(1,887)	220	-	-	34
Percent Change (2019-2028)	7.30%	-0.63%	2.47%	1.96%	4.78%	2.27%	10.09%	-6.57%	6.12%	0.00%	0.00%	0.04%
Compound Annual Growth Rate	0.79%	-0.07%	0.27%	0.22%	0.52%	0.25%	1.07%	-0.75%	0.66%	0.00%	0.00%	0.00%

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
2019	46	29,313	1,060	12,144	264	323	14,879	25,160	3,536	80	20	86,826
2020	46	29,299	1,046	12,171	265	324	14,961	25,038	3,595	80	20	86,845
2021	46	29,193	1,039	12,130	267	325	15,017	24,738	3,587	80	20	86,441
2022	47	29,189	1,042	12,079	268	325	15,099	24,381	3,612	80	20	86,142
2023	47	29,182	1,040	12,048	270	326	15,211	23,824	3,622	80	20	85,669
2024	47	29,271	1,039	12,021	271	327	15,413	23,283	3,639	80	20	85,412
2025	48	29,268	1,046	11,997	272	328	15,551	22,757	3,655	80	20	85,023
2026	48	29,355	1,059	11,976	274	329	15,688	22,247	3,686	80	20	84,761
2027	49	29,464	1,076	11,959	275	330	15,848	21,750	3,716	80	20	84,567
2028	49	29,545	1,087	11,944	277	330	16,036	21,268	3,753	80	20	84,390
Change (2019-2028)	3	232	26	(200)	13	7	1,157	(3,892)	216	-	-	(2,436)
Percent Change (2019-2028)	7.30%	0.79%	2.49%	-1.65%	4.78%	2.27%	7.78%	-15.47%	6.12%	0.00%	0.00%	-2.81%
Compound Annual Growth Rate	0.79%	0.09%	0.27%	-0.18%	0.52%	0.25%	0.84%	-1.85%	0.66%	0.00%	0.00%	-0.32%

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
2019	11	6,697	301	1,023	58	60	1,618	4,060	882	14	4	14,729
2020	11	6,689	304	1,024	58	61	1,634	4,125	888	14	4	14,812
2021	11	6,608	308	1,027	59	61	1,653	4,188	890	14	4	14,823
2022	11	6,584	311	1,035	59	61	1,673	4,266	892	14	4	14,910
2023	11	6,568	315	1,043	59	61	1,693	4,337	894	14	4	14,999
2024	11	6,574	319	1,046	59	61	1,692	4,343	896	14	4	15,020
2025	11	6,636	321	1,050	60	61	1,694	4,343	898	14	4	15,092
2026	11	6,638	323	1,053	60	61	1,696	4,345	900	14	4	15,107
2027	11	6,598	323	1,054	60	62	1,699	4,350	902	14	4	15,078
2028	11	6,595	327	1,059	60	62	1,702	4,356	905	14	4	15,096
Change (2019-2028)	1	(102)	26	36	2	1	84	296	23	-	-	367
Percent Change (2019-2028)	6.69%	-1.52%	8.64%	3.55%	3.87%	2.27%	5.17%	7.28%	2.65%	0.00%	0.00%	2.49%
Compound Annual Growth Rate	0.72%	-0.17%	0.92%	0.39%	0.42%	0.25%	0.56%	0.78%	0.29%	0.00%	0.00%	0.27%

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) ^{80, 81}

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2019	4	5,828	293	923	58	60	1,489	3,385	809	14	4	12,868
2020	4	5,803	296	916	58	61	1,488	3,358	815	14	4	12,818
2021	4	5,808	300	911	59	61	1,488	3,342	817	14	4	12,808
2022	4	5,781	303	911	59	61	1,488	3,340	819	14	4	12,784
2023	4	5,765	307	910	59	61	1,489	3,331	821	14	4	12,766
2024	4	5,772	311	913	59	61	1,492	3,338	823	14	4	12,792
2025	4	5,834	313	917	60	61	1,494	3,337	825	14	4	12,864
2026	4	5,836	315	920	60	61	1,497	3,340	827	14	4	12,879
2027	5	5,796	315	921	60	62	1,499	3,344	829	14	4	12,850
2028	5	5,793	319	926	60	62	1,503	3,350	832	14	4	12,868
Change (2019-2028)	1	(35)	26	3	2	1	13	(35)	23	-	-	(0)
Percent Change (2019-2028)	18.41%	-0.60%	8.87%	0.36%	3.87%	2.27%	0.88%	-1.04%	2.84%	0.00%	0.00%	0.00%
Compound Annual Growth Rate	1.90%	-0.07%	0.95%	0.04%	0.42%	0.25%	0.10%	-0.12%	0.31%	0.00%	0.00%	0.00%

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

⁸⁰ 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.

