PUBLIC SERVICE COMMISSION OF MARYLAND

TEN-YEAR PLAN (2017 – 2026) 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*
March 2018

State of Maryland
Public Service Commission

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

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I. Introduction

This report constitutes the Maryland Public Service Commission's *Ten-Year Plan (2017-2026) 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 2017 – 2026 Ten-Year Plan provides a forward-looking analysis of the composition of Maryland's electricity and generation profile, as well as pertinent resources for more detailed information and Commission reports. This Plan will cover the following topics as relevant to Maryland:

1. Maryland Load Growth Forecasts; and
2. Transmission, Supply, and Generation.

Changes to Maryland's capacity and generation profile anticipated by this report may necessitate additional infrastructure investment in the State's distribution network to ensure the safe, reliable, and economic supply of electricity. The Commission exercises its statutory and regulatory power to promote adequate, economical, and efficient delivery of utility services in the State through docketed proceedings. An account of these proceedings, including those dealing with distribution infrastructure investments, is published by the Commission in an annual report every year.

II. Background

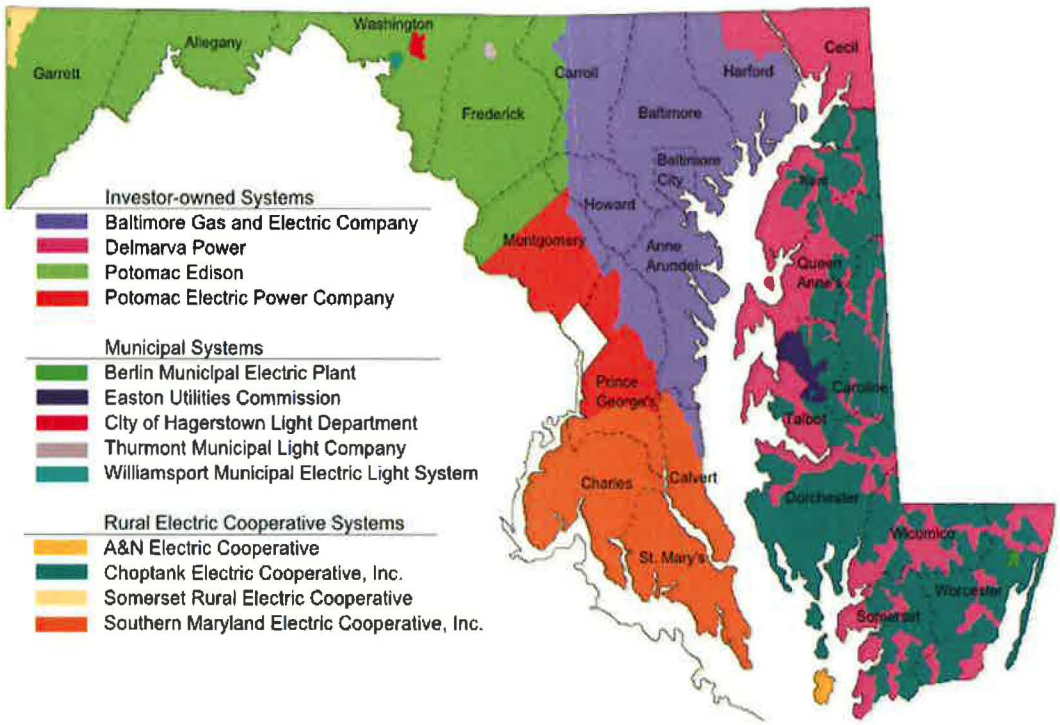
Maryland is geographically divided into thirteen electric utility service territories. The four largest, by number of Maryland customers, are served by investor-owned utilities ("IOUs"); four represent electric cooperatives (two of which serve mainly rural areas of Maryland); and five are served by electric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

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

[2] Potomac Electric Power Company ("Pepco"), Delmarva Power & Light Company ("DPL"), and The Potomac Edison Company ("PE") 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 ("BGE") zone, alone, resides solely within the State of Maryland.

service territories. Figure 2 depicts the PJM forecast zones of which Maryland is comprised.

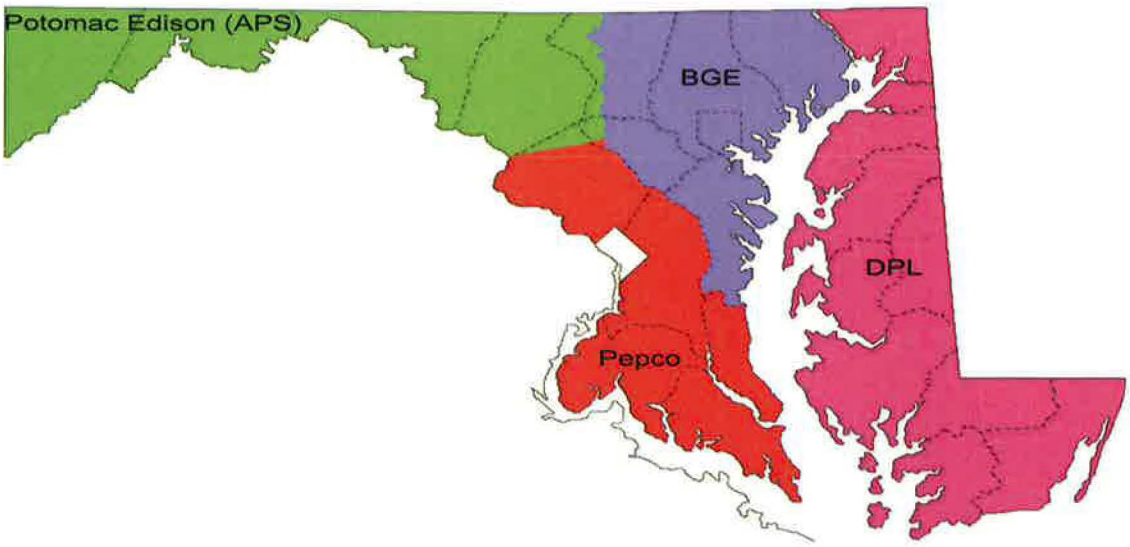
Figure 1: Maryland Utilities and their Service Territories in Maryland[3,4]



[3] *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 December 2016).

[4] 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").

Figure 2: PJM Maryland Forecast Zones[5]



III. Maryland Load Growth Forecasts

Each year, PJM presents a Load Forecast Report for its service territory 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 typically contrasts GDP growth projections included in the current (*i.e.* September 2016) load forecast with that of the previous year (*i.e.* October 2015), as depicted below in Figure 3. At the outset of the 2017 – 2026 planning period discussed in this Ten-Year Plan, the projected average GDP growth reflected in the current PJM load forecast is slightly lower than that projected by the previous year's forecast for the same time period. The reasons cited by PJM include weaker than expected production in the near-term but closer to expectation in terms of employment. This trend greatly resembles the US Macro forecast.

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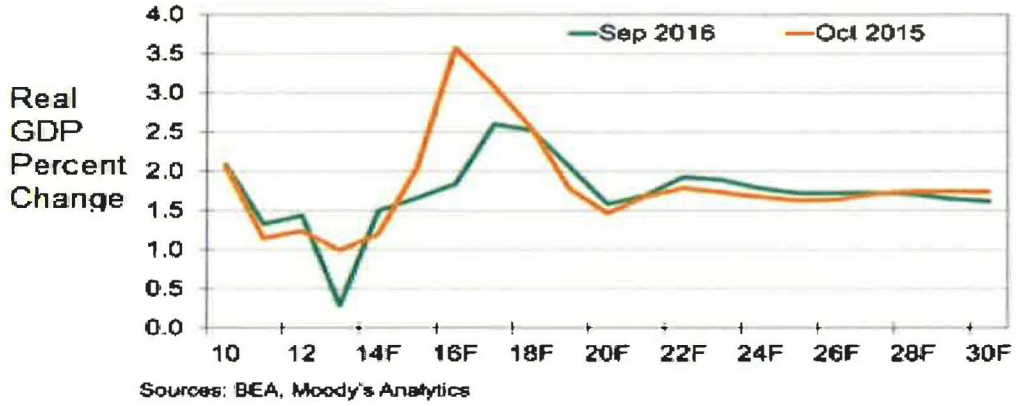
[5] *PJM Load Forecast Report,* PJM, (Jan. 2017), http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx

The single-family housing market has improved steadily but has not yet met the U.S. Census Bureau expected forecast. It is anticipated that this is due to low long-term confidence in the housing market. While multifamily housing has continued to grow in 2016, it too has fallen short of forecast. Additionally, other factors such as higher credit requirements on federally backed mortgage loans may also contribute to the lower than expected performance of the housing market in the near-term. While employment growth has been strong in recent years, the high to mid tier jobs have not caused the overall real median income to increase in the past 15 years.[6] The long-term outlook on housing formation in the PJM service territory is expected to experience economic growth in the next few years.[7] This is said to be due to the use of a new method to estimate past and future housing formation that will more accurately capture the data. Previously, a decrease in forecast population would mean a projected decrease in housing, as well. However, it is anticipated that in the long-term while the population may decrease slightly, there will be an increase in wages and, thus, there will be fewer people per household translating to an increase in housing formation.[8] As a result of this near-term rebound in housing formation, the PJM regional average GDP growth rate has been revised to reflect a projected peak of 2.6 percent in 2017, as compared to the previous year's forecasted peak of 3.2 percent expected to occur in 2016 as well.[9] The PJM region-wide long-term GDP growth projections remain largely comparable to those included in the previous year's forecast, hovering around 1.7 percent for the duration of the 2017 – 2026 planning horizon covered by this Ten-Year Plan because the housing formation rate is projected to increase slightly over time.[10]

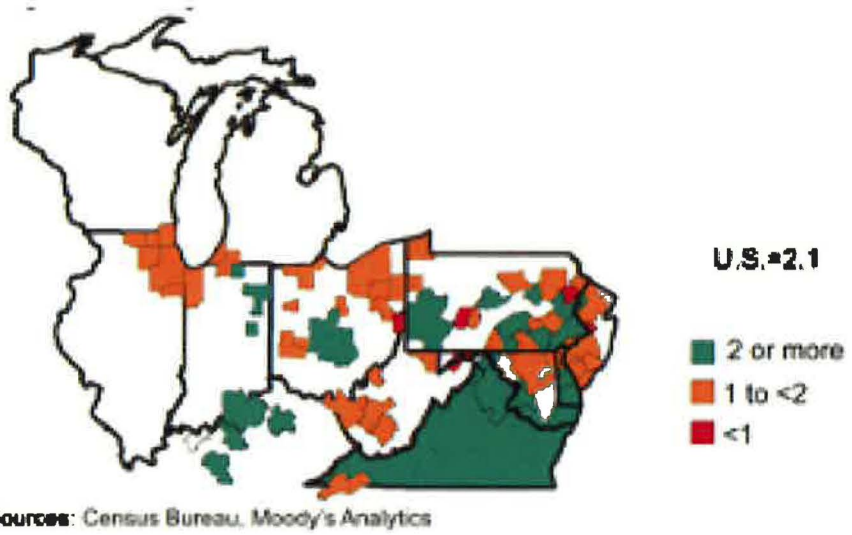
Figure 3: Comparison of Real GDP Growth Projections in PJM Metro Areas, October 2015 Load Forecast versus September 2016 Load Forecast[11]



[6] *Id.* at 14.
[7] *Id.* at 15.
[8] *Id.* at 16
[9] *Id.*.
[10] *Id.*.
[11] *Id.*.

The GDP growth projections discussed above in reference to the larger PJM region translate into varying impacts within the individual states that comprise PJM. As evidenced by Figure 4 below,[12] the southern states in the PJM region, including Maryland, are projected to experience GDP growth rates more on par with the forecasted national average; although, the majority of the PJM region is projected to underperform the U.S.[13] Forecasts specific to Maryland are projected to be more stable than other PJM states due to favorable demographic trends, a highly educated labor force, and the types of industries expected to dominate the marketplace, such as education, healthcare, and hospitality.[14]

Figure 4 Average Real GDP Growth from 2016 to 2030 (%)



Consistent with the stability projected for the State by the PJM 2017 Load Forecast Report, load forecasts submitted by the Maryland utilities for the 2017 – 2026 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, energy sales, and peak demand throughout the State. The current forecasts, however, do anticipate slightly lower energy sales and summer and winter peak demand forecasts compared to the forecasts from previous Ten-Year Plans. Although a departure from prior forecasts, this trend is in line with the increased efficiency measures deployed throughout Maryland and the subsequent reduced demand, as discussed further in Section III.D of this Plan.

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

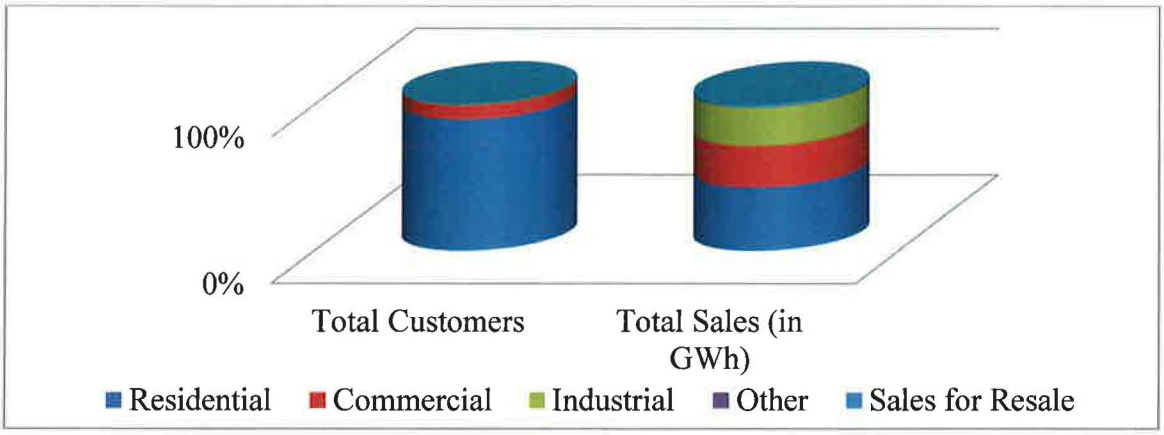
Table 1: Comparison of Compound Annual Growth Rate Projections – 2014, 2015, 2016, and 2017[15]

Compound Annual Growth Rate Projections 2014, 2015, 2016, and 2017				
Forecasts	**Ten-Year Plan 2014-2023**	**Ten-Year Plan 2015-2024**	**Ten-Year Plan 2016-2025**	**Ten-Year Plan 2017-2026**
Customer Forecasts	0.7%	0.5%	0.7%	0.8%
Energy Sales	1.3%	1.2%	0.8%	0.4%
Summer Peak Demand Forecasts	0.9%	0.9%	0.5%	0.4%
Winter Peak Demand Forecasts	0.8%	0.8%	0.6%	0.3%

A. Customer Growth Forecasts[16]

At the close of 2016, approximately 90 percent of utility customers in Maryland were categorized as residential ratepayers; however, residential sales represented only 43 percent of the year's total retail energy sales, as illustrated in Figure 5 below.[17] Conversely, commercial and industrial ("C&I") customers represented just over 10 percent of Maryland utility customers, but corresponded to over half of the total retail energy sales for the State. Therefore, while growth and usage trends in the residential sector should be closely monitored, the overall projected stability of residential sector growth renders a change in either the commercial or industrial sector as potentially more impactful to statewide energy sales projections.

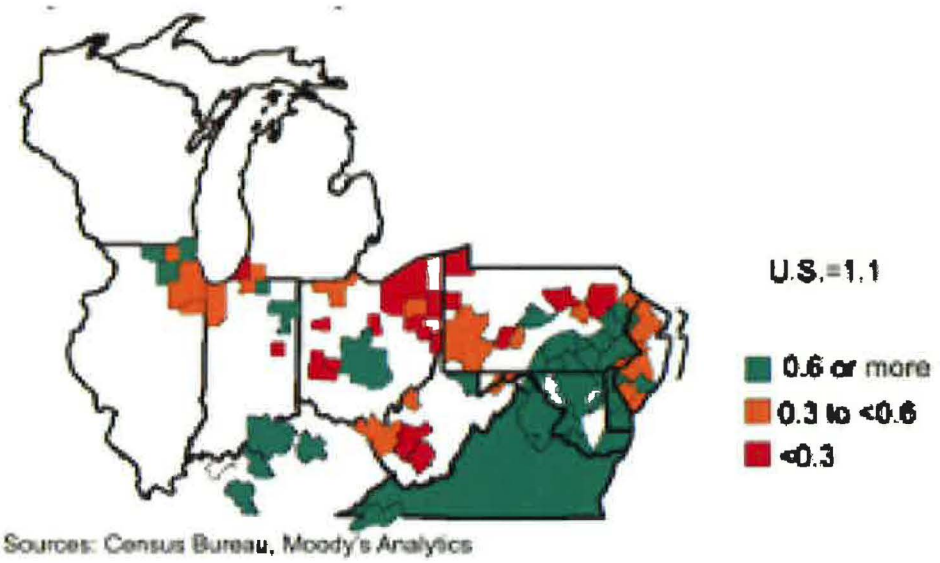
Figure 5 Total Customers and Energy Sales (in GWh) by Customer Class for 2016



[15] *See* Appendix Tables 1(a)(i), 2(a)(i), 3(a)(i), 3(a)(iii).
[16] *See* Appendix Table 1(a) for a complete list of utility-by-utility customer growth forecasts.
[17] *See* Appendix Tables 1(b)(i) and 1(b)(ii).

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.[18] Over the planning horizon, however, the projected housing formation rates differ widely across the PJM service territory, as evidenced by Figure 6 below.

Figure 6 Average Annual Household Growth from 2016 to 2030 (%)[19]



As illustrated by Figure 6 above, Maryland – along with other southern PJM states – retain an advantage compared to the rest of the service territory with respect to forecasted household formation rates, and thus utility customer growth projections. The PJM load forecast attributes this to expected growth in consumer-based services in the applicable states, including Maryland.[20] Further, the PJM forecast regarding expected rates of household formation in Maryland is bolstered by the State's strong population growth in recent years, which translates to a greater number of households in the long run.

The population in Maryland continued to grow in 2016 – albeit at a slower rate than in prior years – which contributed to a net increase in electricity customers. Both the numeric and percentage increase were the smallest for the State this century. The State has increased at a slower rate than the United States as a whole. Among the 50 states and the District of Columbia, Maryland experienced the eighteenth largest numeric gain in

[18] *PJM Load Forecast Report,* PJM, (Jan. 2017), http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx
[19] *Id.* at 17.
[20] *Id.* at 17.

population in 2016. However, the Maryland population has grown faster than that of all of the Northeastern States and Midwestern states except Nebraska, North Dakota, and South Dakota.[21]

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. For the majority of this Ten-Year Plan, the utilities' forecasts depict modest annual growth rates. As reflected in Table 2 below, the statewide forecasted compound annual growth rate during the planning period is 0.84 percent for all customer classes, which translates into a 7.78 percent increase in the total number of Maryland customers by the end of this ten-year planning period. During this timeframe, Berlin, Choptank, PE, Pepco, and SMECO are projecting their overall customer bases to increase by 7.94 percent or more.