⁸¹ 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	Thurmont	William-sport	Total
2019	14	5,872	296	951	65	67	1,734	2,697	943	23	5	12,667
2020	15	5,858	298	950	65	68	1,738	2,700	928	23	5	12,648
2021	16	5,841	302	951	65	68	1,755	2,695	928	23	5	12,649
2022	16	5,860	305	956	66	68	1,774	2,705	934	23	5	12,712
2023	17	5,860	309	960	66	68	1,811	2,709	939	23	5	12,768
2024	18	5,862	314	964	66	68	1,831	2,712	945	23	5	12,809
2025	18	5,862	317	966	66	68	1,851	2,716	951	23	5	12,844
2026	19	5,876	319	970	67	69	1,872	2,723	961	23	5	12,903
2027	20	5,883	319	976	67	69	1,900	2,730	970	23	5	12,962
2028	20	5,905	322	981	67	69	1,930	2,737	981	23	5	13,042
Change (2019-2028)	6	33	26	31	3	2	197	40	39	-	-	375
Percent Change (2019-2028)	40.58%	0.56%	8.78%	3.24%	3.89%	2.27%	11.33%	1.48%	4.11%	0.00%	0.00%	2.96%
Compound Annual Growth Rate	3.86%	0.06%	0.94%	0.35%	0.43%	0.25%	1.20%	0.16%	0.45%	0.00%	0.00%	0.32%

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	Thurmont	William-sport	Total
2019	14	5,792	288	951	65	67	1,612	2,697	939	23	5	12,453
2020	15	5,763	290	950	65	68	1,601	2,700	925	23	5	12,405
2021	16	5,768	294	951	65	68	1,600	2,695	926	23	5	12,410
2022	16	5,781	297	956	66	68	1,603	2,705	932	23	5	12,452
2023	17	5,782	301	960	66	68	1,623	2,709	937	23	5	12,491
2024	18	5,784	306	964	66	68	1,646	2,712	943	23	5	12,536
2025	18	5,784	309	966	66	68	1,666	2,716	949	23	5	12,571
2026	19	5,798	311	970	67	69	1,687	2,723	958	23	5	12,630
2027	20	5,805	311	976	67	69	1,715	2,730	968	23	5	12,688
2028	20	5,827	314	981	67	69	1,745	2,737	979	23	5	12,768
Change (2019-2028)	6	35	26	31	3	2	133	40	40	-	-	315
Percent Change (2019-2028)	40.58%	0.61%	9.03%	3.24%	3.89%	2.27%	8.25%	1.48%	4.24%	0.00%	0.00%	2.53%
Compound Annual Growth Rate	3.86%	0.07%	0.96%	0.35%	0.43%	0.25%	0.88%	0.16%	0.46%	0.00%	0.00%	0.28%

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
2019	14	5,872	296	3,458	65	67	3,412	5,406	943	23	5	19,562
2020	15	5,858	298	3,457	65	68	3,440	5,412	928	23	5	19,569
2021	16	5,841	302	3,459	65	68	3,475	5,401	928	23	5	19,583
2022	16	5,860	305	3,478	66	68	3,501	5,421	934	23	5	19,678
2023	17	5,860	309	3,493	66	68	3,552	5,430	939	23	5	19,763
2024	18	5,862	314	3,506	66	68	3,587	5,436	945	23	5	19,831
2025	18	5,862	317	3,514	66	68	3,618	5,443	951	23	5	19,886
2026	19	5,876	319	3,529	67	69	3,650	5,458	961	23	5	19,976
2027	20	5,883	319	3,552	67	69	3,695	5,471	970	23	5	20,074
2028	20	5,905	322	3,570	67	69	3,743	5,486	981	23	5	20,192
Change (2019-2028)	6	33	26	112	3	2	331	80	39	-	-	630
Percent Change (2019-2028)	40.58%	0.56%	8.78%	3.24%	3.89%	2.27%	9.69%	1.48%	4.11%	0.00%	0.00%	3.22%
Compound Annual Growth Rate	3.86%	0.06%	0.94%	0.35%	0.43%	0.25%	1.03%	0.16%	0.45%	0.00%	0.00%	0.35%