Table 2: Maryland Customer Forecast (All Customer Classes)[22]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2017	2,532	1,279,603	53,755	204,756	10,626	17,339	264,842	567,511	165,034	2,848	1,001	**2,569,847**
2018	2,565	1,288,258	54,313	205,685	10,645	17,425	266,627	573,330	167,804	2,848	1,001	**2,590,501**
2019	2,577	1,296,175	54,832	206,580	10,664	17,512	268,677	579,369	170,764	2,848	1,001	**2,610,999**
2020	2,590	1,304,418	55,317	207,424	10,683	17,600	270,859	585,649	173,824	2,848	1,001	**2,632,213**
2021	2,603	1,313,161	55,786	208,221	10,702	17,687	273,132	591,986	176,964	2,848	1,001	**2,654,091**
2022	2,629	1,322,396	56,264	209,023	10,721	17,776	275,582	598,395	180,084	2,848	1,001	**2,676,719**
2023	2,656	1,331,850	56,777	209,827	10,740	17,864	278,106	604,879	183,204	2,848	1,001	**2,699,752**
2024	2,682	1,341,401	57,284	210,634	10,759	17,953	280,669	611,438	186,224	2,848	1,001	**2,722,894**
2025	2,709	1,350,953	57,777	211,445	10,778	18,043	283,252	618,073	189,344	2,848	1,001	**2,746,223**
2026	2,736	1,360,482	58,265	212,258	10,797	18,133	285,858	624,785	192,534	2,848	1,001	**2,769,698**
Change (2017-2026)	**204**	**80,879**	**4,510**	**7,502**	**171**	**794**	**21,016**	**57,274**	**27,500**	**-**	**-**	**199,851**
Percent Change (2017-2026)	**8.08%**	**6.32%**	**8.39%**	**3.66%**	**1.61%**	**4.58%**	**7.94%**	**10.09%**	**16.66%**	**0.00%**	**0.00%**	**7.78%**
Compound Annual Growth Rate	**0.87%**	**0.68%**	**0.90%**	**0.40%**	**0.18%**	**0.50%**	**0.85%**	**1.07%**	**1.73%**	**0.00%**	**0.00%**	**0.84%**

The customer forecasts provided by the utilities are comparable to the forecasts they provided for the 2016 – 2025 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 188,225 customers by 2026, or 94 percent of total new customers projected. The largest absolute increase in the

[21] *Population Growth for Maryland in 2016*, Maryland Department of Planning, http://www.mdp.state.md.us/msdc/pop_estimate/Estimate-16/MD-Slow-Population-Growth-Continues-Through-2016.pdf

[22] *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 2016 data request for the Ten-Year Plan.

number of customers is projected to come from BGE's residential customer base, with the addition of 76,453 residential customers forecasted during this planning period.[23] BGE's projected increase in its residential customer base accounts for 41 percent of the total number of new residential customers across all service territories during the ten-year planning period.[24] The increase in residential customers for BGE translates into a compound annual growth rate of 0.72 percent,[25] which is comparable to the "0.6% or more" average household formation rate projected by PJM for this zone.

Although several Maryland utilities are projecting an increase in their customer bases during this planning period, Table 3 below shows that the aggregated utilities' customer forecasts are only 1 percent higher than the projections provided during the previous planning period. The most significant change observable in the aggregated statewide data between the previous and current Ten-Year Plan forecasts is within the Residential customer class,[26] largely attributable to projections provided by BGE, Pepco, and SMECO. The combined anticipated total of residential customers for these utilities is an increase of 26,309 by 2026. The percentage increase of the Residential customer class anticipated in the 2017-2026 Ten-Year Plan, however, is less than that projected by the 2016-2025 Plan.

Table 3: Projected Percentage Increase in the Number of Customers by Class, 2017 – 2026 [27]

Class	2016 to 2025	2017 to 2026	Difference
Residential	7.0%	8.2%	1.2%
Commercial	4.7%	3.9%	-0.8%
Industrial	13.8%	13.5%	-0.4%
Other	-0.8%	0.0%	0.8%
Resale	0.0%	0.0%	0.0%
Total Customers	**6.8%**	**7.8%**	**1.0%**

Aside from noteworthy observations visible in the aggregated utility forecasts, there are other trends of note in the customer forecasts provided by individual utilities for the 2017 – 2026 planning period. For example, SMECO forecasted the largest percentage

[23] *See* Appendix Table 1(a)(ii).
[24] *Id.*
[25] *Id.*
[26] 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.
[27] *See* Appendix Table 1(a)(i)-(vi) for more information.

differences of all utilities with respect to the residential and commercial classes, with an increase of 16.98 percent and 13.61 percent, respectively.[28] The Cooperative's projected increases in both the residential and commercial customer classes can be attributed to its reliance on the Maryland Office of Planning forecasts, which project an average annual growth rate of 1.6 percent for the region. Additionally, BGE is projecting the largest percentage difference (17.09 percent) of all utilities with respect to the industrial customer class, which the Company attributes to the general improvement of the economy.[29]

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."[30] In order to provide a more complete look at Maryland energy sales and peak demand forecasts, Sections III.B and III.C discuss the forecasts in "Gross of DSM" terms, which reflect the forecasts *before* the impact of DSM programs. Table 4 shows the energy sales forecast within Maryland (Gross of DSM) for the ten-year planning period, as provided by the utilities. The aggregated forecasts show a compound annual growth rate of 0.4 percent across all the Maryland service territories for 2017 – 2026, a decrease from the 0.8 percent annual growth rate reported in the 2016 – 2025 Ten-Year Plan.

Table 4: Maryland Energy Sales Forecast (GWh) (Gross of DSM) [31]

	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2017-2026)	5	2,122	87	(749)	13	14	812	(288)	355	2,371
Percent Change (2017-2026)	12.71%	7.07%	8.51%	-16.18%	4.92%	4.59%	10.19%	-1.76%	9.85%	3.69%
Compound Annual Growth Rate	1.34%	0.76%	0.91%	-1.94%	0.53%	0.50%	1.08%	-0.20%	1.05%	0.40%

The statewide energy sales growth rate derived from the utilities' 2017 – 2026 forecasts is 0.4 percent lower than the rate projected in last year's report, primarily due to

[28] *See* Appendix Table 1(a)(ii) and 1(a)(iii) for more information.
[29] *See* Appendix Table 1(a)(iv) for more information.
[30] *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.
[31] *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.

BGE's revised projections of a lower energy sales growth rate than included in the 2016 – 2025 Ten-Year Plan.[32] Despite this downward revision, the overall growth projected by BGE for this ten-year planning period remains the largest of any Maryland utility in absolute terms, with the Company projecting an additional 2,122 GWh in energy sales by 2026. In fact, absent BGE's inclusion in the statewide projections, the statewide compound annual growth rate for this planning period drops from 0.4 percent to 0.1 percent.

While BGE is forecasting the largest absolute increase in total energy sales during this planning horizon, Berlin is anticipating the largest percentage change. Part of the reasoning behind this trend is the economic trends for the regions and energy sales are connected. BGE's territory has a stable economic outlook, coupled with the large forecasted growth in industrial customers as discussed earlier, as reasons for continued and steady energy sales growth over the next ten years. Meanwhile, Berlin's forecast takes into consideration steady growth in the residential and commercial customer classes as the economy and incomes remain stable throughout its territory. The other reason is pure numbers. Berlin has smaller numbers in terms of scale, so any changes result in larger percentage changes than similar changes would in larger territories.

C. Peak Load Forecasts

PJM's 2017 Load Forecast Report includes long-term projections of peak loads for the entire wholesale market region and each PJM zone.[33,34] 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.[35] According to PJM's 2017 Load Forecast Report, the PJM Regional Transmission Organization ("RTO") will continue to be summer peaking during the next 15 years.[36] In 2017, the four PJM zones of which Maryland is comprised are projected to experience their peak

[32] Berlin, Easton, and PE projected larger growth rates for the 2017 - 2026 planning horizon than for the previous year's Plan.
[33] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 51-54, Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-report.ashx.
[34] 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.
[35] *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.
[36] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-report.ashx.

demands during the month of July,[37] the same month as the broader PJM Mid-Atlantic Region.[38]

In contrast to PJM's forecasts, Berlin, Hagerstown, and PE are forecasting their peak demands to occur in the winter in most or all of the forecasted years. These utilities have peaked in the winter consistently over the past few planning periods for reasons such as: higher concentrations of electric heating; geographical features; and colder temperatures. Figure 7 highlights the average February temperatures for Maryland. Hagerstown and PE cover territories that typically have colder temperatures than the rest of the State.

Figure 7 Average February Temperatures for Maryland[39]

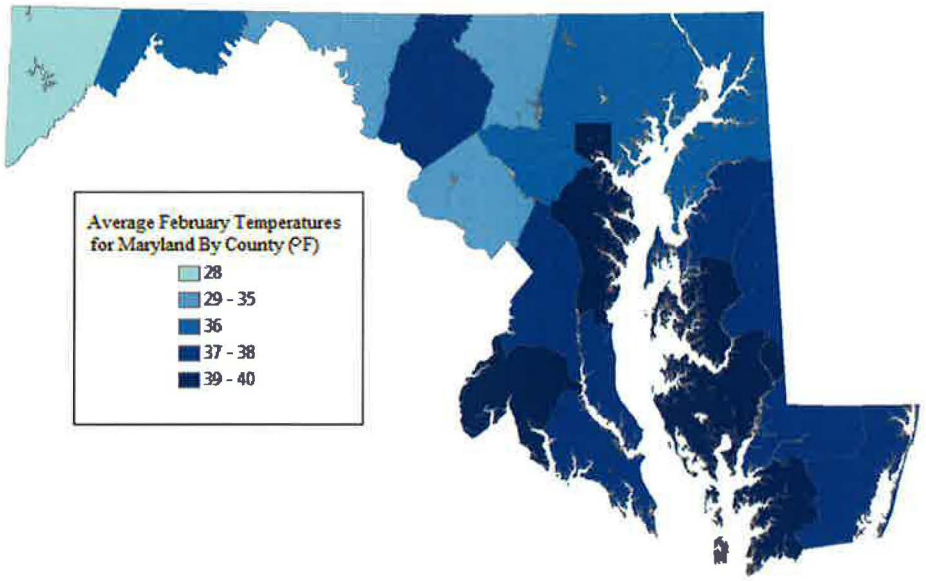


Figure 8 compares the average of the Maryland utilities' forecasted summer peak demands for their Maryland service territories with summer forecasts for the PJM Mid-Atlantic Region and for the PJM RTO as a whole. As illustrated below, the utilities' average summer peak demand growth rate follows a similar 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.

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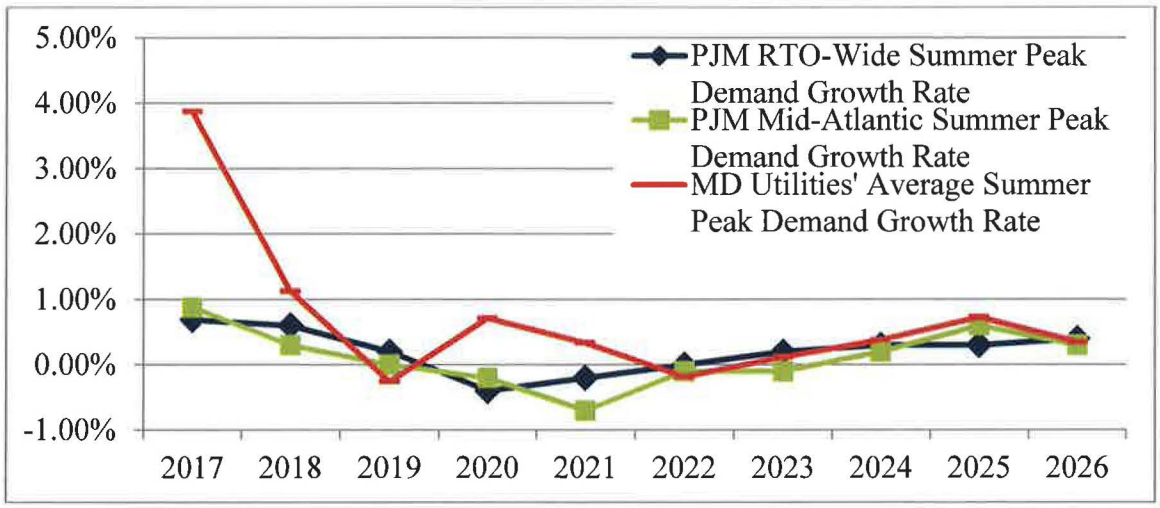
[37] *Id.* at 63-64, Table B-5.

[38] *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.

[39] Sources: http://www.usclimatedata.com/climate/, http://www.wunderground.com/history/

Also reflected in Figure 8 is a brief spike in the summer peak demand growth rates for the Maryland utilities in 2017, after which time the growth rates generally level off through 2026. The PJM 2017 Load Forecast report notes that 2020 corresponds to the next Reliability Pricing Model ("RPM") auction year, which may account for the fact that the 2017 forecast for the PJM RTO and PJM Mid-Atlantic show a decline in the summer peak growth rate while the Maryland utilities are projecting a spike.[40]

Figure 8 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[41,42]



The Maryland utilities also provided peak demand forecasts for the winter season in response to the Ten-Year Plan data request. Figure 9 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 8 and Figure 9 illustrates that the aggregated Maryland utilities' winter peak demand forecast follows a trajectory comparable to the summer peak demand growth rate projections after 2019. Both the PJM summer and winter peak demand forecasts and the PJM GDP growth forecast follow a pattern of peaking in the near-term before transitioning to a more modest level of projected growth in the second half of the planning period. Figure 10 shows that the Utilities' average gross winter peak growth rate is much more stable throughout the ten-year planning period than the average gross summer peak growth rate which peaks and declines several times.

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[40] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-report.ashx.
[41] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 51-54, Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-report.ashx.
[42] The Utilities' average summer peak demand growth rates were calculated using the Utilities' data responses to the Commission's 2017 data request for the Ten-Year Plan. *See* Appendix Table 3(a)(i).

Figure 9 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[43,44]

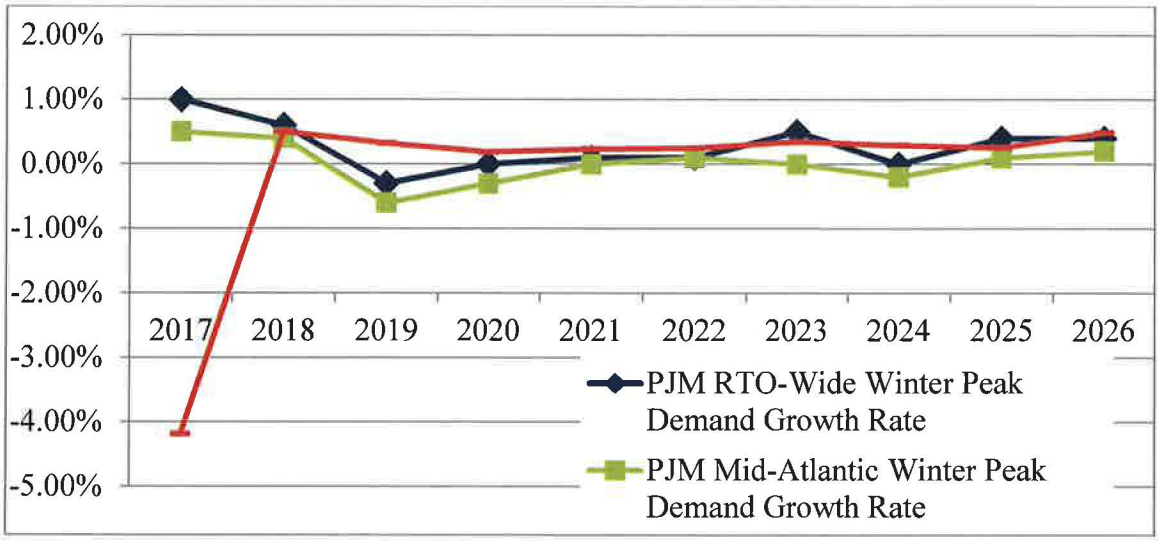
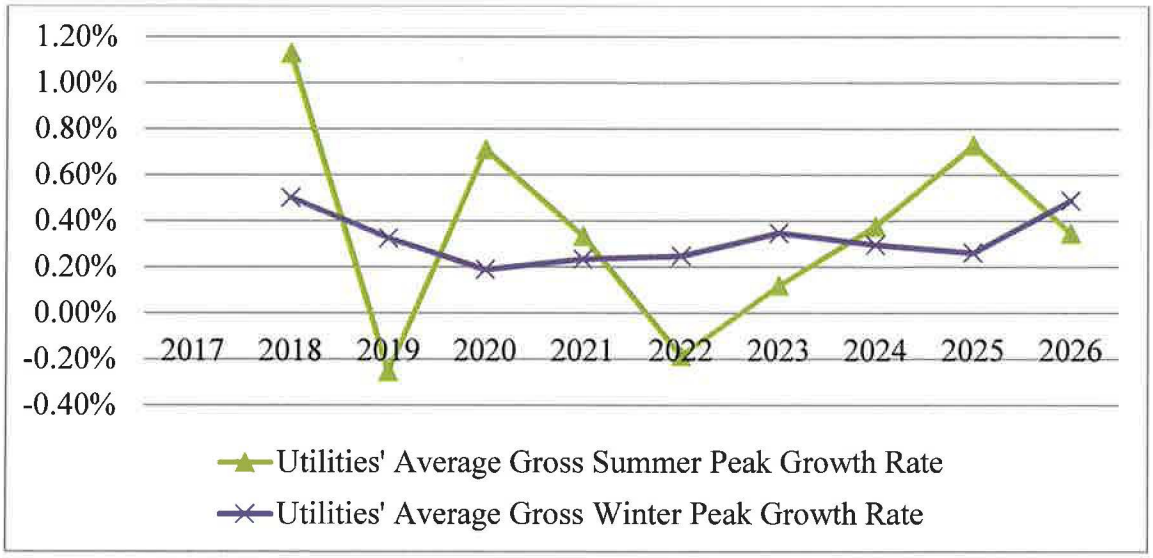


Figure 10 Utilities' Projected Summer Peak Demand Growth Rates (Gross of DSM) Compared to Utilities' Projected Winter Peak Demand Growth Rates (Gross of DSM)



[43] The Utilities' average winter peak demand growth rates were calculated using the Utilities' data responses to the Commission's 2017 data request for the Ten-Year Plan. *See* Appendix Table 3(a)(iii).

[44] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 55-58, Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-report.ashx.