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)^{82, 83}

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2019	4	5,828	293	3,933	58	60	2,846	6,466	809	14	4	20,316
2020	4	5,803	296	3,905	58	61	2,855	6,415	815	14	4	20,230
2021	4	5,808	300	3,883	59	61	2,870	6,384	817	14	4	20,204
2022	4	5,781	303	3,882	59	61	2,874	6,379	819	14	4	20,181
2023	4	5,765	307	3,878	59	61	2,878	6,363	821	14	4	20,154
2024	4	5,772	311	3,890	59	61	2,884	6,375	823	14	4	20,199
2025	4	5,834	313	3,909	60	61	2,888	6,374	825	14	4	20,287
2026	4	5,836	315	3,921	60	61	2,892	6,379	827	14	4	20,314
2027	5	5,796	315	3,927	60	62	2,897	6,388	829	14	4	20,297
2028	5	5,793	319	3,947	60	62	2,903	6,399	832	14	4	20,338
Change (2019-2028)	1	(35)	26	14	2	1	57	(67)	23	-	-	22
Percent Change (2019-2028)	18.41%	-0.60%	8.87%	0.36%	3.87%	2.27%	2.01%	-1.04%	2.84%	0.00%	0.00%	0.11%
Compound Annual Growth Rate	1.90%	-0.07%	0.95%	0.04%	0.42%	0.25%	0.22%	-0.12%	0.31%	0.00%	0.00%	0.01%

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.

⁸² 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.

⁸³ 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
2019	14	5,872	296	3,458	65	67	3,412	5,406	943	23	5	19,562
2020	15	5,858	298	3,457	65	68	3,440	5,412	928	23	5	19,569
2021	16	5,841	302	3,459	65	68	3,475	5,401	928	23	5	19,583
2022	16	5,860	305	3,478	66	68	3,501	5,421	934	23	5	19,678
2023	17	5,860	309	3,493	66	68	3,552	5,430	939	23	5	19,763
2024	18	5,862	314	3,506	66	68	3,587	5,436	945	23	5	19,831
2025	18	5,862	317	3,514	66	68	3,618	5,443	951	23	5	19,886
2026	19	5,876	319	3,529	67	69	3,650	5,458	961	23	5	19,976
2027	20	5,883	319	3,552	67	69	3,695	5,471	970	23	5	20,074
2028	20	5,905	322	3,570	67	69	3,743	5,486	981	23	5	20,192
Change (2019-2028)	6	33	26	112	3	2	331	80	39	-	-	630
Percent Change (2019-2028)	40.58%	0.56%	8.78%	3.24%	3.89%	2.27%	9.69%	1.48%	4.11%	0.00%	0.00%	3.22%
Compound Annual Growth Rate	3.86%	0.06%	0.94%	0.35%	0.43%	0.25%	1.03%	0.16%	0.45%	0.00%	0.00%	0.35%

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
2019	14	5,792	288	3,458	65	67	3,282	5,406	939	23	5	19,340
2020	15	5,763	290	3,457	65	68	3,294	5,412	925	23	5	19,317
2021	16	5,768	294	3,459	65	68	3,312	5,401	926	23	5	19,337
2022	16	5,781	297	3,478	66	68	3,322	5,421	932	23	5	19,409
2023	17	5,782	301	3,493	66	68	3,356	5,430	937	23	5	19,477
2024	18	5,784	306	3,506	66	68	3,394	5,436	943	23	5	19,549
2025	18	5,784	309	3,514	66	68	3,424	5,443	949	23	5	19,605
2026	19	5,798	311	3,529	67	69	3,457	5,458	958	23	5	19,694
2027	20	5,805	311	3,552	67	69	3,501	5,471	968	23	5	19,792
2028	20	5,827	314	3,570	67	69	3,550	5,486	979	23	5	19,910
Change (2019-2028)	6	35	26	112	3	2	267	80	40	-	-	570
Percent Change (2019-2028)	40.58%	0.61%	9.03%	3.24%	3.89%	2.27%	8.14%	1.48%	4.24%	0.00%	0.00%	2.95%
Compound Annual Growth Rate	3.86%	0.07%	0.96%	0.35%	0.43%	0.25%	0.87%	0.16%	0.46%	0.00%	0.00%	0.32%