As shown in Table 5 and Table 6 below, the ten-year forecasted Maryland growth rates of summer and winter peak demand (gross of DSM) are 0.37 percent and 0.32 percent, respectively.[45] In 2026 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 15,332 MW and an expected winter peak demand load (gross of DSM) for Maryland of 13,449 MW.[46]

Table 5: Maryland Summer Peak Demand Forecast (MW) (Gross of DSM)[47,48]

	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2017-2026)	1	16	38	65	2	3	91	224	58	497
Percent Change (2017-2026)	6.69%	0.23%	13.01%	6.13%	3.37%	4.59%	5.66%	5.71%	6.33%	3.35%
Compound Annual Growth Rate	0.72%	0.03%	1.37%	0.66%	0.37%	0.50%	0.61%	0.62%	0.68%	0.37%

Table 6: Maryland Winter Peak Demand Forecast (MW) (Gross of DSM)[49, 50]

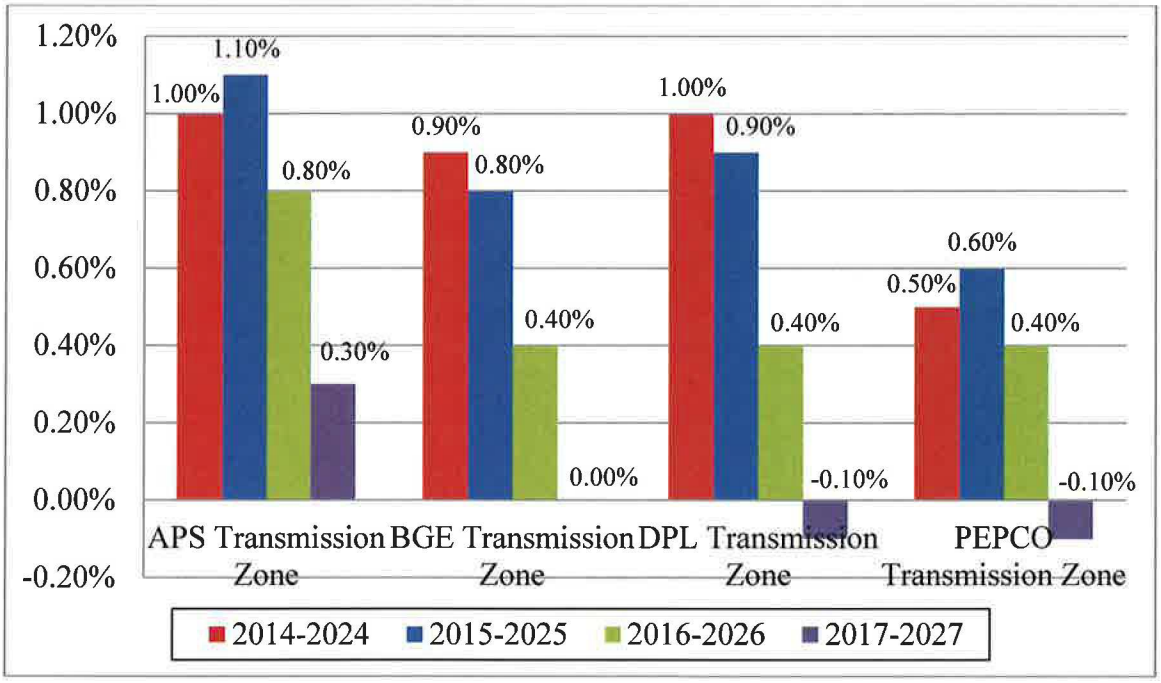
	Berlin	BGE	Choptank	DPL	Easton	Hagers -town	PE	Pepco	SMECO	Total
Change (2017-2026)	6	25	28	(18)	2	3	106	33	170	355
Percent Change (2017-2026)	44.05%	0.42%	9.86%	-4.05%	4.26%	4.59%	6.04%	1.21%	19.45%	2.93%
Compound Annual Growth Rate	4.14%	0.05%	1.05%	-0.46%	0.46%	0.50%	0.65%	0.13%	1.99%	0.32%

Figure 11 and Figure 12 compare the current and historical peak demand growth rates for the four PJM zones of which Maryland is comprised. As illustrated below, all four zones are projecting lower levels of growth than forecasted during the previous planning period. This trend largely corresponds to the utilities' peak demand forecasts, summarized in Table 5 and Table 6 above, which reflect diminished projections for the

[45] *See* Appendix Table 3(a).
[46] *See* Appendix Tables 3(a)(i) and 3(a)(iii).
[47] *Id.*
[48] 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.
[49] *See* Appendix Tables 3(a)(i) and 3(a)(iii).
[50] 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.

BGE, DPL, PE, and Pepco service territories relative to the previous planning period.[51] Figure 13 illustrates that both the summer and winter peak demand growth rates of the PJM RTO and the PJM Mid-Atlantic region have also declined from the previous planning period. This is largely attributable to the changes that PJM made in the load forecast models since the 2016 report; these changes are intended to better reflect the thermal efficiency of residential and commercial structures and increase granularity within each transmission zone.[52]

Figure 11 Comparison of Maryland PJM Zones' Ten-Year Summer Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2014, 2015, 2016, and 2017[53]



[51] DPL and Pepco are projecting slightly higher peak demand summer forecasts than the previous planning period.

[52] *PJM Load Forecast Report,* PJM, (Jan. 2017) at 2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx.

[53] *See PJM Load Forecast Report,* PJM, (Jan. 2014) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2014-load-forecast-report.ashx; *PJM Load Forecast Report*, PJM, (Jan. 2015) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2015-load-forecast-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2016) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2017) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx.

Figure 12 Comparison of Maryland PJM Zones' Ten-Year Winter Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2012, 2013, 2014, and 2015[54]

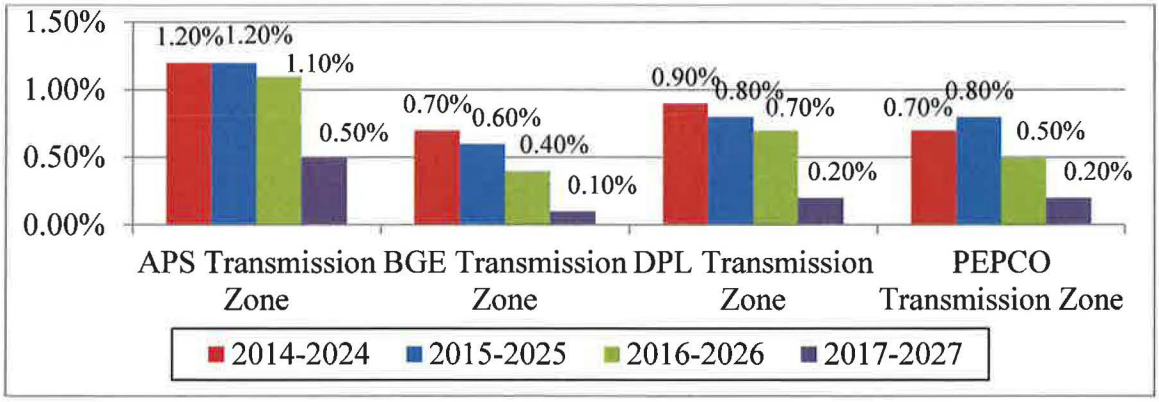
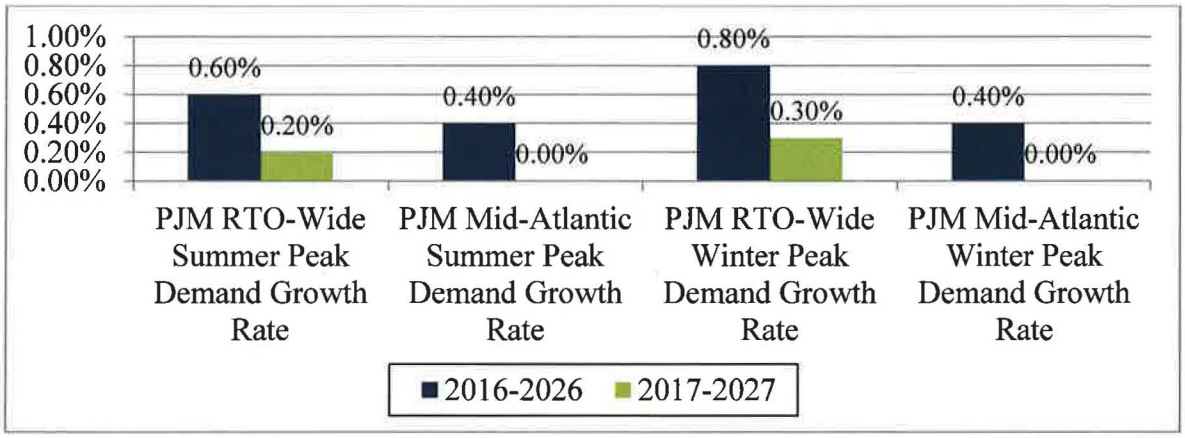


Figure 13 Comparison of PJM Ten-Year Peak Load Growth Rates as Reported in PJM Load Forecast Reports of 2016 and 2017[55]



[54] *See PJM Load Forecast Report,* PJM, (Jan. 2014) at Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2014-load-forecast-report.ashx; *PJM Load Forecast Report*, PJM, (Jan. 2015) at Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2015-load-forecast-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2016) at Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2017) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx.

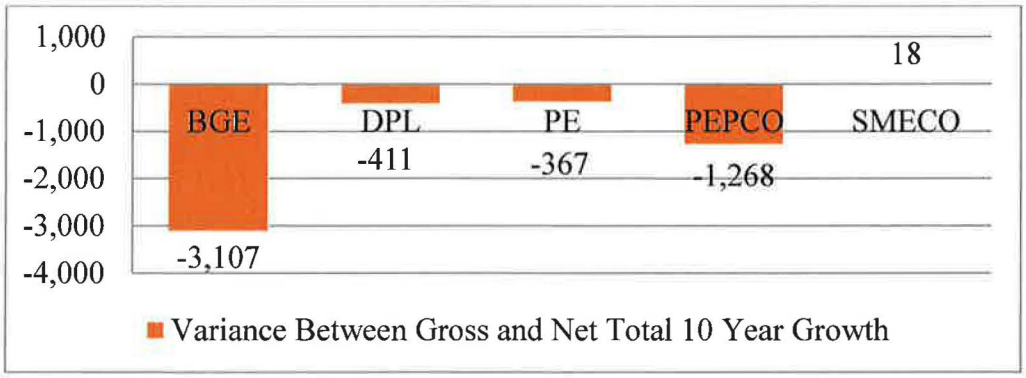
[55] *PJM Load Forecast Report,* PJM, (Jan. 2016) at Table B-1 and Table B-2, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-report.ashx; *PJM Load Forecast Report,* PJM, (Jan. 2017) at Table B-1, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx.

D. Impact of Demand Side Management

DSM programs result in lower growth of both energy sales and peak demand. To evaluate the impact of DSM programs, this section reflects the Maryland utilities' energy sales forecasts *after* the benefits of DSM programs are included ("net of DSM"). For purposes of this section, only the five utilities participating in EmPOWER Maryland are evaluated: BGE, DPL, PE, Pepco, and SMECO ("the Participating Utilities").[56] According to the Participating Utilities' Ten-Year Plan forecasts, the DSM programs will save a total of 52,139 GWh over the planning period. These savings will be achieved by reducing the annual rate of growth in energy sales and peak demand.

Figure 14 below shows the impact of the Participating Utilities' DSM programs on their respective energy sales projections over the duration of the ten-year planning period. BGE is forecasting the largest quantity of energy savings stemming from DSM programs, most notably from its Residential Lighting and Appliances Programs, and Smart Grid Programs, which represent 20.1 percent and 22.6 percent of BGE's forecasted savings, respectively.[57] Conversely, SMECO is forecasting the lowest quantity of savings attributable to DSM programs, due primarily to the fact that the Cooperative does not implement as many programs outside of its traditional energy efficiency and conservation ("EE&C") portfolio as compared to the other Participating Utilities that offer additional programs, such as: conservation voltage reduction ("CVR") program, Dynamic Pricing, Streetlights, and High Efficiency Transformers.

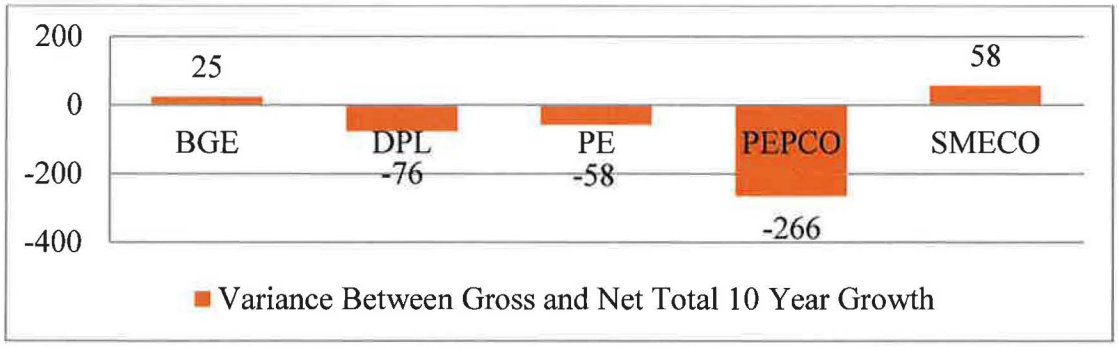
Figure 14 Impact of the Participating Utilities' DSM Programs on the Ten-Year Energy Sales Projections (MWh) [58]



[56] *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:* http://www.psc.state.md.us/wp-content/uploads/2016-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf.
[57] BGE's response to Staff's 2017 Data Request. The percentages represent the total savings the programs comprise of the 2015-2017 program cycle plan.
[58] *See* Appendix Table 2(a)(i) and 2(a)(ii) for the data used to make this Figure.

Figure 15 details the impact of the DSM programs on the Participating Utilities' 2017 peak demand forecasts as compared to their respective 2026 projections. As noted above, all of the Participating Utilities' programs are expected to experience an increased differential in peak demand growth attributable to DSM programs; however, Pepco is projecting the largest demand savings to accrue during the planning period attributable to the DSM programs. Pepco is forecasting that summer peak demand will be lower in 2026 than in 2017 due to its DSM programs, despite forecasted growth of 10 percent in the number of customers during the planning period and a summer peak demand growth rate (gross of DSM) for the 2017 – 2026 planning period of 5.7 percent.

Figure 15 Impact of the Participating Utilities' DSM Programs on the Ten-Year Summer Peak Load (MW) [59]



The tables below compare the growth in DSM savings across the Participating Utilities from 2017 to 2020. The forecasted savings post-2017, however, fluctuate in derivation method and amount across the Participating Utilities given that Commission-approved plans for utility-implemented EE&C programs pertain to the 2015 – 2017 program cycle only at this time.[60] 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 2017 – 2025 planning horizon may be affected by future iterations of EmPOWER Maryland program cycle proposals, as well as pending changes to the capacity market as a result of PJM's Capacity Performance Proposal.[61]

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[59] *See* Appendix Table 3(a)(i) and 3(a)(ii) for the data used to make this Figure.

[60] Because the Commission has only approved plans pertaining to the 2015 – 2017 program cycle at this date, BGE did not include any EE&C savings projections after 2017, with the exception of its Residential Demand Response Program. The other Participating Utilities assume a constant level of savings post-2017.

[61] On June 15, 2015, the FERC approved a proposal by PJM to dramatically restructure its capacity market, referred to as the "capacity performance" ("CP") proposal. PJM

Table 7: Average Annual Increase in Demand Savings due to DSM Programs from 2017 to 2020 for EE&C Programs[62,63]

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-4.7%	15.4%	13.0%	12.4%	-36.0%

noted that its proposal is intended to result in larger capacity payments for the most reliable resources, and higher penalties for non-performers. Critics of the CP proposal, including the Maryland Commission, countered that the changes are unnecessary for reliable service operations and will likely increase electricity end user costs significantly, and further that the CP proposal generates major concerns regarding the future of DR and intermittent resources. Without modification to the CP proposal, the Maryland Commission and others warned that the majority of DR resources will be required to withdraw from the PJM market. On November 17, 2016, PJM filed with the FERC several improvements to the CP proposal, which it asserts will increase opportunities for seasonal resources (such as summer-focused DR programs) to participate in the capacity auctions. With FERC approval, the changes were in effect for the May 2017 auction for the 2020 – 2021 delivery year. Because of the uncertainty surrounding the PJM CP proposal and proposed modifications, this Ten-Year Plan does not speculate further as to the CP proposal's impact on Maryland utilities' future DSM savings during the remainder of the ten-year planning horizon; however, future iterations of the Ten-Year Plan will explore this topic further.

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

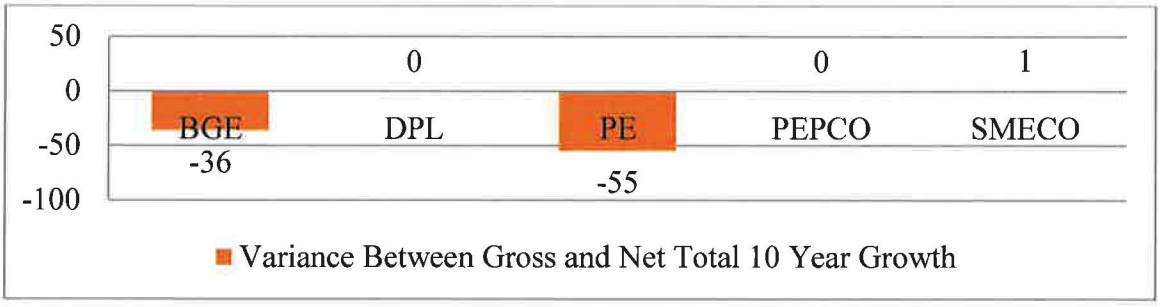
[63] BGE and SMECO are projecting a decrease in average annual demand savings from 2017 to 2020 for EE&C programs. BGE's decrease is due to 2018's demand savings being 14 percent smaller than 2017's savings, and then those 2018 values are held constant through 2020 for an annual change of -14% percent between 2017 and 2018 and 0 percent between 2018 and 2019 and between 2019 and 2020, for an average of -4.7 percent. SMECO's decrease is because 2018's demand savings are 25 percent smaller than 2017's savings and 2019's savings are 89 percent smaller than 2018's with only a 0.6 percent increase between 2019's demand savings and 2020's, for an average of -36 percent. BGE only accounted for demand savings for EE&C programs through 2017 since that is what has been approved by the Commission. It held its Demand Response program savings constant through 2026 for the reasons listed above. SMECO only included savings for its Demand Response programs through 2018.

Table 8: Average Annual Increase in Demand Savings due to DSM Programs from 2017 to 2020 for All DSM Programs[64,65]

Description	BGE	DPL	PE	Pepco	SMECO
Average Annual MW Savings Increase due to DSM Programs	-1.3%	19.1%	11.5%	12.3%	-36.0%

As illustrated by Figure 16, none of the Participating Utilities are forecasting a significant reduction in *winter* peak demand due to the DSM programs, since the majority of DSM programs focus on summer peak demand reduction opportunities. While Pepco and DPL operate energy efficiency programs similar to the other Participating Utilities, the PHI Companies did not project any DSM program savings for the winter peak load. Conversely, BGE projected sizeable winter peak demand savings, attributable to a combination of its residential direct load control (*i.e.*, hot water heaters), CVR, and Smart Grid program offerings. DPL and Pepco did not report DSM programs for winter peak demand therefore the graph below reflects a zero net impact for the DPL and Pepco service territories.[66]

Figure 16 Impact of the Participating Utilities' DSM Programs on the Ten-Year Winter Peak Load (MW)[67]



[64] *Id.*

[65] BGE and SMECO are projecting a decrease in average annual demand savings from 2017 to 2020 for all DSM programs. BGE's decrease is because 2018's demand savings are 6 percent smaller than 2017's savings, and then the increases between 2018 and 2019 and 2019 and 2020 are modest at 1.1 percent and 1.4 percent respectively for an average of -1.3 percent. SMECO's decrease is because 2018's demand savings are 24 percent smaller than 2017's savings and 2019's savings are 85 percent smaller than 2018's with only a 0.6% increase between 2019's demand savings and 2020's, for an average of -36 percent. BGE only accounted for demand savings for EE&C programs through 2017 since that is what has been approved by the Commission. It held its Demand Response program savings constant through 2026 for the reasons listed above. SMECO only included savings for its Demand Response programs through 2018.