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

Transmission Owner	Voltage (kV)	Length (miles)	No. of Circuits	Start Date	Comp. Date	In-Service Date	Purpose	Start location		End Location	
								County	Terminal	County	Terminal
BGE	115	2.20	2.00	Jun-05		Dec, 2019	Transmission work for distribution substation	Baltimore City	Westport	Baltimore City	Wilkins Avenue
DPL	138	30.85	1	4/3/2013	5/31/2018	5/31/2018	Capacity Expansion	Wicomico	Piney Grove	Accomack (VA)	Wattsville
DPL	138	N/A	N/A	5/29/2015	10/25/2018	10/25/2018	Aging Infrastructure/ Reliability	Queen Anne's	Carville	N/A	N/A
DPL	69	N/A	N/A	6/9/2015	12/12/2018	12/12/2018	Reliability	Wicomico	Hebron	N/A	N/A
PE	138	0.10	2.00	Jul-05	Jul-05	Jul-05	Accommodate for Generator Interconnection	Allegany	Dans Mountain (new)	Allegany	Carlos Junction-Ridgeley
PE	138	0.00	1.00	Jul-05	Suspended	Jul-05	Accommodate for Generator Interconnection	Cumberland	Cumberland	Cumberland	Ridgeley
PE	138	0.10	1.00	Jul-05	Suspended	Jul-05	Accommodate for Generator Interconnection	Garrett	Hazelton	Garrett	AA1-047
PE	138	0.10	1.00	7/8/1905	Suspended	7/9/1905	Accommodate for Generator Interconnection	Garrett	AA1-047	Garrett	Jennings
PE	138	0.00	1.00	7/10/1905	7/11/1905	7/11/1905	Baseline Transmission Reliability	Carroll	Carroll	Montgomery	Germantown
PE	138	0.10	1.00	7/8/1905	7/11/1905	7/11/1905	Distribution Adequacy	Washington	Ringgold	Frederick	Garfield (new)
PE	138	0.10	1.00	7/8/1905	7/11/1905	7/11/1905	Distribution Adequacy	Frederick	Garfield (new)	Frederick	Catoctin
PE	230	0.10	1.00	7/10/1905	7/12/1905	7/12/1905	Distribution Adequacy	Frederick	Doubs	Frederick	Jefferson (New)
PE	230	0.10	1.00	7/10/1905	7/12/1905	7/12/1905	Distribution Adequacy	Frederick	Jefferson (New)	Frederick	Monocacy
PE	230	0.00	1.00	7/9/1905	7/12/1905	7/12/1905	Baseline Transmission Reliability	Washington	Ringgold	Washington	Ringgold
PE	230	0.00	1.00	7/9/1905	7/12/1905	7/12/1905	Baseline Transmission Reliability	Frederick	Catoctin	Frederick	Catoctin
PE	230	9.70	1.00	7/9/1905	7/12/1905	7/12/1905	Baseline Transmission Reliability	Washington	Ringgold	Frederick	Catoctin
SMECO	69	0.80	2.00	2nd Qtr 2018	4th Qtr 2018	4th Qtr 2018	Capacity / Reliability	Prince George	W. Brandywine tap GOAB switch	Prince George	West Brandywine