[66] SMECO reports a difference in the total numbers for gross and net winter peak demand; however, there is no difference in the growth rates.

[67] *See* Appendix Tables 3(a)(iii) and 3(a)(iv) for data used to derive this graph.

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 regional transmission and importation by the PJM market system. 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 2015, Maryland's net summer generating capacity was approximately 12,408 MW.[68] Maryland's peak demand forecast for 2017, net of utility demand-side management and energy conservation measures, is approximately 13,266 MW.[69] Although Maryland's summer peak demand has grown faster than the State's net summer generating capacity over the last several years, Maryland was able to meet 96.6 percent of its summer peak demand with in-State generation in 2015.[70,71] This is consistent with the trend in Maryland energy imports discussed in more detail in Part B of this section.

A. Regional Transmission [72]

PJM in its 2016 Regional Transmission Expansion Plan ("RTEP") authorized more than $1.5 billion dollars in system transmission improvement projects. The development of the RTEP takes into account the total effects of system trends, which are often driven by federal and state policy decisions. The planning process takes into consideration the following: (1) load growth forecast; (2) distributed energy resources;

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[68] The U.S. Energy Information Administration ("EIA"), State Electricity Profile: Maryland; http://www.eia.gov/electricity/state/Maryland/.
[69] *See* Appendix Table 3(a)(ii).
[70] The EIA's most recent data available is from 2015. The next anticipated release date is listed as December 2017.
[71] The peak demand net of DSM programs for the summer of 2015 was 12,844 according to the 2015-2024 Ten-Year Plan. 12,408/12,844 = 96.6%
[72] *See* Appendix Table 4 for a full list of transmission enhancements proposed by Maryland utilities.

and (3) changes in capacity mix, grid resilience, winter peak capacity, and geomagnetic disturbances.[73]

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.[74] 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.

As shown in Table 9, in 2016 the congestion costs decreased for the second time in three years. Total congestion costs for the PJM RTO decreased by 26.1% ($361.6 million) between 2015 and 2016. According to PJM, the BGE Control Zone had the third highest congestion charges of any control zone in 2016 largely due to the positive load congestion payments being offset by smaller positive generation congestion credits.

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[73] *2016 Regional Transmission Expansion Plan.* PJM, (February 28, 2017) at 4 - 8, http://www.pjm.com/-/media/library/reports-notices/2016-rtep/2016-rtep-book-1.ashx?la=en.

[74] Monitoring Analytics, *State of the Market Report for PJM - 2015*, PJM, (March 10, 2016) at 415, http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2015/2015-som-pjm-volume2.pdf.

Table 9: PJM Total Annual Zonal Congestion Costs, 2014 – 2016[75]

PJM Control Zone	2014 Total Annual Zonal Congestion Costs ($ million)	2015 Total Annual Zonal Congestion Costs ($ million)	2016 Total Annual Zonal Congestion Costs ($ million)
Allegheny Power (Potomac Edison)	$189.50	$93.70	$42.40
Baltimore Gas and Electric	$150.70	$126.80	$128.80
Delmarva Power	$112.30	$48.40	$12.60
Potomac Electric Power[76]	$148.20	$132.70	$92.40
Maryland Zones Total	**$600.70**	**$401.60**	**$276.20**
PJM RTO Total Annual Zonal Congestion Costs ($ Million)	**$1,932.20**	**$1,385.30**	**$1,023.70**
Percent Attributed to MD Zones	**31.1%**	**29.0%**	**27.0%**
Change in Costs for PJM RTO From Previous Year	**185.4%**	**-28.3%**	**-26.1%**
Change in Costs for MD Zones From Previous Year	**179.4%**	**-33.1%**	**-31.2%**

[75] *Monitoring Analytics - PJM State of the Market - 2016, Tables G-1 and G-2, http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016/2016-som-pjm-volume2-appendix.pdf*

[76] In 2016, the North American Electric Reliability Corporation ("NERC") determined that SMECO's 230 kV facilities should be considered as part of the bulk electric system, resulting in a requirement that SMECO register with NERC as a transmission owner with respect to the applicable facilities. On November 1, 2016, PJM and SMECO submitted a joint filing with the Federal Energy Regulatory Commission ("FERC") in Docket No. ER17-282 proposing to make SMECO subject to PJM transmission operations and planning protocols. Subject to FERC approval of the SMECO/PJM filing, SMECO will be added to the Transmission Owners Agreement as a Zero Revenue Requirement Party. Zonal congestion costs for SMECO will continue to be reflected in the Pepco Transmission Control Zone. *See* PJM Interconnection, LLC, *Docket No. ER17-282-000 (OATT) and Docket No. ER17-283-000(TOA)* (Nov. 1, 2016), http://www.pjm.com/media/documents/etariff/FercDockets/2003/20161101-er17-282-000.pdf.

2. Regional Transmission Upgrades

The Commission recognizes the need to maintain and improve the transmission system within Maryland in order to ensure safe, reliable, and economic electric service to the State's ratepayers. As with increases in local generating capacity and the reduction of system load, transmission expansions and improvements can reduce congestion and LMP differences among zones; such improvements may also support reliability requirements and mitigate economic concerns.

In 2016, to ensure the smooth operation of the transmission system within the PJM service territory, the PJM Board and PJM's 2016 RTEP approved 334 individual bulk electric system baseline and network upgrades, totaling $712 million and $985 million, respectively.[77] The authorized transmission upgrades to improve system reliability could potentially also alleviate some congestion costs in Maryland, since a portion of the transmission upgrades approved by the PJM Board in 2016 are located in Maryland and the District of Columba.[78] PJM's 2016 RTEP authorized 6 transmission upgrades for Maryland and the District of Columbia, with each costing more than $5 million.[79] Together, the upgrades cost approximately $137 million.[80]

The Edison Electric Institute, in its *Transmission Projects: at a Glance* report, highlighted five recent transmission upgrades within Maryland. The five recent projects total approximately $297 million and are highlighted below.[81]

- Conastone – Graceton – Raphael Road Project: This project consists of constructing and building 29 miles of 230kV lines between Conastone, Graceton, and Raphael Rd in the BGE Zone. The improvement will create double-circuit connections between the substations; increasing circuit capabilities. The project costs approximately $111 million and remains under construction. [82]

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[77] *Book 1: PJM 2016 RTEP State Summaries*, PJM, at 4, (February 28, 2017), http://www.pjm.com/-/media/library/reports-notices/2016-rtep/2016-rtep-book-1.ashx?la=en.

[78] PJM's RTEP report treats Maryland and the District of Columbia as one region.

[79] Maryland and Washington D.C., Infrastructure Report, PJM, at 17-22, (July 2017), *http://www.pjm.com/-/media/library/reports-notices/2016-rtep/2016-maryland-and-dc-state-reports.ashx?la=en.*

[80] *Id. at 3.*

[81] Edison Electric Institute, *Transmission Projects at a Glance* (December 2016), *available at*: http://www.eei.org/issuesandpolicy/transmission/Documents/Trans_Project_lowres_bookmarked.pdf.

[82] Edison Electric Institute, *Transmission Projects at a Glance* (December 2016), *available at*: http://www.eei.org/issuesandpolicy/transmission/Documents/Trans_Project_lowres_bookmarked.pdf at 72.

- Constitution Street 115 kV Switching Station: The project consists of building a new 115 kV breaker and a half arrangement Gas Insulated Substation (GIS) on the new Front Street site (between Green Street substation and Concord Street substation). The project also includes a new 115 kV underground line from Orchard Street to Constitution Street substation. The project costs approximately $50 million, and the first phase is expected to be completed by June 1, 2014. The second phase is currently underway.[83]

- Burtonsville-Metzerott-Takoma Transmission Project: The project consists of replacing 10 miles of double circuit 230 kV transmission line between the Burtonsville Substation in Laurel, Maryland, and the Takoma Substation, in Takoma, Maryland. The project also includes upgrades at each substation. The project is designed to replace aging infrastructure and to address winter load reliability issues. The project will also increase the transmission capacity into the Takoma and Metzerott areas. The project costs approximately $35 million and was completed in June of 2015. [84]

- BL England At-Risk Transmission Projects: The BL England at-risk projects consist of upgrades to existing 138 kV, and 69 kV infrastructure in the Atlantic City Electric (ACE) zone. The projects are required to address numerous transmission reliability concerns if the BL England generation plant is retired, as identified by PJM. The project is estimated to cost approximately $165 million and is expected to be completed between 2015-2019.[85]

- Delmarva Power: Wattsville – Piney Grove New 138 kV Transmission Line: The project eliminates the generation deliverability criteria violation identified in the 2013 RTEP analysis. The new 138 kV Piney Grove – Wattsville line will eliminate this overload and mitigate voltage issues in the area as well as also addressing the age and condition of existing infrastructure. This project cost approximately $47 million and is expected to be completed June 1, 2018.[86]

Appendix Table 4 lists all transmission enhancements identified by the Maryland utilities in response to data requests for the Ten-Year Plan. Together, the 28 identified transmission enhancements in Appendix Table 4 account for over 194.5 miles of upgrades.

[83] *Id.*72.
[84] *Id.* at 74.
[85] *Id.* at 76.
[86] *Id. at* 76.

B. Electricity Imports

Maryland continues to be a net importer of electricity, similar to many other states in PJM.[87] As of 2015, 46 percent of the electricity consumed in the State is imported from other states and internationally.[88] As illustrated in the table below, nine of the 13 PJM states plus the District of Columbia are net importers of electricity. In a nationwide comparison, Maryland is the fourth largest electricity importer based on percentage of electricity sales.[89] Only the District of Columbia, Vermont, and Massachusetts exceed Maryland in the percentage of electricity sales that are imported. In contrast, as of 2015, the states within the PJM region that exported more electricity in aggregate than consumed within each state are: Illinois, Kentucky, Pennsylvania, Michigan, and West Virginia.[90] Table 10 shows the percentage of retail sales that was imported by Maryland in 2015, together with other net-importing states in the PJM RTO and the country.

[87] 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.

[88] *State Electricity Profiles 2014*, U.S. Energy Information Administration, (June 3, 2016) at Table 10, http://www.eia.gov/electricity/state/maryland/xls/sept10md.xls.

[89] *State Electricity Profiles 2014*, U.S. Energy Information Administration, (June 3, 2016), at Table 10 (for each state, http://www.eia.gov/electricity/state/index.cfm.

[90] *Electricity Power Industry Generation by Primary Energy Source, 1990-2014 Maryland*, U.S. Energy Information Administration, (June 2017) at Table 10.

Table 10: State Electricity Imports (Year 2015) (GWh) [91]

Electricity Imports 2015									
State	Retail Sales	Direct Use	Losses	Total Sales, Direct Use and Losses	Net Interstate Trade	International Imports	International Exports	Net Imports	Percent Retail Sales Imported
District of Columbia	11,291,233	71,837	563,133	11,926,203	(12,045,215)	-	-	(12,045,215)	101%
Vermont	5,521,109	4,375	275,357	5,800,841	6,887,947	10,804,451	13,235	(3,903,269)	67%
Massachusetts	54,621,088	1,186,376	2,724,142	58,531,606	(25,950,917)	1,338,101	7,650	(27,281,368)	47%
Maryland	61,683,869	844,760	3,262,266	65,790,895	(28,524,880)	181,263	1,047	(28,705,096)	44%
Delaware	11,498,205	768,848	573,455	12,840,508	(5,206,431)	-	-	(5,206,431)	41%
Idaho	23,058,814	633,465	1,150,022	24,842,301	(9,514,335)	19,104	5,420	(9,528,019)	38%
California	261,170,437	11,510,704	13,025,469	285,706,610	(79,365,599)	13,782,398	-	(93,147,997)	33%
Virginia	112,009,045	2,741,042	5,586,277	120,336,364	(37,638,570)	-	-	(37,638,570)	31%
Tennessee	99,632,108	2,523,087	4,968,996	107,124,191	(33,433,980)	-	-	(33,433,980)	31%
South Dakota	12,101,979	63	603,567	12,705,609	(3,257,744)	-	-	(3,257,744)	26%
Ohio	149,213,224	1,199,485	7,441,777	157,854,486	(38,244,127)	-	-	(38,244,127)	24%
Maine	11,888,168	2,417,219	592,904	14,898,291	1,377,151	4,999,517	283,445	(3,338,921)	22%
Minnesota	66,579,234	1,147,220	3,320,536	71,046,990	(7,075,919)	8,037,772	27,771	(15,085,920)	21%
Wisconsin	69,494,755	2,117,420	3,675,359	75,287,534	(15,065,290)	-	-	(15,065,290)	20%
Rhode Island	7,664,718	35,320	382,266	8,082,304	(1,097,908)	162,651	-	(1,260,559)	16%
Georgia	135,878,215	5,256,855	6,776,714	147,911,784	(21,172,896)	-	-	(21,172,896)	14%
New York	148,913,655	1,666,049	7,426,836	158,006,540	(4,361,322)	17,790,977	495,020	(21,657,279)	14%
Indiana	104,514,518	8,352,553	5,212,499	118,079,570	(15,541,868)	122,740	5,185	(15,659,423)	13%
North Carolina	133,847,523	2,296,824	6,675,437	142,819,784	(16,479,278)	-	-	(16,479,278)	12%
Colorado	54,116,046	73,138	2,698,953	56,888,137	(5,322,535)	638	109	(5,323,064)	9%
Louisiana	91,676,489	20,810,055	1,402,699	113,889,243	(10,649,112)	-	-	(10,649,112)	9%
New Jersey	75,489,623	1,521,535	3,764,927	80,776,085	(7,088,072)	234,185	-	(7,322,257)	9%
Florida	235,599,398	5,389,463	11,750,153	252,739,014	(18,931,178)	-	-	(18,931,178)	7%
Michigan	103,314,098	2,333,108	5,463,958	111,111,164	297,513	6,175,525	331,263	(5,546,749)	5%
Missouri	81,504,081	268,017	4,064,889	85,836,987	(3,443,976)	-	-	(3,443,976)	4%
Nevada	35,075,606	105,014	1,855,039	37,035,659	(1,420,798)	40,345	766	(1,460,377)	4%
Texas	392,337,354	36,116,457	19,567,214	448,021,025	(4,450,549)	-	252,888	(4,197,661)	1%

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 2015, however, in-State resources generated slightly under 37 million MWh.[92]

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

[91] *Id.*

[92] *Electricity Power Industry Generation by Primary Energy Source, 1990-2014 Maryland*, U.S. Energy Information Administration, (June 2017) at Table 5, http://www.eia.gov/electricity/state/maryland/xls/sept05md.xls.

region. On a per capita basis, Maryland's actual peak demand for 2015 was 2.06 kW.[93] Compared to the per capita peak demand in 2007 of 2.07 kW, there has been a 7.53 percent decrease over the last 8 years.

C. Maryland Capacity and Generation Profiles

The capacity and generation profiles of in-State resources must be comprehensively analyzed for both short- and long-term reliability planning purposes, due to the uncertain future of coal-fired generation.[94] 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.[95]

1. Conventional Capacity and Generation Profiles, 2015

Coal-fired power plants represent 38 percent of the electric generating capacity in Maryland, of which 88 percent of such capacity is aged 31 years or older. Within this category, 52 percent is considered "at-risk," as defined by PJM.[96] Table 11 and Table 12 below depict the electric generating capacity in Maryland, as well as the age of plants by fuel type.[97]

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[93] *Per Capita Peak Electricity Consumption*, Maryland State Stat, Per Capita Peak Electricity Demand Line Chart (2015), at D13. http://www.dbm.maryland.gov/Documents/MFR_documents/2018/MarylandEnergyAdministration.pdf.

[94] 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.

[95] 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.

[96] 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.

[97] *See* Appendix Table 5 for a complete list of Maryland generation capacity in 2015.

Table 11: Maryland Summer Peak Capacity Profile, 2015[98]

Primary Fuel Type	Capacity	
	Summer (MW)	Percent of Total
Coal	4,712.0	38.0%
Oil	1,648.9	13.3%
Natural Gas	3,320.8	26.8%
Nuclear	1,707.8	13.8%
Hydroelectric	590.0	4.8%
Other and Renewables	417.0	3.4%
Total	**12,396.5**	**100.0%**

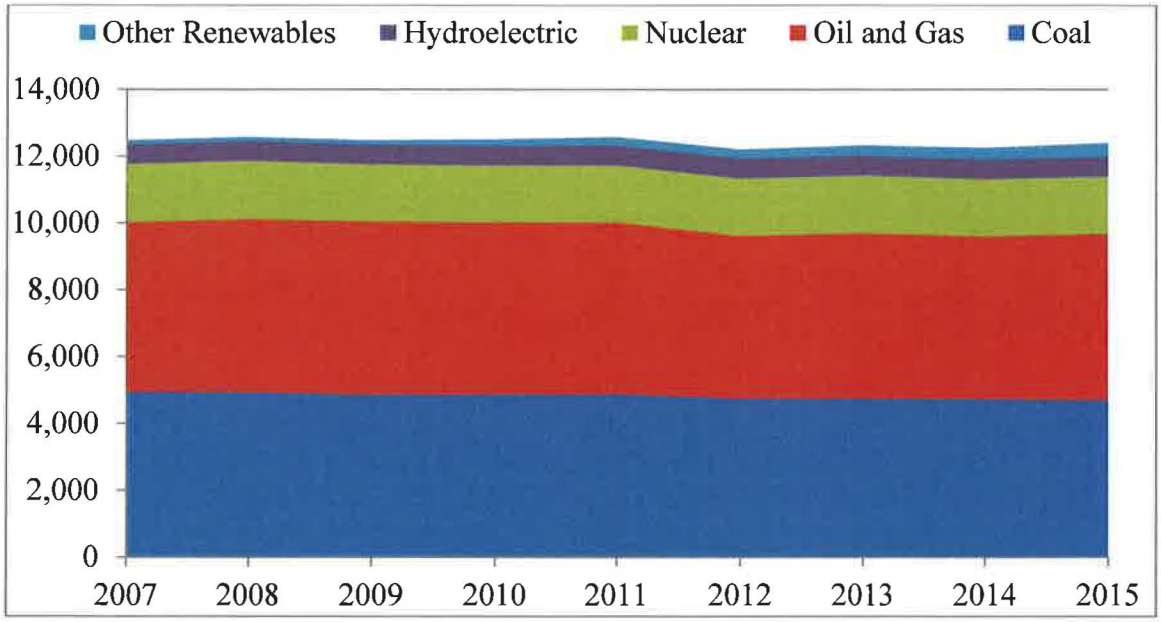
Table 12: Age of Maryland Generation by Fuel Type, 2015[99]

Primary Fuel Type	Age of Plants, By Percent			
	1-10 Years	11-20 Years	21-30 Years	31+ Years
Coal	0%	6%	6%	88%
Oil	3%	10%	24%	63%
Natural Gas	18%	34%	7%	41%
Nuclear	0%	0%	0%	100%
Hydroelectric	0%	0%	0%	100%
Other and Renewables	79%	8%	11%	2%

Maryland's summer peak capacity profile increased by 248.7 MW in 2015 compared to 2014, as illustrated in Figure 17. The new capacity added in 2015 can be attributed to increases in renewable generation, oil, and gas.

[98] *Report EIA-860: "3_1_Generator_Y2014" Excel*, U.S. Energy Information Administration (last visited June 27, 2017), http://www.eia.gov/cneaf/electricity/page/eia860.html.
[99] Electricity Power Industry Capability by Primary Energy Source, 1990-2014 Maryland, U.S. Energy Information Administration, (June 27, 2017) at Table 4.

Figure 17 Maryland Summer Capacity Profile (MW), 2007 – 2015[100]



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 over half of in-State capacity.[101] Conversely, oil and natural gas facilities, which operate as mid-merit or peaking units that come on-line when needed, generate 13% of the electric energy produced in Maryland while representing over 40 percent of in-State capacity.[102] Table 13 summarizes Maryland's 2015 in-State generation profile according to fuel source.

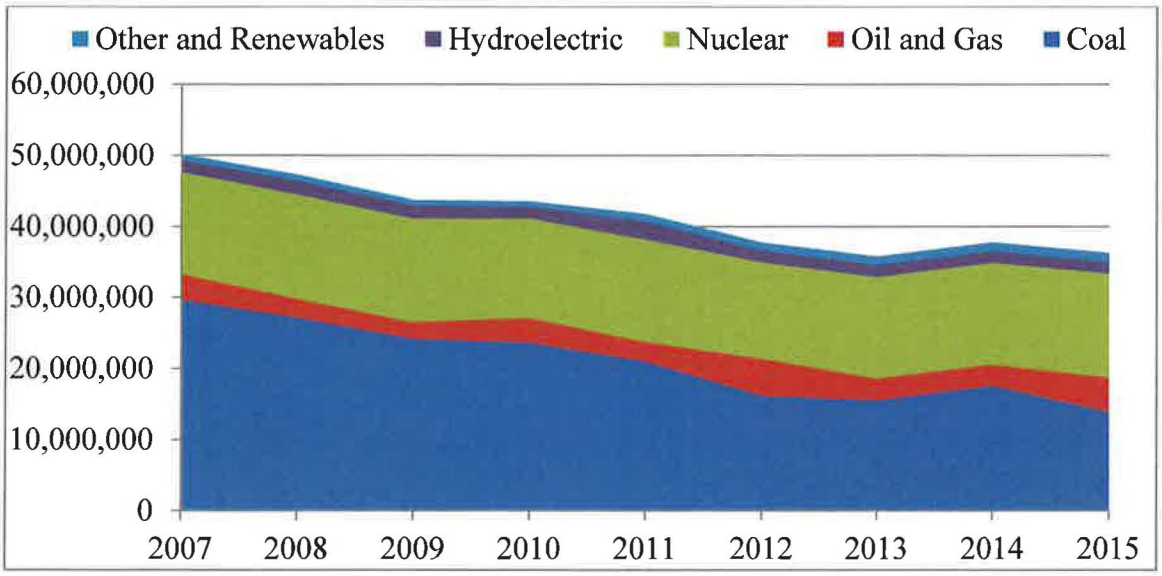
[100] http://www.eia.gov/electricity/state/maryland/xls/sept04md.xls.
[101] *See supra* Table 11. Coal facilities represented 38% of the in-State capacity in 2015, while nuclear facilities represented 13.8% of capacity. Therefore, coal and nuclear facilities combined for almost 52% of Maryland's generating capacity profile in 2015.
[102] *Id.*

Table 13: Maryland Generation Profile, 2015[103]

Primary Fuel Source	Generation	
	Annual (MWh)	Percent of Total
Coal	13,925,604	38.3%
Oil	232,348	0.6%
Gas	4,555,345	12.5%
Nuclear	14,643,325	40.3%
Hydroelectric	1,623,190	4.5%
Other & Renewables	1,385,732	3.8%
Total	**36,365,544**	**100.0%**

Unlike the stability historically exhibited by Maryland's summer capacity profile, the percentage of in-State generation derived from various fuel sources continues to evolve as illustrated in Figure 18 below. Between 2007 and 2015, in-state coal generation decreased by approximately 13,832 GWh, causing the percentage of in-state generation derived from coal to decrease from 59.2 percent in 2007, to roughly 38.3 percent in 2015.

Figure 18 Maryland Generation Profile, 2007 – 2015[104]



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

[103] *State Electricity Profiles 2015*, U.S. Energy Information Administration, (June 27, 2017) at Table 5, http://www.eia.gov/electricity/state/Maryland/xls/sept05md.xls.
[104] *Electricity Power Industry Generation by Primary Energy Source, 1990-2014* Maryland, U.S. Energy Information Administration, (June 2016) at Table 5, http://www.eia.gov/electricity/state/maryland/xls/sept05md.xls.

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 38 percent of the in-State generation in 2015. 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 currently registers approximately 127 MW of capacity in Maryland retired in 2016. This represents more than 32 percent of the 392 MW that retired RTO-wide in 2016.[105] BGE and Pepco have pending deactivation requests for Wagner 2 for 135 MW and GUDE Landfill for .8 MW, respectively. PJM currently registers 7,560 MW of capacity resources requesting deactivation within the RTO.[106] PJM completed a reliability analysis and identified no reliability impacts associated with either deactivation request. There are no projects outside of the State, but within the four transmission zones that include Maryland, for which deactivation has been requested at this time.[107]

2. Proposed Conventional Generation Additions[108]

The construction of new generation, both conventional and renewable, is a way to address the in-State capacity and electricity import issues discussed in previous sections. As of the date of this report, there was no new coal, oil, natural gas, or nuclear generation in the State had been proposed during the planning period. [109]

3. Renewable Generation and Proposed Additions[110]

The Commission recognizes the importance renewable generation plays in meeting Maryland's energy needs while also addressing environmental concerns. Based

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[105] Maryland and Washington D.C., PJM, at 3, (July 2017), http://www.pjm.com/-/media/library/reports-notices/2016-rtep/2016-maryland-and-dc-state-reports.ashx?la=en.

[106] *Future Deactivations,* PJM (last visited July 27, 2017), http://www.pjm.com/~/media/planning/gen-retire/pending-deactivation-requests-xls.ashx.

[107] *Id.*

[108] *See* Appendix Table 6 for a complete list of new conventional generation proposed in Maryland.

[109] *Generation Queues: Active (Maryland)*, PJM (November, 2016) http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx.

[110] Maryland's Renewable Portfolio Standard has helped incent a significant amount of 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. More details can be found at the *Renewable Energy Standard Report;* available at: *http://www.psc.state.md.us/wp-content/uploads/2016-Renewable-Energy-Portfolio-Report.pdf.*

on the PJM queue, Maryland's renewable generation capacity is planned to increase by an estimated 1,730 MW over the next few years as shown in Table 14 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 14: Proposed New Renewable Generation in Maryland

Transmission Owner	Fuel Type	In-Service Date Range	Total Capacity (MW)
APS	Solar	2019	214
	Hydro	2019	15
BGE	Nuclear	2017-2018	30
DPL	Solar	2016-2019	1,001
	Biomass	2019	4
	Methane; Solar	2018	12
	Storage	2017	1
	Natural Gas	2017	390
Pepco	Solar	2017	3
SMECO	Solar	2018	60
Total (MW):			1,730

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

D. PJM's Reliability Pricing Model

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

("LDA") (and capacity imported into constrained LDAs) are paid the Unconstrained (lower) Resource Clearing Price.

Using this information, PJM evaluates offers from generators and other resources three years in advance to be available for a one year delivery period running from June through May (up to three years for new generation) through the Base Residual Auction ("BRA").[111] 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 the North American Electric Reliability Corporation ("NERC").

However, the Commission noted in Case No. 9214 that "[s]ince its inception in 2007, RPM has brought no new generation to Maryland, in spite of the fact that clearing prices for capacity in Southwestern MAAC ("SWMAAC") have averaged almost double those of the non-constrained[112] portions of PJM."[113] Furthermore, the Mid-Atlantic Advisory Council ("MAAC") LDA, which includes SWMAAC, has experienced significant volatility in Net Zonal Load[114] 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.

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[111] Reliability Pricing Model, PJM Markets & Operations (last visited August 17, 2017), http://www.pjm.org/markets-and-operations/rpm.aspx.

[112] Constraints are limitations on delivery of electricity through the grid. When constraints occur, issues such as the inability to use the "next least-cost generator", need to use higher-cost generators closer to load to meet demand, and increased costs are placed on the constrained portions of PJM. Non-constrained portions are where there are no issues with delivering electricity to meet demand. (http://www.pjm.com/~/media/training/nerc-certifications/markets-exam-materials/mkt-optimization-wkshp/locational-marginal-pricing-components.ashx)

[113] *In the Matter of Whether New Generating Facilities are Needed to Meet Long-Term Demand for Standard Offer Service*, Case No. 9214, Order No. 84815 (April 12, 2012), pp. 22.

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

Table 15 PJM BRA Capacity Prices by Zone[115]

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

PJM noted the 2017/2018 capacity prices were greater than the previous delivery year due to a net increase in supply from improved design elements and a shift in demand resources with more flexibility and contributes to reliability.[116] The amount of cleared capacity in the 2017/2018 BRA decreased by 2,156 MW over the 2016/2017 BRA.[117]

V. Conclusion

Electricity sector planning will continue to be effected by several different issues over the next ten years, including projections regarding Maryland utility customers, energy sales, and in-State capacity and generation profiles. Other factors that will play a significant role in the planning process will be Maryland's median income, the State's population, and its housing stock. The Maryland utilities' load forecasts indicate a modest amount of projected annual growth in the number of customers, energy sales, and peak demand throughout the State during the 2017 – 2026 planning horizon. The PJM interconnection queue indicates an expected increase in both conventional and renewable generation in the State over the next several years. In response to these, and other developments, the 2018 – 2027 Ten-Year Plan will review and assess the impacts that the above-mentioned issues will have on Maryland's long-term electricity resource planning.

[115] *PJM RPM Auction User Information: Delivery Year*, PJM Markets & Operations (Delivery Years 2012-2017), http://www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx.
[116] *2017/2018 RPM Base Residual Auction Results,* PJM, at 1 (May 23, 2014), http://www.pjm.com/~/media/markets-ops/rpm/rpm-auction-info/2017-2018-base-residual-auction-report.ashx,
[117] *Id.* at 1.

VI. Appendices to the Public Service Commission of Maryland's Ten-Year Plan (2017 – 2026) 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
2017	2,532	1,279,603	53,755	204,756	10,626	17,339	264,842	567,511	165,034	2,848	1,001	**2,569,847**
2018	2,565	1,288,258	54,313	205,685	10,645	17,425	266,627	573,330	167,804	2,848	1,001	**2,590,501**
2019	2,577	1,296,175	54,832	206,580	10,664	17,512	268,677	579,369	170,764	2,848	1,001	**2,610,999**
2020	2,590	1,304,418	55,317	207,424	10,683	17,600	270,859	585,649	173,824	2,848	1,001	**2,632,213**
2021	2,603	1,313,161	55,786	208,221	10,702	17,687	273,132	591,986	176,964	2,848	1,001	**2,654,091**
2022	2,629	1,322,396	56,264	209,023	10,721	17,776	275,582	598,395	180,084	2,848	1,001	**2,676,719**
2023	2,656	1,331,850	56,777	209,827	10,740	17,864	278,106	604,879	183,204	2,848	1,001	**2,699,752**
2024	2,682	1,341,401	57,284	210,634	10,759	17,953	280,669	611,438	186,224	2,848	1,001	**2,722,894**
2025	2,709	1,350,953	57,777	211,445	10,778	18,043	283,252	618,073	189,344	2,848	1,001	**2,746,223**
2026	2,736	1,360,482	58,265	212,258	10,797	18,133	285,858	624,785	192,534	2,848	1,001	**2,769,698**
Change (2017-2026)	**204**	**80,879**	**4,510**	**7,502**	**171**	**794**	**21,016**	**57,274**	**27,500**	**-**	**-**	**199,851**
Percent Change (2017-2026)	**8.08%**	**6.32%**	**8.39%**	**3.66%**	**1.61%**	**4.58%**	**7.94%**	**10.09%**	**16.66%**	**0.00%**	**0.00%**	**7.78%**
Compound Annual Growth Rate	**0.87%**	**0.68%**	**0.90%**	**0.40%**	**0.18%**	**0.50%**	**0.85%**	**1.07%**	**1.73%**	**0.00%**	**0.00%**	**0.84%**

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
2017	2,085	1,153,822	48,537	177,595	8,269	14,789	232,452	518,408	149,600	2,464	848	**2,308,868**
2018	2,118	1,161,880	49,039	178,358	8,282	14,863	234,024	524,148	152,100	2,464	848	**2,328,123**
2019	2,129	1,169,268	49,508	179,092	8,295	14,937	235,837	530,099	154,800	2,464	848	**2,347,277**
2020	2,139	1,177,019	49,946	179,783	8,308	15,012	237,777	536,287	157,600	2,464	848	**2,367,183**
2021	2,150	1,185,318	50,370	180,435	8,321	15,087	239,795	542,554	160,500	2,464	848	**2,387,842**
2022	2,171	1,194,096	50,801	181,090	8,334	15,162	241,963	548,894	163,400	2,464	848	**2,409,224**
2023	2,193	1,203,083	51,265	181,747	8,347	15,238	244,188	555,307	166,300	2,464	848	**2,430,981**
2024	2,215	1,212,149	51,723	182,407	8,360	15,314	246,452	561,796	169,100	2,464	848	**2,452,829**
2025	2,237	1,221,223	52,168	183,069	8,373	15,391	248,740	568,361	172,000	2,464	848	**2,474,874**
2026	2,260	1,230,275	52,607	183,733	8,386	15,468	251,050	575,002	175,000	2,464	848	**2,497,093**
Change (2017-2026)	**175**	**76,453**	**4,070**	**6,139**	**117**	**679**	**18,598**	**56,594**	**25,400**	**-**	**-**	**188,225**
Percent Change (2017-2026)	**8.37%**	**6.63%**	**8.39%**	**3.46%**	**1.41%**	**4.59%**	**8.00%**	**10.92%**	**16.98%**	**0.00%**	**0.00%**	**8.15%**
Compound Annual Growth Rate	**0.90%**	**0.72%**	**0.90%**	**0.38%**	**0.16%**	**0.50%**	**0.86%**	**1.16%**	**1.76%**	**0.00%**	**0.00%**	**0.87%**

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
2017	311	113,324	4,962	26,683	2,357	2,502	29,366	49,004	15,430	335	129	**244,402**
2018	311	113,725	5,014	26,848	2,363	2,515	29,584	49,084	15,700	335	129	**245,607**
2019	313	114,060	5,062	27,008	2,369	2,527	29,826	49,171	15,960	335	129	**246,760**
2020	314	114,346	5,107	27,160	2,375	2,540	30,075	49,264	16,220	335	129	**247,864**
2021	316	114,570	5,150	27,304	2,381	2,552	30,335	49,334	16,460	335	129	**248,866**
2022	319	114,794	5,194	27,450	2,387	2,565	30,623	49,404	16,680	335	129	**249,879**
2023	322	115,017	5,241	27,596	2,393	2,578	30,927	49,474	16,900	335	129	**250,912**
2024	326	115,249	5,288	27,743	2,399	2,591	31,232	49,544	17,120	335	129	**251,955**
2025	329	115,468	5,334	27,890	2,405	2,604	31,532	49,615	17,340	335	129	**252,980**
2026	332	115,678	5,379	28,039	2,411	2,617	31,834	49,685	17,530	335	129	**253,969**
Change (2017-2026)	**21**	**2,354**	**417**	**1,356**	**54**	**115**	**2,468**	**681**	**2,100**	**-**	**-**	**9,566**
Percent Change (2017-2026)	**6.69%**	**2.08%**	**8.40%**	**5.08%**	**2.29%**	**4.59%**	**8.40%**	**1.39%**	**13.61%**	**0.00%**	**0.00%**	**3.91%**
Compound Annual Growth Rate	**0.72%**	**0.23%**	**0.90%**	**0.55%**	**0.25%**	**0.50%**	**0.90%**	**0.15%**	**1.43%**	**0.00%**	**0.00%**	**0.43%**

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
2017	115	12,176	26	202	0	48	2,720	0	4	9	15	**15,315**
2018	115	12,373	27	202	0	48	2,717	0	4	9	15	**15,509**
2019	115	12,568	27	202	0	48	2,713	0	4	9	15	**15,701**
2020	116	12,775	27	202	0	48	2,710	0	4	9	15	**15,905**
2021	116	12,996	27	202	0	48	2,706	0	4	9	15	**16,123**
2022	117	13,230	28	202	0	48	2,702	0	4	9	15	**16,355**
2023	119	13,475	28	202	0	48	2,699	0	4	9	15	**16,598**
2024	120	13,729	28	202	0	48	2,696	0	4	9	15	**16,850**
2025	121	13,989	28	202	0	48	2,692	0	4	9	15	**17,108**
2026	122	14,257	29	202	0	48	2,689	0	4	9	15	**17,375**
Change (2017-2026)	**8**	**2,081**	**3**	**0**	**-**	**-**	**(32)**	**-**	**-**	**-**	**-**	**2,060**
Percent Change (2017-2026)	**6.69%**	**17.09%**	**11.54%**	**0.00%**	**N/A**	**0.00%**	**-1.16%**	**N/A**	**0.00%**	**0.00%**	**0.00%**	**13.45%**
Compound Annual Growth Rate	**0.72%**	**1.77%**	**1.22%**	**0.00%**	**N/A**	**0.00%**	**-0.13%**	**N/A**	**0.00%**	**0.00%**	**0.00%**	**1.41%**

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
2017	21	281	230	277	0	0	301	100	0	40	9	**1,258**
2018	21	280	233	278	0	0	299	99	0	40	9	**1,259**
2019	21	279	235	278	0	0	297	99	0	40	9	**1,258**
2020	21	278	237	279	0	0	295	98	0	40	9	**1,258**
2021	21	277	239	280	0	0	293	98	0	40	9	**1,257**
2022	22	276	241	281	0	0	291	98	0	40	9	**1,257**
2023	22	275	243	282	0	0	289	98	0	40	9	**1,257**
2024	22	274	245	282	0	0	287	98	0	40	9	**1,257**
2025	22	273	247	283	0	0	285	98	0	40	9	**1,257**
2026	22	272	250	284	0	0	283	98	0	40	9	**1,258**
Change (2017-2026)	**1**	**(9)**	**20**	**7**	**-**	**-**	**(18)**	**(2)**	**-**	**-**	**-**	**(0)**
Percent Change (2017-2026)	**6.69%**	**-3.20%**	**8.70%**	**2.64%**	**N/A**	**N/A**	**-6.09%**	**-1.51%**	**N/A**	**0.00%**	**0.00%**	**-0.01%**
Compound Annual Growth Rate	**0.72%**	**-0.36%**	**0.93%**	**0.29%**	**N/A**	**N/A**	**-0.70%**	**-0.17%**	**N/A**	**0.00%**	**0.00%**	**0.00%**