Appendix 5: List of Maryland Generators, as of December 31, 2018

Appendix Table 5: List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Brandon Shores LLC	Brandon Shores	Anne Arundel	685.0	635.0	93%
Brandon Shores LLC	Brandon Shores	Anne Arundel	685.0	638.0	93%
Constellation Power Source Gen	Gould Street	Baltimore City	103.5	97.0	94%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	132.8	126.0	95%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	136.0	118.0	87%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	359.0	305.0	85%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	414.7	397.0	96%
H.A. Wagner LLC	Herbert A Wagner	Anne Arundel	16.0	12.9	81%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	78%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	78%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	78%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.0	78%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.6	81%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	15.6	87%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	14.5	81%
Constellation Power Source Gen	Notch Cliff	Baltimore	18.0	16.0	89%
Constellation Power Source Gen	Perryman	Harford	53.1	52.0	98%
Constellation Power Source Gen	Perryman	Harford	53.1	51.0	96%
Constellation Power Source Gen	Perryman	Harford	53.1	52.0	98%
Constellation Power Source Gen	Perryman	Harford	192.0	139.0	72%
Constellation Power Source Gen	Perryman	Harford	141.0	109.8	78%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	15.3	74%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	16.0	77%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	14.8	71%
Constellation Power Source Gen	Philadelphia	Baltimore City	20.7	14.8	71%
Constellation Power Source Gen	Riverside (MD)	Baltimore	25.0	19.0	76%
Constellation Power Source Gen	Riverside (MD)	Baltimore	25.0	20.0	80%
Constellation Power Source Gen	Westport	Baltimore City	121.5	115.8	95%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	90%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	90%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	90%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	2.9	2.6	90%
NRG Vienna Operations Inc.	Vienna Operations	Dorchester	18.6	14.3	77%
NRG Vienna Operations Inc.	Vienna Operations	Dorchester	162.0	153.0	94%
BP Piney & Deep Creek LLC	Deep Creek	Garrett	10.0	9.0	90%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
BP Piney & Deep Creek LLC	Deep Creek	Garrett	10.0	9.0	90%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	659.0	582.0	88%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	659.0	582.0	88%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	16.0	16.0	100%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	35.0	22.0	63%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	103.0	73.0	71%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	103.0	73.0	71%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	125.0	81.0	65%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	125.0	81.0	65%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	364.0	331.0	91%
GenOn Chalk Point, LLC	Chalk Point LLC	Prince George's	364.0	336.0	92%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	88%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	88%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	19.0	18.0	95%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	163.0	147.0	90%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	163.0	147.0	90%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	196.0	173.0	88%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	74%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	74%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	74%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	65.0	48.0	74%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	18.0	13.0	72%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	18.0	13.0	72%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	626.0	596.0	95%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	626.0	609.0	97%
Exelon Power	Conowingo	Harford	45.0	48.0	107%
Exelon Power	Conowingo	Harford	55.6	65.0	117%
Exelon Power	Conowingo	Harford	55.6	65.0	117%
Exelon Power	Conowingo	Harford	36.0	36.0	100%
Exelon Power	Conowingo	Harford	48.0	48.0	100%
Exelon Power	Conowingo	Harford	47.7	48.0	101%
Exelon Power	Conowingo	Harford	36.0	36.0	100%
Exelon Power	Conowingo	Harford	47.7	48.0	101%
Exelon Power	Conowingo	Harford	48.0	48.0	100%
Exelon Power	Conowingo	Harford	55.6	65.0	117%
Exelon Power	Conowingo	Harford	55.6	65.0	117%
Easton Utilities Comm	Easton	Talbot	3.5	3.5	100%
Easton Utilities Comm	Easton	Talbot	1.5	1.5	100%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Easton Utilities Comm	Easton	Talbot	1.5	1.5	100%
Easton Utilities Comm	Easton	Talbot	3.8	3.6	95%
Easton Utilities Comm	Easton	Talbot	4.1	4.1	100%
Easton Utilities Comm	Easton	Talbot	5.6	5.6	100%
Easton Utilities Comm	Easton	Talbot	5.6	5.6	100%
Easton Utilities Comm	Easton	Talbot	2.5	2.0	80%
Easton Utilities Comm	Easton	Talbot	2.5	2.0	80%
Easton Utilities Comm	Easton	Talbot	3.0	2.5	83%
Easton Utilities Comm	Easton 2	Talbot	1.5	1.5	100%
Easton Utilities Comm	Easton 2	Talbot	1.5	1.5	100%
Easton Utilities Comm	Easton 2	Talbot	5.4	4.5	83%
Easton Utilities Comm	Easton 2	Talbot	5.4	4.5	83%