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
2017	0	0	0	0	0	0	3	0	0	0	0	**3**
2018	0	0	0	0	0	0	3	0	0	0	0	**3**
2019	0	0	0	0	0	0	3	0	0	0	0	**3**
2020	0	0	0	0	0	0	3	0	0	0	0	**3**
2021	0	0	0	0	0	0	3	0	0	0	0	**3**
2022	0	0	0	0	0	0	3	0	0	0	0	**3**
2023	0	0	0	0	0	0	3	0	0	0	0	**3**
2024	0	0	0	0	0	0	3	0	0	0	0	**3**
2025	0	0	0	0	0	0	3	0	0	0	0	**3**
2026	0	0	0	0	0	0	3	0	0	0	0	**3**
Change (2017-2026)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Percent Change (2017-2026)	**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, 2016 (number of customers)

	System Wide						Maryland					
Utility	Residential	Commercial	Industrial	Other	Sales for Resale	Total	Residential	Commercial	Industrial	Other	Sales for Resale	Total
Berlin	2,082	308	114	21	-	**2,525**	2,082	308	114	21	-	**2,525**
BGE	1,143,869	112,858	11,985	282	-	**1,268,994**	1,143,869	112,858	11,985	282	-	**1,268,994**
Choptank	48,083	4,916	26	228	-	**53,253**	48,083	4,916	26	228	-	**53,253**
DPL	454,702	60,950	414	643	-	**516,709**	176,868	26,472	204	276	-	**203,820**
Easton	8,256	2,351	-	-	-	**10,607**	8,256	2,351	-	-	-	**10,607**
Hagerstown	14,789	2,502	48	-	-	**17,339**	14,789	2,502	48	-	-	**17,339**
PE	350,578	45,630	4,626	603	4	**401,441**	230,209	28,669	2,709	302	2	**261,891**
PEPCO	774,451	75,966	-	126	-	**850,544**	514,539	49,878	-	98	-	**564,516**
SMECO	146,606	15,074	4	379	-	**162,062**	146,606	15,074	4	379	-	**162,062**
Thurmont	2,466	329	9	38	-	**2,843**	2,466	329	9	38	-	**2,843**
Williamsport	842	124	15	9	-	**989**	842	124	15	9	-	**989**
Total	**2,946,724**	**321,008**	**17,241**	**2,329**	**4**	**3,287,306**	**2,288,609**	**243,481**	**15,113**	**1,634**	**2**	**2,548,838**

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' 2016 Energy Sales by Customer Class (GWh)

	System Wide						Maryland					
Utility	Residential	Commercial	Industrial	Other	Sales for Resale	Total	Residential	Commercial	Industrial	Other	Sales for Resale	Total
Berlin	25	3	14	0	-	**43**	25	3	14	0	-	**43**
BGE	12,749	3,028	14,002	276	-	**30,055**	12,749	3,028	14,002	276	-	**30,055**
Choptank	669	213	91	-	-	**973**	669	213	91	-	-	**973**
DPL	3,163	3,515	1,332	35	-	**8,046**	2,151	1,787	390	14	-	**4,342**
Easton	106	149	-	-	-	**255**	106	149	-	-	-	**255**
Hagerstown	156	95	45	-	-	**296**	156	95	45	-	-	**296**
PE	5,019	2,955	2,463	22	1,023	**11,483**	3,212	2,101	1,618	16	1,023	**7,970**
PEPCO	8,297	17,575	-	145	-	**26,017**	5,767	8,821	-	67	-	**14,655**
SMECO	2,098	1,285	28	8	-	**3,419**	2,098	1,285	28	8	-	**3,419**
Thurmont	36	16	24	1	-	**77**	36	16	24	1	-	**77**
Williamsport	9	3	7	0	-	**20**	9	3	7	0	-	**20**
Total	**32,328**	**28,837**	**18,007**	**488**	**1,023**	**80,683**	**26,979**	**17,501**	**16,221**	**382**	**1,023**	**62,105**

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
2017	42	30,002	1,022	4,631	256	296	7,972	16,376	3,608	77	20	**64,302**
2018	44	30,041	1,043	4,561	258	297	8,203	16,477	3,626	77	20	**64,648**
2019	45	30,292	1,046	4,518	259	299	8,270	16,605	3,668	77	20	**65,099**
2020	45	30,634	1,054	4,502	261	300	8,358	16,777	3,710	77	20	**65,738**
2021	45	30,904	1,062	4,485	262	302	8,487	16,959	3,747	77	20	**66,350**
2022	46	31,151	1,067	4,355	263	303	8,519	16,780	3,795	77	20	**66,377**
2023	46	31,402	1,080	4,230	265	305	8,598	16,604	3,840	77	20	**66,466**
2024	47	31,663	1,092	4,109	266	307	8,670	16,430	3,876	77	20	**66,556**
2025	47	31,885	1,097	3,993	268	308	8,728	16,258	3,916	77	20	**66,597**
2026	47	32,124	1,109	3,882	269	310	8,784	16,088	3,964	77	20	**66,673**
Change (2017-2026)	**5**	**2,122**	**87**	**(749)**	**13**	**14**	**812**	**(288)**	**355**	**-**	**-**	**2,371**
Percent Change (2017-2026)	**12.71%**	**7.07%**	**8.51%**	**-16.18%**	**4.92%**	**4.59%**	**10.19%**	**-1.76%**	**9.85%**	**0.00%**	**0.00%**	**3.69%**
Compound Annual Growth Rate	**1.34%**	**0.76%**	**0.91%**	**-1.94%**	**0.53%**	**0.50%**	**1.08%**	**-0.20%**	**1.05%**	**0.00%**	**0.00%**	**0.40%**

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
2017	42	29,580	1,021	4,101	256	296	7,339	14,245	3,560	77	20	**60,537**
2018	44	29,269	1,042	3,943	258	297	7,494	14,073	3,590	77	20	**60,107**
2019	45	29,164	1,046	3,802	259	299	7,475	13,900	3,631	77	20	**59,718**
2020	45	29,144	1,054	3,679	261	300	7,466	13,742	3,673	77	20	**59,460**
2021	45	29,060	1,061	3,544	262	302	7,488	13,560	3,716	77	20	**59,135**
2022	46	28,967	1,066	3,414	263	303	7,520	13,381	3,765	77	20	**58,822**
2023	46	28,881	1,079	3,289	265	305	7,599	13,205	3,809	77	20	**58,574**
2024	47	28,806	1,091	3,168	266	307	7,672	13,031	3,845	77	20	**58,328**
2025	47	28,691	1,096	3,052	268	308	7,729	12,859	3,885	77	20	**58,032**
2026	47	28,595	1,108	2,940	269	310	7,785	12,689	3,933	77	20	**57,773**
Change (2017-2026)	**5**	**(985)**	**87**	**(1,160)**	**13**	**14**	**445**	**(1,556)**	**373**	**-**	**-**	**(2,764)**
Percent Change (2017-2026)	**12.71%**	**-3.33%**	**8.52%**	**-28.30%**	**4.92%**	**4.59%**	**6.07%**	**-10.92%**	**10.49%**	**0.00%**	**0.00%**	**-4.57%**
Compound Annual Growth Rate	**1.34%**	**-0.38%**	**0.91%**	**-3.63%**	**0.53%**	**0.50%**	**0.66%**	**-1.28%**	**1.11%**	**0.00%**	**0.00%**	**-0.52%**

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
2017	42	30,002	1,022	12,704	256	296	14,901	27,807	3,608	77	20	**90,736**
2018	44	30,041	1,043	12,663	258	297	15,523	27,904	3,626	77	20	**91,498**
2019	45	30,292	1,046	12,699	259	299	15,752	28,074	3,668	77	20	**92,232**
2020	45	30,634	1,054	12,801	261	300	15,929	28,321	3,710	77	20	**93,152**
2021	45	30,904	1,062	12,908	262	302	16,124	28,570	3,747	77	20	**94,021**
2022	46	31,151	1,067	12,864	263	303	16,208	28,405	3,795	77	20	**94,200**
2023	46	31,402	1,080	12,825	265	305	16,340	28,243	3,840	77	20	**94,444**
2024	47	31,663	1,092	12,793	266	307	16,469	28,083	3,876	77	20	**94,692**
2025	47	31,885	1,097	12,765	268	308	16,581	27,925	3,916	77	20	**94,889**
2026	47	32,124	1,109	12,743	269	310	16,694	27,770	3,964	77	20	**95,126**
Change (2017-2026)	**5**	**2,122**	**87**	**39**	**13**	**14**	**1,793**	**(37)**	**355**	**-**	**-**	**4,390**
Percent Change (2017-2026)	**12.71%**	**7.07%**	**8.51%**	**0.31%**	**4.92%**	**4.59%**	**12.03%**	**-0.13%**	**9.85%**	**0.00%**	**0.00%**	**4.84%**
Compound Annual Growth Rate	**1.34%**	**0.76%**	**0.91%**	**0.03%**	**0.53%**	**0.50%**	**1.27%**	**-0.01%**	**1.05%**	**0.00%**	**0.00%**	**0.53%**

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
2017	42	29,580	1,021	12,121	256	296	14,234	25,356	3,560	77	20	**86,562**
2018	44	29,269	1,042	11,963	258	297	14,771	25,127	3,590	77	20	**86,458**
2019	45	29,164	1,046	11,865	259	299	14,913	24,943	3,631	77	20	**86,262**
2020	45	29,144	1,054	11,820	261	300	14,993	24,807	3,673	77	20	**86,194**
2021	45	29,060	1,061	11,770	262	302	15,080	24,640	3,716	77	20	**86,034**
2022	46	28,967	1,066	11,726	263	303	15,165	24,476	3,765	77	20	**85,873**
2023	46	28,881	1,079	11,688	265	305	15,297	24,313	3,809	77	20	**85,780**
2024	47	28,806	1,091	11,655	266	307	15,426	24,153	3,845	77	20	**85,692**
2025	47	28,691	1,096	11,627	268	308	15,537	23,996	3,885	77	20	**85,552**
2026	47	28,595	1,108	11,605	269	310	15,650	23,840	3,933	77	20	**85,454**
Change (2017-2026)	**5**	**(985)**	**87**	**(516)**	**13**	**14**	**1,416**	**(1,515)**	**373**	**-**	**-**	**(1,108)**
Percent Change (2017-2026)	**12.71%**	**-3.33%**	**8.52%**	**-4.26%**	**4.92%**	**4.59%**	**9.95%**	**-5.98%**	**10.49%**	**0.00%**	**0.00%**	**-1.28%**
Compound Annual Growth Rate	**1.34%**	**-0.38%**	**0.91%**	**-0.48%**	**0.53%**	**0.50%**	**1.06%**	**-0.68%**	**1.11%**	**0.00%**	**0.00%**	**-0.14%**

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
2017	11	6,889	292	1,055	62	61	1,614	3,918	916	14	4	**14,835**
2018	11	6,953	299	1,074	62	61	1,631	3,976	917	14	4	**15,002**
2019	11	6,860	301	1,089	63	61	1,644	4,030	888	14	4	**14,964**
2020	11	6,879	304	1,102	63	62	1,658	4,074	901	14	4	**15,071**
2021	11	6,824	308	1,113	63	62	1,678	4,132	913	14	4	**15,121**
2022	11	6,786	312	1,109	63	62	1,681	4,126	925	14	4	**15,093**
2023	11	6,784	317	1,109	64	62	1,688	4,120	938	14	4	**15,111**
2024	11	6,811	322	1,111	64	63	1,695	4,125	949	14	4	**15,169**
2025	11	6,886	326	1,116	64	63	1,700	4,134	961	14	4	**15,279**
2026	11	6,905	330	1,119	64	63	1,705	4,142	974	14	4	**15,332**
Change (2017-2026)	**1**	**16**	**38**	**65**	**2**	**3**	**91**	**224**	**58**	**-**	**-**	**497**
Percent Change (2017-2026)	**6.69%**	**0.23%**	**13.01%**	**6.13%**	**3.37%**	**4.59%**	**5.66%**	**5.71%**	**6.33%**	**0.00%**	**0.00%**	**3.35%**
Compound Annual Growth Rate	**0.72%**	**0.03%**	**1.37%**	**0.66%**	**0.37%**	**0.50%**	**0.61%**	**0.62%**	**0.68%**	**0.00%**	**0.00%**	**0.37%**

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) [118, 119]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2017	4	6,054	284	961	62	61	1,508	3,464	851	14	4	**13,266**
2018	4	6,171	291	963	62	61	1,513	3,465	868	14	4	**13,416**
2019	4	6,069	294	960	63	61	1,512	3,456	880	14	4	**13,317**
2020	4	6,077	297	953	63	62	1,511	3,430	893	14	4	**13,308**
2021	4	6,016	301	943	63	62	1,514	3,412	906	14	4	**13,238**
2022	4	5,977	305	939	63	62	1,517	3,405	918	14	4	**13,209**
2023	4	5,975	310	939	64	62	1,524	3,400	931	14	4	**13,227**
2024	4	6,002	316	941	64	63	1,531	3,405	942	14	4	**13,285**
2025	5	6,077	319	946	64	63	1,536	3,413	954	14	4	**13,395**
2026	5	6,096	324	949	64	63	1,541	3,421	967	14	4	**13,449**
Change (2017-2026)	**1**	**41**	**40**	**(11)**	**2**	**3**	**33**	**(42)**	**116**	**-**	**-**	**182**
Percent Change (2017-2026)	**18.41%**	**0.68%**	**14.08%**	**-1.19%**	**3.37%**	**4.59%**	**2.20%**	**-1.22%**	**13.63%**	**0.00%**	**0.00%**	**1.37%**
Compound Annual Growth Rate	**1.90%**	**0.08%**	**1.47%**	**-0.13%**	**0.37%**	**0.50%**	**0.24%**	**-0.14%**	**1.43%**	**0.00%**	**0.00%**	**0.15%**

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

[118] 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.

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

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

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

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William-sport	Total
2017	13	5,883	284	447	58	61	1,758	2,691	874	24	5	**12,097**
2018	14	5,899	271	448	59	61	1,771	2,699	909	24	5	**12,158**
2019	14	5,901	286	441	59	61	1,785	2,697	925	24	5	**12,198**
2020	15	5,894	289	438	59	62	1,800	2,692	944	24	5	**12,221**
2021	16	5,885	292	435	59	62	1,821	2,691	961	24	5	**12,250**
2022	16	5,883	296	433	60	62	1,830	2,694	978	24	5	**12,280**
2023	17	5,887	300	433	60	63	1,841	2,700	995	24	5	**12,323**
2024	18	5,893	303	430	60	63	1,848	2,705	1,011	24	5	**12,359**
2025	18	5,892	306	429	60	63	1,855	2,713	1,027	24	5	**12,392**
2026	19	5,908	312	429	61	63	1,864	2,723	1,045	24	5	**12,452**
Change (2017-2026)	**6**	**25**	**28**	**(18)**	**2**	**3**	**106**	**33**	**170**	**-**	**-**	**355**
Percent Change (2017-2026)	**44.05%**	**0.42%**	**9.86%**	**-4.05%**	**4.26%**	**4.59%**	**6.04%**	**1.21%**	**19.45%**	**0.00%**	**0.00%**	**2.93%**
Compound Annual Growth Rate	**4.14%**	**0.05%**	**1.05%**	**-0.46%**	**0.46%**	**0.50%**	**0.65%**	**0.13%**	**1.99%**	**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	Thur-mont	William-sport	Total
2017	13	5,817	278	447	58	61	1,657	2,691	871	24	5	**11,922**
2018	14	5,827	265	448	59	61	1,659	2,699	906	24	5	**11,965**
2019	14	5,822	280	441	59	61	1,660	2,697	922	24	5	**11,985**
2020	15	5,805	283	438	59	62	1,661	2,692	941	24	5	**11,984**
2021	16	5,787	287	435	59	62	1,665	2,691	958	24	5	**11,989**
2022	16	5,781	291	433	60	62	1,674	2,694	975	24	5	**12,015**
2023	17	5,785	295	433	60	63	1,685	2,700	992	24	5	**12,058**
2024	18	5,791	298	430	60	63	1,693	2,705	1,008	24	5	**12,095**
2025	18	5,790	301	429	60	63	1,699	2,713	1,024	24	5	**12,127**
2026	19	5,806	307	429	61	63	1,708	2,723	1,042	24	5	**12,188**
Change (2017-2026)	**6**	**(11)**	**29**	**(18)**	**2**	**3**	**52**	**33**	**171**	**-**	**-**	**266**
Percent Change (2017-2026)	**44.05%**	**-0.19%**	**10.43%**	**-4.05%**	**4.26%**	**4.59%**	**3.11%**	**1.21%**	**19.63%**	**0.00%**	**0.00%**	**2.23%**
Compound Annual Growth Rate	**4.14%**	**-0.02%**	**1.11%**	**-0.46%**	**0.46%**	**0.50%**	**0.34%**	**0.13%**	**2.01%**	**0.00%**	**0.00%**	**0.25%**

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
2017	11	6,889	292	4,131	62	61	2,953	7,137	916	14	4	**22,469**
2018	11	6,953	299	4,162	62	61	3,003	7,207	917	14	4	**22,694**
2019	11	6,860	301	4,174	63	61	3,039	7,264	888	14	4	**22,679**
2020	11	6,879	304	4,172	63	62	3,062	7,296	901	14	4	**22,767**
2021	11	6,824	308	4,158	63	62	3,086	7,348	913	14	4	**22,791**
2022	11	6,786	312	4,143	63	62	3,092	7,336	925	14	4	**22,748**
2023	11	6,784	317	4,142	64	62	3,103	7,325	938	14	4	**22,764**
2024	11	6,811	322	4,149	64	63	3,113	7,335	949	14	4	**22,834**
2025	11	6,886	326	4,172	64	63	3,121	7,351	961	14	4	**22,973**
2026	11	6,905	330	4,186	64	63	3,129	7,366	974	14	4	**23,047**
Change (2017-2026)	**1**	**16**	**38**	**54**	**2**	**3**	**176**	**229**	**58**	**-**	**-**	**578**
Percent Change (2017-2026)	**6.69%**	**0.23%**	**13.01%**	**1.31%**	**3.37%**	**4.59%**	**5.97%**	**3.21%**	**6.33%**	**0.00%**	**0.00%**	**2.57%**
Compound Annual Growth Rate	**0.72%**	**0.03%**	**1.37%**	**0.15%**	**0.37%**	**0.50%**	**0.65%**	**0.35%**	**0.68%**	**0.00%**	**0.00%**	**0.28%**

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)[120, 121]

Year	Berlin	BGE	Chop-tank	DPL	Easton	Hagers-town	PE	Pepco	SMECO	Thur-mont	William -sport	Total
2017	4	6,054	284	4,028	62	61	2,842	6,614	851	14	4	**20,819**
2018	4	6,171	291	4,037	62	61	2,880	6,616	868	14	4	**21,008**
2019	4	6,069	294	4,024	63	61	2,902	6,599	880	14	4	**20,914**
2020	4	6,077	297	3,995	63	62	2,909	6,550	893	14	4	**20,868**
2021	4	6,016	301	3,952	63	62	2,917	6,515	906	14	4	**20,754**
2022	4	5,977	305	3,937	63	62	2,923	6,503	918	14	4	**20,710**
2023	4	5,975	310	3,936	64	62	2,933	6,492	931	14	4	**20,725**
2024	4	6,002	316	3,943	64	63	2,943	6,502	942	14	4	**20,797**
2025	5	6,077	319	3,966	64	63	2,951	6,518	954	14	4	**20,935**
2026	5	6,096	324	3,980	64	63	2,960	6,533	967	14	4	**21,010**
Change (2017-2026)	**1**	**41**	**40**	**(48)**	**2**	**3**	**117**	**(81)**	**116**	**-**	**-**	**191**
Percent Change (2017-2026)	**18.41%**	**0.68%**	**14.08%**	**-1.19%**	**3.37%**	**4.59%**	**4.12%**	**-1.22%**	**13.63%**	**0.00%**	**0.00%**	**0.92%**
Compound Annual Growth Rate	**1.90%**	**0.08%**	**1.47%**	**-0.13%**	**0.37%**	**0.50%**	**0.45%**	**-0.14%**	**1.43%**	**0.00%**	**0.00%**	**0.10%**

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.

[120] 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.
[121] 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
2017	13	5,883	284	1,631	58	61	3,415	5,379	874	24	5	**17,627**
2018	14	5,899	271	1,634	59	61	3,468	5,396	909	24	5	**17,738**
2019	14	5,901	286	1,609	59	61	3,509	5,392	925	24	5	**17,785**
2020	15	5,894	289	1,596	59	62	3,523	5,382	944	24	5	**17,791**
2021	16	5,885	292	1,586	59	62	3,551	5,380	961	24	5	**17,819**
2022	16	5,883	296	1,580	60	62	3,564	5,385	978	24	5	**17,852**
2023	17	5,887	300	1,579	60	63	3,583	5,397	995	24	5	**17,909**
2024	18	5,893	303	1,569	60	63	3,593	5,408	1,011	24	5	**17,945**
2025	18	5,892	306	1,565	60	63	3,603	5,423	1,027	24	5	**17,986**
2026	19	5,908	312	1,565	61	63	3,617	5,444	1,045	24	5	**18,062**
Change (2017-2026)	**6**	**25**	**28**	**(66)**	**2**	**3**	**202**	**65**	**170**	**-**	**-**	**435**
Percent Change (2017-2026)	**44.05%**	**0.42%**	**9.86%**	**-4.05%**	**4.26%**	**4.59%**	**5.92%**	**1.21%**	**19.45%**	**0.00%**	**0.00%**	**2.47%**
Compound Annual Growth Rate	**4.14%**	**0.05%**	**1.05%**	**-0.46%**	**0.46%**	**0.50%**	**0.64%**	**0.13%**	**1.99%**	**0.00%**	**0.00%**	**0.27%**

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
2017	13	5,817	278	1,631	58	61	3,309	5,379	871	24	5	**17,446**
2018	14	5,827	265	1,634	59	61	3,350	5,396	906	24	5	**17,540**
2019	14	5,822	280	1,609	59	61	3,379	5,392	922	24	5	**17,566**
2020	15	5,805	283	1,596	59	62	3,378	5,382	941	24	5	**17,549**
2021	16	5,787	287	1,586	59	62	3,390	5,380	958	24	5	**17,553**
2022	16	5,781	291	1,580	60	62	3,403	5,385	975	24	5	**17,582**
2023	17	5,785	295	1,579	60	63	3,422	5,397	992	24	5	**17,638**
2024	18	5,791	298	1,569	60	63	3,432	5,408	1,008	24	5	**17,675**
2025	18	5,790	301	1,565	60	63	3,443	5,423	1,024	24	5	**17,716**
2026	19	5,806	307	1,565	61	63	3,457	5,444	1,042	24	5	**17,792**
Change (2017-2026)	**6**	**(11)**	**29**	**(66)**	**2**	**3**	**147**	**65**	**171**	**-**	**-**	**346**
Percent Change (2017-2026)	**44.05%**	**-0.19%**	**10.43%**	**-4.05%**	**4.26%**	**4.59%**	**4.45%**	**1.21%**	**19.63%**	**0.00%**	**0.00%**	**1.98%**
Compound Annual Growth Rate	**4.14%**	**-0.02%**	**1.11%**	**-0.46%**	**0.46%**	**0.50%**	**0.48%**	**0.13%**	**2.01%**	**0.00%**	**0.00%**	**0.22%**

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

Appendix 4: Transmission Enhancements, by Service Territory

Appendix Table 4: Transmission Enhancements, by Service Territory

								Start location		End Location	
Transmission Owner	Voltage (kV)	Length (miles)	No. of Circuits	Start Date	Comp. Date	In-Service Date	Purpose	County	Terminal	County	Terminal
BGE	115	1	1	Sep, 2009	May, 2017	June, 2017	BTR	Baltimore City	Orchard St	Baltimore City	Constitution St
BGE	115	1.91	2	Sep, 2009	May, 2017	June, 2017	BTR	Baltimore City	Green St	Baltimore City	Constitution St
BGE	115	0.9	2	Sep, 2009	May, 2017	June, 2017	BTR	Baltimore City	Concord St	Baltimore City	Constitution St
BGE	230	8.6	1	Jan, 2011	Aug, 2016	June, 2017	BTR	Harford	Conastone	Harford	Graceton
BGE	230	13.7	1	Jan, 2009	Feb, 2017	June, 2017	BTR	Harford	Graceton	Harford	Bagley
BGE	230	6.1	2	April, 2007	Jan, 2017	June, 2017	BTR	Harford	Raphael Rd	Harford	Bagley
BGE	115	3	1	June, 2013		Dec, 2017	BTR	Harford	Joppatowne	Harford	Raphael Rd
DPL	138	30.91	1	5/17/2013	5/31/2018	5/31/2018	BTR	Wicomico	Piney Grove	Accomack (VA)	Wattsville
DPL	69	19.13	1	5/1/2012	12/31/2017	12/31/2017	BTR	Worcester	Kenney	Accomack (VA)	Wattsville
DPL	69	23.49	1	10/26/2012	5/1/2017	5/1/2017	BTR	Wicomico	North Salisbury	Worcester	Worcester
DPL	69	0.91	1	8/9/2013	12/31/2017	12/31/2017	STR	Worcester	Worcester	Worcester	Ocean City
DPL	138	26	1	8/9/2013	12/31/2017	12/31/2017	STR	Queen Annes	Church	Caroline	Steele
DPL	69	4.51	1	2/4/2014	12/31/2017	12/31/2017	STR	Wicomico	Mt. Hermon	Wicomico	Chesapeake
DPL	230	23.02	1	1/2/2015	1/30/2017	1/30/2017	STR	Sussex (DE)	Milford	Caroline	Steele
DPL	69	7.02	1	4/14/2014	12/31/2017	12/31/2017	STR	Wicomico	North Salisbury	Wicomico	Fruitland
DPL	138	8.62	1	4/1/2015	12/31/2018	12/31/2018	STR	Queen Annes	Wye Mills	Caroline	Hillsboro
DPL	230	-	1	9/1/2014	5/31/2018	5/31/2018	STR	Cecil	Crest		
DPL	69	-	1	11/1/2015	9/1/2017	9/1/2017	NTU	Dorchester	New Substation		
DPL	69	-	1	10/14/2015	4/30/2018	4/30/2018	NTU	Kent	New Substation		
DPL	138	-	1	5/29/2015	12/31/2018	12/31/2018	MDCAP	Queen Annes	Carville		
DPL	69	-	1	1/28/2015	12/31/2019	12/31/2019	MDCAP	Wicomico	Beaglin		
Easton	69	0.1	1	9/12/2016	5/19/2017	2/9/2017	Reliability	Talbot	Easton Sub 1	Talbot	Easton Sub 1
PE	138	0.1	2	2013	Suspended	2015	AGI	Allegany	Dans Mountain (new)	Allegany	Carlos Junction-Ridgeley
PE	230	0	1	2015	5/18/2016	5/18/2016	BTR	Frederick	Doubs	Frederick	Lime Kiln (Section 207)
PE	230	0	1	2015	5/17/2016	5/17/2016	BTR	Frederick	Doubs	Frederick	Lime Kiln (Section 231)
PE	138	0	1	2016	5/22/2016	5/22/2016	BTR	Washington	Paramount	Washington	Reid
PE	138	0	1	2016	2/4/2016	2/4/2016	BTR	Washington	Halfway	Washington	Paramount
PE	138	0	1	2016	5/22/2016	5/22/2016	BTR	Washington	Reid	Washington	Paramount
PE	138	0	1	2016	4/28/2017	4/28/2017	BTR	Berkeley, WV	Marlowe	Washington	Halfway
PE	138	0	1	2017	Suspended	2017	AGI	Cumberland	Cumberland	Cumberland	Ridgeley
PE	138	0.1	1	2016	Suspended	2017	AGI	Garrett	Hazelton	Garrett	AA1-047
PE	138	0.1	1	2016	Suspended	2017	AGI	Garrett	AA1-047	Garrett	Jennings
PE	138	0	1	2016	4/15/2016	4/15/2016	BTR	Berkeley, WV	Nipetown	Berkeley, WV	Bedington
PE	138	0	1	2018	2019	2019	BTR	Carroll	Carroll	Montgomery	Germantown
PE	230	0	1	2016	5/26/2017	5/26/2017	BTR	Montgomery	Damascus	Montgomery	Damascus
PE	138	0.1	1	2016	2018	2018	Distribution Adequacy	Washington	Ringgold	Frederick	Wolfsville (new)
PE	138	0.1	1	2016	2018	2018	Distribution Adequacy	Frederick	Wolfsville (new)	Frederick	Catoctin
PE	230	0.1	1	2018	2020	2020	Distribution Adequacy	Frederick	Doubs	Frederick	Jefferson (New)
PE	230	0.1	1	2018	2020	2020	Distribution Adequacy	Frederick	Jefferson (New)	Frederick	Monocacy
PE	230	0	1	2017	2020	2020	BTR	Washington	Ringgold	Washington	Ringgold
PE	230	9.9	1	2017	2020	2020	BTR	Washington	Ringgold	Frederick	Catoctin
Pepco	230	n/a	n/a	9/2013	3/2016	3/2016	BTR	Montgomery	Brighton	Montgomery	Brighton
Pepco	230	n/a	n/a	9/2013	3/2016	3/2016	BTR	Montgomery	Dickerson H	Montgomery	Dickerson H
Pepco	230	n/a	n/a	9/2014	4/2016	4/2016	Generation Interconnection	Prince George's	(New) Keslon Ridge	Prince George's	(New) Keslon Ridge
Pepco	230	n/a	n/a	9/2014	Suspended	6/2018	Generation Interconnection	Prince George's	(New) Mattawoman	Prince George's	(New) Mattawoman
Pepco	230	n/a	1	9/2014	Suspended	6/2018	Generation Interconnection	Prince George's	Burches Hill	Prince George's	(New) Mattawoman
Pepco	230	n/a	n/a	9/2014	Suspended	6/2018	Generation Interconnection	Prince George's	Burches Hill	Prince George's	Burches Hill
Pepco	500	n/a	n/a	9/2014	6/2018	6/2018	Generation Interconnection	Prince George's	(New) Cheltenham	Prince George's	(New) Cheltenham
SMECO	69	4.2	1	Q3 2017	Q3 2018	Q3 2018	Reliability	Calvert	Huntingtown	Calvert	Sunderland
SMECO	69	0.8	2	Q1 2018	Q4 2018	Q4 2018	Capacity / Reliability	Prince George	West Brandywine tap GOAB switch	Prince George	West Brandywine

KEY: BTR =Baseline Transmission Reliability; STR= Supplementel Transmission Reliability; NTU = Network Transmission Upgrade; MDCAP = Maryland Corrective Action Plan; AGI = Accommodate for Generator Interconnection

Appendix 5: List of Maryland Generators, as of December 31, 2016

Appendix Table 5: List of Maryland Generators, as of December 31, 2016

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
A & N Electric Coop	Smith Island	Somerset	1.7	1.6	0.01%
AES Tait LLC	AES Warrior Run Energy Storage Project	Allegany	11.0	11.0	0.09%
AES WR Ltd Partnership	AES Warrior Run Cogeneration Facility	Allegany	229.0	180.0	1.45%
Altus Power America Management, LLC	MEBA	Talbot	1.5	1.5	0.01%
American Sugar Refining, Inc.	Domino Sugar Baltimore	Baltimore City	17.5	17.5	0.14%
Bloom Energy	Green Machine	Anne Arundel	1.7	1.6	0.01%
BP Piney & Deep Creek LLC	Deep Creek	Garrett	20.0	18.0	0.15%
Calpine Mid-Atlantic Generation LLC	Crisfield	Somerset	11.6	10.4	0.08%
CB&I	Montgomery County Oaks LFGE Plant	Montgomery	2.4	2.3	0.02%
City Council of Baltimore City	Back River Waste Water Treatment	Baltimore City	3.0	2.6	0.02%
Consolidated Edison Solutions Inc.	CES VMT Solar	Washington	1.1	1.1	0.01%
Constellation Power Source Gen	Gould Street	Baltimore City	103.5	97.0	0.78%
Constellation Power Source Gen	Notch Cliff	Baltimore	144.0	116.7	0.94%
Constellation Power Source Gen	Perryman	Harford	545.4	463.4	3.73%
Constellation Power Source Gen	Philadelphia	Baltimore City	82.8	60.9	0.49%
Constellation Power Source Gen	Riverside (MD)	Baltimore	122.2	113.0	0.91%
Constellation Power Source Gen	Westport	Baltimore City	121.5	115.8	0.93%
Constellation Solar Holding, LLC	CCBC-Catonsville	Howard	1.6	1.6	0.01%
Constellation Solar Horizons LLC	Mount Saint Mary's	Frederick	13.7	13.7	0.11%
Constellation Solar Maryland II LLC	UMMS at Pocomoke	Somerset	2.8	2.8	0.02%
Constellation Solar Maryland II LLC	CNE at Cambridge MD	Dorchester	3.2	3.2	0.03%
Constellation Solar Maryland, LLC	McCormick & Co. Inc. at Belcamp	Harford	1.4	1.4	0.01%
Constellation Solar Maryland, LLC	General Motors Corp at White Marsh MD	Baltimore	1.0	1.0	0.01%
Covanta Montgomery, Inc.	Montgomery County Resource Recovery	Montgomery	67.8	54.0	0.44%
Criterion Power Partners LLC	Criterion Wind Project	GARRETT	70.0	70.0	0.56%
Dominion Cove Point LNG, LP	Cove Point LNG Terminal	Calvert	91.6	81.8	0.66%
Eastern Landfill Gas LLC	Eastern Landfill Gas LLC	BALTIMORE	3.0	3.0	0.02%
Easton Utilities Comm	Easton	Talbot	33.6	31.9	0.26%
Easton Utilities Comm	Easton 2	Talbot	38.8	37.0	0.30%
Energy Recovery Operations, Inc.	Harford Waste to Energy Facility	Harford	1.2	1.1	0.01%
Essential Power Rock Springs LLC	Essential Power Rock Springs LLC	Cecil	772.6	653.5	5.27%
Exelon Nuclear	Calvert Cliffs Nuclear Power Plant	Calvert	1,828.7	1,707.8	13.76%
Exelon Power	Conowingo	Harford	530.8	572.0	4.61%
Fair Wind Power Partners	Fair Wind Power	Garrett	30.0	30.0	0.24%
FC Landfill Energy	FC Landfill Energy	Frederick	2.2	2.0	0.02%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2016

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
First Solar Asset Management	Maryland Solar	Washington	27.0	20.9	0.17%
Fourmile Wind Energy, LLC	Fourmile Ridge	Garrett	40.0	40.0	0.32%
GenOn Mid-Atlantic LLC	Dickerson	Montgomery	933.0	831.0	6.70%
GenOn Mid-Atlantic LLC	Morgantown Generating Plant	Charles	1,548.0	1,423.0	11.47%
GSA Metropolitan Service Center	Central Utility Plant at White Oak	Montgomery	54.3	54.2	0.44%
Howard County - Maryland	Alpha Ridge LFG	Howard	1.0	1.0	0.01%
IKEA Property Inc.	IKEA Perryville 460	Cecil	2.1	2.0	0.02%
IKEA Property Inc.	IKEA College Park 411	Prince Georges	1.0	1.0	0.01%
Industrial Power Generating Company LLC	Wicomico	Wicomico	5.4	5.4	0.04%
KMC Thermo, LLC	Brandywine Power Facility	Prince Georges	288.8	230.0	1.85%
LES Operations Services LLC	Millersville LFG	Anne Arundel	3.2	3.0	0.02%
Maryland Environmental Service	Eastern Correctional Institute	Somerset	5.8	4.6	0.04%
NewPage Corp-Luke	Luke Mill	Allegany	65.0	60.0	0.48%
NRG Chalk Point LLC	Chalk Point LLC	Prince Georges	2,647.0	2,248.0	18.12%
NRG Solar Arrowhead LLC	FedEx Field Solar Facility	Prince Georges	2.0	2.0	0.02%
NRG Vienna Operations Inc.	Vienna Operations	Dorchester	180.6	167.3	1.35%
NVT LICENSES, LLC	UMES (MD) - Princess Anne	Somerset	2.2	2.1	0.02%
Power Choice/Pepco Energy Serv	NIH Cogeneration Facility	MONTGOMERY	22.0	21.3	0.17%
Prince George's County	Brown Station Road Plant I	PRINCE GEORGES	2.7	2.4	0.02%
Prince George's County	Brown Station Road Plant II	PRINCE GEORGES	4.0	3.2	0.03%
Raven Power Holdings LLC	Brandon Shores	Anne Arundel	1,370.0	1,273.0	10.26%
Raven Power Holdings LLC	CP Crane Power, LLC	Baltimore	415.8	399.0	3.22%
Raven Power Holdings LLC	Herbert A Wagner	Anne Arundel	1,058.5	958.9	7.73%
Rockfish Solar LLC	Rockfish Solar LLC	Charles	10.3	10.3	0.08%
Roth Rock Wind Farm LLC	Roth Rock Wind Farm LLC	Garrett	40.0	40.0	0.32%
Roth Rock Wind Farm LLC	Roth Rock North Wind Farm, LLC	Garrett	10.0	10.0	0.08%
SMECO Solar LLC	Herbert Farm Solar	Charles	5.5	5.5	0.04%
SolarCity Corporation	Queen Anne's County	Queen Annes	2.0	2.0	0.02%
SolarCity Corporation	Town of Chestertown- Chestertown WWTP	Kent	1.0	1.0	0.01%
SunE DB27, LLC	Elkton Solar	Cecil	1.6	1.6	0.01%
SunE DB42, LLC	Cecil County CCVT HS	Cecil	2.0	2.0	0.02%
SunE SEM 1, LLC	Chimes West Friendship (Nixon Farms)	Howard	1.5	1.2	0.01%
Town of Berlin - (MD)	Berlin	Worcester	9.0	9.0	0.07%
Trigen Inner Harbor East, LLC	Inner Harbor East Heating	BALTIMORE CITY	2.1	2.1	0.02%
Trigen-Cinergy Solutions College Park	UMCP CHP Plant	Prince Georges	27.4	20.8	0.17%
WGL Energy Systems, Inc.	Perdue Salisbury Photovoltaic	Wicomico	1	1.0	0.01%
WGL Energy Systems, Inc.	Kent County-Kennedyville	Kent	1	1.0	0.01%
WGL Energy Systems, Inc.	Rock Hall	Kent	1	1.0	0.01%