Easton Utilities Comm	Easton 2	Talbot	6.2	6.2	100%
Easton Utilities Comm	Easton 2	Talbot	6.2	6.2	100%
Easton Utilities Comm	Easton 2	Talbot	6.3	6.3	100%
Easton Utilities Comm	Easton 2	Talbot	6.3	6.3	100%
Exelon Nuclear	Calvert Cliffs Nuclear Power Plant	Calvert	918.0	872.0	95%
Exelon Nuclear	Calvert Cliffs Nuclear Power Plant	Calvert	910.7	853.8	94%
A & N Electric Coop	Smith Island	Somerset	0.5	0.4	80%
A & N Electric Coop	Smith Island	Somerset	1.2	1.2	100%
Town of Berlin - (MD)	Berlin	Worcester	1.1	1.1	100%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	100%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	100%
Town of Berlin - (MD)	Berlin	Worcester	1.8	1.8	100%
Town of Berlin - (MD)	Berlin	Worcester	2.5	2.5	100%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	164.0	82%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	175.9	163.0	93%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	168.6	85%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	198.9	169.4	85%
Wheelabrator Environmental Systems	Wheelabrator Baltimore Refuse	Baltimore City	60.2	57.0	95%
Wheelabrator Environmental Systems	Wheelabrator Baltimore Refuse	Baltimore City	4.3	4.3	100%
AES WR Ltd Partnership	AES Warrior Run Cogeneration Facility	Allegany	229.0	180.0	79%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.9	1.3	68%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.9	1.3	68%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.0	1.0	100%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	1.0	1.0	100%
Prince George's County	Brown Station Road Plant I	Prince George's	0.9	0.8	89%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Prince George's County	Brown Station Road Plant I	Prince George's	0.9	0.8	89%
Prince George's County	Brown Station Road Plant I	Prince George's	0.9	0.8	89%
Verso Luke LLC	Luke Mill	Allegany	35.0	32.0	91%
Verso Luke LLC	Luke Mill	Allegany	30.0	28.0	93%
Covanta Montgomery, Inc.	Montgomery County Resource Recovery	Montgomery	67.8	54.0	80%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	5.0	5.0	100%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	2.5	2.5	100%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	10.0	10.0	100%
KMC Thermo, LLC	Brandywine Power Facility	Prince George's	98.7		n/a
KMC Thermo, LLC	Brandywine Power Facility	Prince George's	98.7		n/a
KMC Thermo, LLC	Brandywine Power Facility	Prince George's	91.4	230.0	252%
CB&I	Montgomery County Oaks LFGE Plant	Montgomery	1.6	1.5	94%
CB&I	Montgomery County Oaks LFGE Plant	Montgomery	0.8	0.8	100%
Prince George's County	Brown Station Road Plant II	Prince George's	1.0	0.8	80%
Prince George's County	Brown Station Road Plant II	Prince George's	1.0	0.8	80%
Prince George's County	Brown Station Road Plant II	Prince George's	1.0	0.8	80%
Prince George's County	Brown Station Road Plant II	Prince George's	1.0	0.8	80%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince George's	11.0	9.4	85%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince George's	11.0	9.4	85%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince George's	5.4	2.0	37%
Trigen Inner Harbor East, LLC	Inner Harbor East Heating	Baltimore City	2.1	2.1	100%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	100%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	100%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	Baltimore	1.0	1.0	100%
Power Choice/Pepeco Energy Serv	NIH Cogeneration Facility	Montgomery	28.0	27.6	99%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
Industrial Power Generating Company LLC	Wicomico	Wicomico	0.3	0.3	100%
CPV Maryland LLC	CPV St Charles Energy Center	Charles	215.0	205.0	95%
CPV Maryland LLC	CPV St Charles Energy Center	Charles	215.0	205.0	95%
CPV Maryland LLC	CPV St Charles Energy Center	Charles	316.0	316.0	100%
Roth Rock Wind Farm LLC	Roth Rock Wind Farm LLC	Garrett	40.0	40.0	100%
Roth Rock Wind Farm LLC	Roth Rock North Wind Farm, LLC	Garrett	10.0	10.0	100%
Criterion Power Partners LLC	Criterion	Garrett	70.0	70.0	100%
Constellation Solar Maryland, LLC	McCormick & Co. Inc. at Belcamp	Harford	1.4	1.4	100%
NRG Solar Arrowhead LLC	FedEx Field Solar Facility	Prince George's	2.0	2.0	100%
Constellation Solar Horizons LLC	Mount Saint Mary's	Frederick	13.7	13.7	100%
WGL Energy Systems, Inc.	Perdue Salisbury Photovoltaic	Wicomico	1.0	1.0	100%
IKEA Property Inc.	IKEA Perryville 460	Cecil	2.1	2.0	95%
IKEA Property Inc.	IKEA College Park 411	Prince George's	1.0	1.0	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	5.7	5.6	98%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	5.0	5.0	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	2.3	2.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.3	4.3	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	7.5	7.5	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	7.5	7.5	100%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	4.5	4.5	100%
WGL Energy Systems, Inc.	Kent County-Kennedyville	Kent	1.0	1.0	100%
WGL Energy Systems, Inc.	Rock Hall	Kent	1.0	1.0	100%
WGL Energy Systems, Inc.	Kent County - Worton Complex	Kent	1.0	1.0	100%
LES Operations Services LLC	Millersville LFG	Anne Arundel	1.6	1.5	94%
LES Operations Services LLC	Millersville LFG	Anne Arundel	1.6	1.5	94%
Howard County - Maryland	Alpha Ridge LFG	Howard	1.0	1.0	100%