Appendix 5 (Continued): List of Maryland Generators, as of December 31, 2016

Owner / Operator	Plant Name	County	Capacity Statistics (MW)		
			Nameplate	Summer	% Summer
WGL Energy Systems, Inc.	Kent County - Worton Complex	Kent	1	1.0	0.01%
WGL Energy Systems, Inc.	Presbyterian Senior Living Service	Baltimore	1.2	1.2	0.01%
Wheelabrator Environmental Systems	Wheelabrator Baltimore Refuse	Baltimore City	64.5	61.3	0.49%
			13,775.4	12,407.5	100.0%

Appendix 6: 2016 Retired RECs by Facility (in-State and Out-of-State) and by Source

Appendix Table 6: 2016 Retired RECs by Facility (in-State and Out-of-State) and by Source[122]

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**BLQ %**	**Tier 1**
AEP W Kingsport	BLQ	TN	202,205	11.96%	2.80%
Chillicothe	BLQ	OH	125,564	7.43%	1.74%
Covington	BLQ	VA	341,348	20.20%	4.73%
Domtar Paper	BLQ	NC	170,969	10.12%	2.37%
Franklin Mill	BLQ	VA	208,420	12.33%	2.89%
Hopewell	BLQ	VA	159,444	9.43%	2.21%
Kapstone Kraft	BLQ	NC	158,729	9.39%	2.20%
Luke Mill	BLQ	MD	68,855	4.07%	0.95%
West Point	BLQ	VA	254,582	15.06%	3.53%
		Total	**1,690,116**	**100.00%**	**23.42%**
Facility Name	**Fuel**	**State**	**Quantity**	**GEO %**	**Tier 1**
Bird, J.	GEO	MD	72	10.40%	0.00%
Bird, W.	GEO	MD	29	4.19%	0.00%
Dixon	GEO	MD	21	3.03%	0.00%
Hendrickson	GEO	MD	69	9.97%	0.00%
Hucht	GEO	MD	6	0.87%	0.00%
Kawalek	GEO	MD	7	1.01%	0.00%
Keeney	GEO	MD	46	6.65%	0.00%
Loudermilk	GEO	MD	97	14.02%	0.00%
MacInnes	GEO	MD	16	2.31%	0.00%
McWilliams	GEO	MD	36	5.20%	0.00%
Menning	GEO	MD	31	4.48%	0.00%
Overstreet	GEO	MD	70	10.12%	0.00%
Parlegreco	GEO	MD	41	5.92%	0.00%
Patel	GEO	MD	27	3.90%	0.00%
Ryan	GEO	MD	12	1.73%	0.00%
Shriner	GEO	MD	13	1.88%	0.00%
Verde	GEO	MD	16	2.31%	0.00%
Vorhauer	GEO	MD	47	6.79%	0.00%
Wissel	GEO	MD	36	5.20%	0.00%
		Total	**692**	**100.00%**	**0.01%**
Facility Name	**Fuel**	**State**	**Quantity**	**LFG %**	**Tier 1**
AP Arden	LFG	PA	5,294	6.59%	0.07%
BC Alpha Ridge	LFG	MD	57	0.07%	0.00%
BC Millersville	LFG	MD	5,803	7.22%	0.08%
Broad Mountain	LFG	PA	4,207	5.23%	0.06%
BWWTP	LFG	MD	4,707	5.86%	0.07%
CID	LFG	IL	724	0.90%	0.01%
Martinsville	LFG	VA	4,040	5.03%	0.06%
Croda Atlas Pt	LFG	DE	750	0.93%	0.01%
DPL NWLND	LFG	MD	5,923	7.37%	0.08%
Fairless Hills	LFG	PA	1,330	1.65%	0.02%
FE Erie County	LFG	OH	3,026	3.76%	0.04%
FE Geneva	LFG	OH	3	0.00%	0.00%
FE Mahoning	LFG	OH	1,022	1.27%	0.01%
Lakeview Gas	LFG	PA	683	0.85%	0.01%
Mallard Lake	LFG	IL	1,356	1.69%	0.02%
Monmouth	LFG	NJ	752	0.94%	0.01%
New Bern	LFG	NC	8,496	10.57%	0.12%
Ritchie Brown	LFG	MD	10,267	12.77%	0.14%
PEP Ritchie PG	LFG	MD	403	0.50%	0.01%
VP Amelia	LFG	VA	6	0.01%	0.00%
VP Bethel	LFG	VA	3,230	4.02%	0.04%
VP Charles City	LFG	VA	2,258	2.81%	0.03%
VP Chester	LFG	VA	1,221	1.52%	0.02%
VP King	LFG	VA	3,623	4.51%	0.05%
VP Northeast	LFG	VA	11,194	13.93%	0.16%
		Total	**80,375**	**100.00%**	**1.11%**

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**MSW %**	**Tier 1**
Covanta Fairfax	MSW	VA	298,320	27.09%	4.13%
Harford	MSW	MD	876	0.08%	0.01%
Montgomery	MSW	MD	345,089	31.34%	4.78%
Wheelabrator	MSW	MD	456,793	41.49%	6.33%
		Total	**1,101,078**	**100.00%**	**15.26%**
Facility Name	**Fuel**	**State**	**Quantity**	**OBG %**	**Tier 1**
Buckeye BioGas	OBG	OH	2,433	14.22%	0.03%
Central Ohio	OBG	OH	3,678	21.50%	0.05%
French Creek	OBG	OH	1,225	7.16%	0.02%
Haviland	OBG	OH	2,062	12.05%	0.03%
Van Erk Dairy	OBG	OH	1,209	7.07%	0.02%
Wooster	OBG	OH	5,906	34.53%	0.08%
Zanesville	OBG	OH	593	3.47%	0.01%
		Total	**17,106**	**100.00%**	**0.24%**
Facility Name	**Fuel**	**State**	**Quantity**	**WAT %**	**Tier 1**
AEP Buck	WAT	VA	55,920	3.86%	0.77%
AEP Fries	WAT	VA	30,141	2.08%	0.42%
AEP Glen Ferris	WAT	WV	23,790	1.64%	0.33%
Allegheny	WAT	PA	51,679	3.56%	0.72%
Allegheny Lock	WAT	PA	47,429	3.27%	0.66%
Allegheny River	WAT	PA	168,865	11.64%	2.34%
AP Misc Hydro	WAT	WV	52,599	3.63%	0.73%
Beardslee	WAT	NY	39,734	2.74%	0.55%
Beebee Island	WAT	NY	37,137	2.56%	0.51%
Big Shoals	WAT	VA	1,394	0.10%	0.02%
Black River	WAT	NY	9,096	0.63%	0.13%
Brasfield	WAT	VA	12,268	0.85%	0.17%
Coleman Falls	WAT	VA	6,055	0.42%	0.08%
Conemaugh	WAT	PA	20,000	1.38%	0.28%
Cushaw	WAT	VA	7,535	0.52%	0.10%
Deep Creek	WAT	MD	26,735	1.84%	0.37%
Deferiet	WAT	NY	35,402	2.44%	0.49%
Dixon	WAT	IL	26,075	1.80%	0.36%
E.J. West	WAT	NY	37,485	2.58%	0.52%
French paper	WAT	MI	10,277	0.71%	0.14%
Granby	WAT	NY	26,297	1.81%	0.36%
Great Falls	WAT	NJ	19,131	1.32%	0.27%
Halifax	WAT	VA	4,014	0.28%	0.06%
Holcomb Rock	WAT	VA	11,513	0.79%	0.16%
Inghams	WAT	NY	5,987	0.41%	0.08%
KC Brighton	WAT	MD	5,285	0.36%	0.07%
Lakeview	WAT	VA	997	0.07%	0.01%
Lockport	WAT	IL	16,983	1.17%	0.24%
London	WAT	WV	92,532	6.38%	1.28%
Lyons Falls	WAT	NY	14,670	1.01%	0.20%
Marmet	WAT	WV	66,784	4.60%	0.93%
Niagara	WAT	VA	718	0.05%	0.01%
Prospect	WAT	NY	39,700	2.74%	0.55%
Schoolfield	WAT	VA	28,126	1.94%	0.39%
Snowden	WAT	VA	17,495	1.21%	0.24%
Soft Maple	WAT	NY	21,832	1.51%	0.30%
Trenton	WAT	NY	108,485	7.48%	1.50%
Upper Sterling	WAT	IL	9,068	0.63%	0.13%
VP Emporia	WAT	VA	7,843	0.54%	0.11%
Winfield	WAT	WV	113,815	7.85%	1.58%
York Haven	WAT	PA	139,416	9.61%	1.93%
		Total	**1,450,307**	**100.00%**	**20.10%**

[122] Further information regarding the most recent RPS compliance data will be available in the Commission's forthcoming Renewable Energy Portfolio Standard Report with data for calendar year 2016.

Appendix 6 (Continued): 2016 Retired RECs by Facility (in-State and Out-of-State) and by Source

Tier 1 (Cont'd)*					
Facility Name	**Fuel**	**State**	**Quantity**	**WND %**	**Tier 1**
Adam	WND	IL	438	0.02%	0.01%
AEP Blue Creek	WND	OH	10,451	0.45%	0.14%
AEP Fowler Ridge	WND	IN	31,336	0.89%	0.29%
AEP Meadow Lake	WND	IN	17,252	0.16%	0.05%
AP Beech Ridge	WND	WV	9,699	0.41%	0.13%
AP Greenland	WND	WV	24,501	1.05%	0.34%
AP Laural	WND	WV	770	0.03%	0.01%
AP Pinnacle	WND	WV	171,558	7.33%	2.38%
AP Roth Rock	WND	MD	26,322	1.13%	0.36%
AP South Chestnut	WND	PA	1,153	0.05%	0.02%
Big Sky	WND	IL	12,076	0.52%	0.17%
Bishop Hill	WND	IL	597,150	25.52%	8.27%
Camp Grove	WND	IL	6,353	0.27%	0.09%
Cayuga Ridge	WND	IL	406,542	17.38%	5.63%
Crystal Lake	WND	IA	76,429	3.27%	1.06%
Crystal Lake Wind	WND	IA	94,801	4.05%	1.31%
Eco Grove	WND	IL	1,051	0.04%	0.01%
Farmer City	WND	MO	171,742	7.34%	2.38%
Findlay	WND	OH	2,904	0.12%	0.04%
Fowler Ridge	WND	IN	320	0.01%	0.00%
Grand Ridge	WND	IL	5,526	0.12%	0.04%
Harpster	WND	OH	724	0.03%	0.01%
High Trail	WND	IL	80,016	3.42%	1.11%
Klondike Rd	WND	MD	141	0.01%	0.00%
Meyersdale	WND	PA	10,481	0.45%	0.15%
Minonk	WND	IL	16,246	0.69%	0.23%
PL Locust Ridge	WND	PA	6,014	0.26%	0.08%
PN Allegheny Ridge	WND	PA	38,251	1.63%	0.53%
PN Armenia Mtn	WND	PA	7,362	0.31%	0.10%
PN Highland North	WND	PA	3,323	0.14%	0.05%
PN Lookout	WND	PA	81,762	3.49%	1.13%
PN Mehoopany	WND	PA	69,081	2.95%	0.96%
PN Patton	WND	PA	1,812	0.08%	0.03%
PN Sandy Ridge	WND	PA	441	0.02%	0.01%
PN Stony Creek	WND	PA	42,709	1.83%	0.59%
Providence Heights	WND	IL	11,838	0.51%	0.16%
SP Twin Ridges	WND	PA	2,775	0.12%	0.04%
Tatanka	WND	ND	282,055	12.06%	3.91%
Top Crop	WND	IL	11,989	0.51%	0.17%
Zephyr	WND	OH	4,202	0.18%	0.06%
		Total	**2,339,596**	**100.00%**	**32.42%**

Facility Name	**Fuel**	**State**	**Quantity**	**AB %**	**Tier 1**
Kapstone Kraft	AB	NC	95	100.00%	0.00%
		Total	**95**	**100.00%**	**0.00%**

Tier 1 (Cont'd)*					
Facility Name	**Fuel**	**State**	**Quantity**	**WDS %**	**Tier 1**
AEP W Kingsport	WDS	TN	60,180	11.21%	0.83%
Covington	WDS	VA	58,940	10.97%	0.82%
Cox Waste	WDS	KY	5,474	1.02%	0.08%
Domtar Paper	WDS	NC	87,669	16.32%	1.21%
Hopewell	WDS	VA	10,355	1.93%	0.14%
Kapstone Kraft	WDS	NC	323	0.06%	0.00%
Multitrade	WDS	VA	43,268	8.06%	0.60%
VP South Boston	WDS	VA	265,009	49.34%	3.67%
West Point	WDS	VA	5,856	1.09%	0.08%
		Total	**537,074**	**100.00%**	**7.44%**

Tier 2					
Facility Name	**Fuel**	**State**	**Quantity**	**WAT %**	**Tier 2**
AEP Summerville	WAT	WV	183	0.01%	0.01%
Conowingo	WAT	MD	435,449	29.00%	29.00%
Covanta	WAT	WV	37,304	2.48%	2.48%
Falls	WAT	NC	32,790	2.18%	2.18%
Gaston	WAT	NC	10,945	0.73%	0.73%
High Rock	WAT	NC	87,241	5.81%	5.81%
Lake Lynn	WAT	PA	92,262	6.14%	6.14%
Narrows	WAT	NC	62,677	4.17%	4.17%
Piney	WAT	PA	9,509	0.63%	0.63%
Racine	WAT	OH	5,094	0.34%	0.34%
Roanoke	WAT	NC	13,378	0.89%	0.89%
Safe Harbor	WAT	PA	211,794	14.10%	14.10%
Tuckertown	WAT	NC	53,322	3.55%	3.55%
XIC Calderwood	WAT	TN	224,853	14.97%	14.97%
XIC Cheoah	WAT	NC	224,786	14.97%	14.97%
		Total	**1,501,587**	**100.00%**	**100.00%**

Tier 1 REC Total	7,216,439
SREC Total	411,787
Tier 2 REC Total	1,501,587
Grand Total	9,129,813

*Solar facilities are not represented in this table. In 2016, 28,582 facilities produced 411,787 SRECs.

Resource Definitions			
Agriculture Waste	AB	Municipal Solid Waste	MSW
Black Liquor	BLQ	Other Biomass Gas	OBG
Geothermal	GEO	Wood/Waste Solids	WDS
Landfill Gas	LFG	Wind	WND
Hydroelectric	WAT		

Appendix 7: Proposed New Renewable Generation in Maryland PJM Queue

Appendix Table 7: Proposed New Renewable Generation in Maryland PJM Queue
Effective Date: August 2017 ["Under Construction"]

Transmission Owner	Project Name	County Location	PJM Queue #	Fuel Type	Project Capacity (MW)	Projected In-Service Date
APS	Cotoctin-Troutville Junction 34.5kV	Frederick	AA1-109	solar	4.5	2017 Q4
APS	Maple Ave-Mount Lena 34.5kV	Washington	AB2-027	solar	3.3	2017 Q4
APS	Antietam 34.5kV	Washington	AB2-097	solar	0	2019 Q2
APS	Damascus-Mt. Airy 34.5kV	Frederick	Y3-029	natural gas	4.375	2017 Q4
BGE	Harrisonville 13kV	Baltimore County	AB1-005	natural gas	0	2015 Q4
BGE	Cold Spring 240v	Baltimore City	AB1-020	storage	0	2015 Q4
BGE	Mill Creek 240v	Anne Arundel	AB1-035	storage	0	2015 Q4
BGE	Howard 240v	Howard	AB1-036	storage	0	2015 Q4
BGE	Ridgeview 240v	Anne Arundel	AB1-037	storage	0	2015 Q4
BGE	Shadyside 240v	Anne Arundel	AB1-038	storage	0	2015 Q4
BGE	Lipins Corner 240v	Anne Arundel	AB1-039	storage	0	2015 Q4
BGE	Glendale 240v	Howard	AB1-040	storage	0	2015 Q4
BGE	Hunt Club 240v	Anne Arundel	AB1-041	storage	0	2015 Q4
BGE	Wall Cove 240v	Anne Arundel	AB1-042	storage	0	2015 Q4
BGE	Riva Road 240v	Anne Arundel	AB1-043	storage	0	2015 Q4
BGE	Highland 240v	Howard	AB1-044	storage	0	2015 Q4
BGE	East Towson 240v	Baltimore County	AB1-045	storage	0	2015 Q4
BGE	Sudbrook Park 240v	Baltimore County	AB1-046	storage	0	2015 Q3
BGE	Highland 240v	Howard	AB1-047	storage	0	2015 Q4
BGE	Texas 240v	Baltimore County	AB1-048	storage	0	2015 Q4
BGE	Friendship Manor 240v	Howard	AB1-049	storage	0	2015 Q4
BGE	High Ridge 240v	Howard	AB1-050	storage	0	2015 Q4
BGE	Lutherville 240v	Baltimore County	AB1-051	storage	0	2015 Q4
BGE	Bengies 240v	Baltimore County	AB1-052	storage	0	2015 Q4
BGE	Greenbury Point 240V	Anne Arundel	AB1-071	storage	0	2015 Q4
BGE	Friendship Manor	Howard	Y1-045	solar	0	2017 Q3
BGE	Perryman Solar	Harford	Y2-117	solar	7.6	2017 Q4
BGE	Ashton 480V	Montgomery	Y3-074	hydro	0	2014 Q3
DPL	Crisfield 25kV	Somerset	AA1-059	solar	4.3	2018 Q2
DPL	Kings Creek-Loretto 138kV	Somerset	AA1-102	solar	37.5	2018 Q4
DPL	Massey 25kV	Kent	AA1-110	solar	4	2019 Q4
DPL	Loretto-Kings Creek 138kV	Somerset	X1-096	wind	19.5	2018 Q4
DPL	Todd 69kV	Anne Arundel	X3-008	solar	7.6	2018 Q4
DPL	Worcester South 25kV	Worcester	Z2-076	solar	3.99	2018 Q4
DPL	Worcester North 25kV	Worcester	Z2-077	solar	3.99	2018 Q4
DPL	Church 25kV	Kent	Z2-097	solar	3.54	2018 Q2
Essential Power	Rock Springs 500kV	Cecil	Y3-102	natural-gas	135	2017 Q3
PEPCO	Burches Hill-Chalk Point 500kV	Prince George's	X4-035	natural-gas	735.5	2018 Q2
PEPCO	Burches Hill-Chalk Point 500kV	Prince George's	Z1-052	natural-gas	44.5	2018 Q2
				Total:	**1,019**	