Constellation Solar Maryland II LLC	UMMS at Pocomoke	Somerset	2.8	2.8	100%
CD Arevon USA, Inc.	Maryland Solar	Washington	27.0	20.9	77%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
SMECO Solar LLC	Herbert Farm Solar	Charles	5.5	5.5	100%
Tesla Inc.	Queen Anne's County	Queen Anne's	2.0	2.0	100%
Fourmile Wind Energy, LLC	Fourmile Ridge	Garrett	40.0	40.0	100%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	1.1	0.9	82%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	1.1	0.9	82%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	0.8	0.8	100%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	90%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	90%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	9.4	8.5	90%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	23.9	21.7	91%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	23.9	21.7	91%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	15.6	12.9	83%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	3.0	3.0	100%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	1.3	1.3	100%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	1.7	1.7	100%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	1.0	1.0	100%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	65.0	40.0	62%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	65.0	40.0	62%
Fair Wind Power Partners, LLC	Fair Wind	Garrett	30.0	30.0	100%
Old Dominion Electric Coop	Wildcat Point Generation Facility	Cecil	310.3	310.3	100%
Old Dominion Electric Coop	Wildcat Point Generation Facility	Cecil	310.3	310.3	100%
Old Dominion Electric Coop	Wildcat Point Generation Facility	Cecil	493.0	493.0	100%
SunE SEM 1, LLC	Chimes West Friendship (Nixon Farms)	Howard	1.5	1.2	80%
NVT LICENSES, LLC	UMES (MD) - Princess Anne	Somerset	2.2	2.1	95%
Rockfish Solar LLC	Rockfish Solar LLC	Charles	10.3	10.3	100%
Constellation Solar Maryland, LLC	General Motors Corp at White Marsh MD	Baltimore	1.0	1.0	100%
Constellation Solar Maryland II LLC	CNE at Cambridge MD	Dorchester	3.2	3.2	100%
Great Bay Solar I LLC	Great Bay Solar 1	Somerset	150.0	75.0	50%
AES Tait LLC	AES Warrior Run Energy Storage Project	Allegany	11.0	5.0	45%
Consolidated Edison Solutions Inc.	CES VMT Solar	Washington	1.1	1.1	100%
Constellation Solar Holding, LLC	CCBC-Catonsville	Howard	1.6	1.6	100%
SunE DB27, LLC	Elkton Solar	Cecil	1.6	1.6	100%
Tesla Inc.	Town of Chestertown- Chestertown WWTP	Kent	1.0	1.0	100%
Customized Energy Solutions	NA 1(Hagerstown)	Washington	2.0	2.0	100%
PSEG Keys Energy Center, LLC	Keys Energy Center	Prince George's	359.6	327.0	91%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
PSEG Keys Energy Center, LLC	Keys Energy Center	Prince George's	235.5	214.0	91%
PSEG Keys Energy Center, LLC	Keys Energy Center	Prince George's	235.5	214.0	91%
SunE DB42, LLC	Cecil County CCVT HS	Cecil	2.0	2.0	100%
WGL Energy Systems, Inc.	Presbyterian Senior Living Service	Baltimore	1.2	1.2	100%
Tesla Inc.	The Clorox Company	Harford	1.6	1.6	100%
Tesla Inc.	Chesapeake College	Queen Anne's	1.5	1.5	100%
Altus Power America Management, LLC	MEBA	Talbot	1.5	1.5	100%
Tesla Inc.	Wye Mills VNEM CSG	Queen Anne's	10.0	10.0	100%
Constellation New Energy Inc.	Archdiocese of Baltimore J	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Archdiocese of Baltimore L	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Baltimore City B	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Baltimore City D	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Baltimore City F	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Baltimore City G	Harford	2.0	2.0	100%
Constellation New Energy Inc.	City of Havre De Grace C	Harford	2.0	2.0	100%
Constellation New Energy Inc.	Sod Run WTP A	Harford	2.0	2.0	100%
Annapolis Solar Park, LLC	Annapolis Solar Park, LLC	Anne Arundel	12.0	12.0	100%
Constellation New Energy Inc.	Havre de Grace II - E at Perryman	Harford	1.4	1.4	100%
Marina Energy LLC	Longview Solar	Wicomico	13.6	12.5	92%
Marina Energy LLC	Church Hill	Queen Anne's	6.0	5.6	93%
Tesla Inc.	Montgomery County Correctional Facility	Montgomery	1.4	1.4	100%
Tesla Inc.	Garrett County - DPU Treatment Plant	Garrett	1.2	1.2	100%
UGI Energy Services, LLC	Emmitsburg Solar Arrays	Frederick	1.7	1.7	100%
WGL Energy Systems, Inc.	Pfeffers	Baltimore	1.0	1.0	100%
US Dept. of Army, Garrison, APG	APG Combined Heat and Power Plant	Harford	7.9	6.2	78%
IGS Solar I, LLC	IGS Solar I - BWI5	Baltimore	1.1	1.1	100%
IGS ORIX Solar I, LLC	IGS Solar I - BWI2	Baltimore	1.4	1.4	100%
Cypress Creek Renewables	Baker Point	Frederick	9.0	9.0	100%
Montevue Lane Solar, LLC	Fort Detrick Solar PV	Frederick	15.7	15.7	100%
Montgomery County Solar	Montgomery County Solar	Montgomery	1.9	1.9	100%
GWCC PV Solar Farm	GWCC PV Solar Farm	Prince George's	1.6	1.6	100%
NRG Chalk Point CT	NRG Chalk Point CT	Prince George's	94.0	71.0	76%
WGL Energy Systems, Inc.	Bowie State Solar	Prince George's	1.3	1.3	100%
IOS II LLC	First Baptist Church of Glenarden	Prince George's	1.5	1.6	107%
Constellation New Energy Inc.	NIST Solar	Montgomery	4.0	4.0	100%
Northstar Macy's Maryland 2015, LLC	Macy's MD Joppa Solar Project	Harford	1.8	1.0	56%
Standard Solar	UMCES Ground Mount	Dorchester	2.0	2.0	100%
Standard Solar	Anne Arundel County Public Schools	Anne Arundel	1.0	1.0	100%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2018

Onyx Asset Services Group	APG Old Bayside	Harford	1.7	1.7	100%
Onyx Asset Services Group	APG New Chesapeake	Harford	2.3	2.3	100%
Standard Solar	MNCPPC Germantown Solar	Montgomery	1.0	1.0	100%
			16,337.0	14,777.3	90%

Appendix 6: Proposed New Renewable Generation in Maryland PJM Queue

**Appendix Table 6: Proposed New Renewable Generation in Maryland PJM Queue
Effective Date: August 2019**

Transmission Owner	Project Name	County Location	PJM Queue Status	PJM Queue #	Fuel Type	Project Capacity (MW)	Projected In-Service Date
APS	Albright-Cross School 138 kV	Garrett	Active	AC2-021	Hydro	15	1/15/2019
APS	Frostburg 138kV	Allegany	Active	AE2-030	Other; Solar	7.56	8/24/2020
APS	Bedington 138 kV	Frederick	Active	AE2-333	Solar	60	12/1/2022
APS	Thayerville 34.5 kV	Garrett	Active	AF1-001	Solar	6.5	3/2/2020
APS	Carlos Junction-Lonaconing 34.5 kV	Allegany	Active	AE2-309	Solar; Storage	16.66	10/30/2020
DPL	Indian River 230 kV I	Sussex, DE	Active	AF1-007	Offshore Wind	1.9	10/1/2021
DPL	Perch 34.5kV	Cecil	Active	AB2-168	Solar	3.8	1/1/2018
DPL	Keeney-Steele 230kV	Caroline	Active	AB2-037	Solar	76.7	10/31/2019
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	Centreville 69 kV	Queen Anne's	Active	AD2-076	Solar	18.62	11/30/2021
DPL	Easton-Steele 138 kV	Talbot	Active	AE2-093	Solar	19.7	11/30/2021
DPL	Carville 138 kV	Queen Anne's	Active	AE2-112	Solar	7.6	11/30/2021
DPL	Carville 138 kV	Queen Anne's	Active	AF1-036	Solar	8.4	11/30/2021
DPL	Wye Mills-Longwood 69 kV	Talbot	Active	AF1-044	Solar	18.9	11/30/2021
DPL	Piney Grove-New Church 138kV	Worcester	Active	AB2-120	Solar	38	12/14/2018
DPL	Price 25kV II	Queen Anne's	Active	AB1-176	Solar	3.4	12/31/2016
DPL	East New Market 69kV	Dorchester	Active	AC1-190	Solar	35	12/31/2017
DPL	Todd 69kV	Dorchester	Active	AB2-172	Solar	19	12/31/2018
DPL	Airey 69 kV	Dorchester	Active	AE2-209	Solar	33	12/31/2021
DPL	Church-Kent 69kV	Queen Anne's	Active	AB2-135	Solar	29.9	5/1/2018
DPL	West Cambridge-Vienna 69kV	Dorchester	Active	AB2-136	Solar	24.8	5/1/2018
DPL	Rockawalkin 69kV	Wicomico	Active	AB2-180	Solar	14	6/30/2017
DPL	Wye Mills 25kV	Queen Anne's	Active	AB2-185	Solar	14	6/30/2017
DPL	North Salisbury 25kV	Somerset	Active	AC1-213	Solar	3.2	9/30/2017
DPL	Chestertown-Church 69kV	Kent	Active	AB2-133	Solar	24.6	9/30/2018
DPL	Hebron 69kV	Wicomico	Active	AC2-023	Solar	26.5	9/30/2019
PEPCO	Walker Mill Road 13 kV	Prince George's	Active	AE2-003	Solar	1.2	10/1/2019
PEPCO	64th Street 13 kV	Prince George's	Active	AE2-002	Solar	3.6	12/31/2019
PEPCO	St. Barnabas 13kV II	Prince George's	Active	AD2-199	Solar	1.26	12/31/2020
PEPCO	St. Barnabas 13 kV	Prince George's	Active	AE2-336	Solar	1.932	12/31/2020
PEPCO	St. Barnabas 13 kV	Prince George's	Active	AE2-337	Solar	1.008	12/31/2020
					Total	641.4	