PUBLIC SERVICE COMMISSION OF MARYLAND

RENEWABLE ENERGY PORTFOLIO STANDARD REPORT

With Data for Calendar Year 2017

In compliance with Section 7-712 of
the Public Utilities Article,
Annotated Code of Maryland

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I. INTRODUCTION

This document constitutes the annual report of the Public Service Commission of Maryland ("Commission") regarding the implementation of the Maryland Renewable Energy Portfolio Standard ("RPS") Program, with data for calendar year 2017. This report is submitted pursuant to § 7-712 of the Public Utilities Article, *Annotated Code of Maryland* ("PUA"), which requires the Commission to report to the General Assembly on the status of the implementation of the RPS Program on or before December 1 of each year.[1] The Maryland RPS Program is designed to support a stable and predictable market for energy generated from renewables, and to lower the cost to consumers of electricity produced from these resources. Implementation of the RPS Program assists in overcoming market barriers seen as impediments to the development of the industry. Moreover, increasing reliance upon renewable energy technologies to satisfy electric power requirements can result in long-term emission reductions, increased fuel diversity, and economic benefits to the State.[2]

The calendar year 2017 electricity supplier compliance reports, as verified by the Commission, indicate that the State of Maryland RPS obligations were almost entirely fulfilled through the submission of the appropriate level of Tier 1 and Tier 2 Renewable Energy Credits ("RECs").[3] All remaining calendar year 2017 RPS obligations were satisfied by compliance fees, also known as alternative compliance payments ("ACPs").

A. Objectives of the Program

The objective of PUA § 7-701 *et seq.* (hereinafter, "RPS Statute") is to recognize and to develop the benefits associated with a diverse portfolio of renewable energy resources to serve Maryland. The State's RPS Program does this by recognizing the environmental and consumer benefits associated with renewable energy. The RPS Program requires electricity suppliers to supply a prescribed minimum portion of their retail electricity sales with various renewable energy sources, which have been classified within the RPS Statute as Tier 1 and Tier 2 renewable sources. The program is implemented through the creation, sale, and transfer of RECs.

The development of renewable energy resources is further promoted by requiring electricity suppliers to pay an ACP for failing to acquire sufficient RECs to satisfy the RPS as set forth in PUA § 7-703. Compliance fees are deposited into the Maryland Strategic Energy Investment Fund ("SEIF") as dedicated funds to provide for loans and grants that spur the creation of new Tier 1 renewable energy resources in the State. Responsibility for developing renewable energy resources is vested with the Maryland Energy Administration ("MEA").

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[1] Electricity suppliers must file an RPS compliance report with the Commission for the prior calendar year by April 1st of the subsequent year. Consequently, this report, which is due to the General Assembly in December 2018, highlights data from electricity suppliers' 2017 compliance reports and other relevant 2017 data. In compliance with PUA § 7-712, topics addressed in this report include the availability of Tier 1, Tier 1 Solar, and Tier 2 renewable energy sources, compliance fees collected to support in-State renewable projects, and other pertinent information.

[2] *See* PUA § 7-702, which describes the legislative intent and legislative findings in support of the enactment of the Maryland Renewable Energy Portfolio Standard.

[3] *See* Section I.B.2 for a description of eligible Tier 1 and Tier 2 resources and requirements.

B. Overview of the Maryland RPS Program

Under the RPS Program, Maryland electricity suppliers are required to demonstrate compliance on an annual basis with an escalating renewable energy portfolio standard. This requirement applies to both competitive retail suppliers and electric companies in the State – including those that provide Standard Offer Service.[4] Electricity suppliers must file annual compliance reports with the Commission verifying that the renewable requirement for each entity has been satisfied.

A REC constitutes the renewable attributes associated with the production of one megawatt-hour ("MWh") of electricity generated using eligible renewable resources. As such, a REC is a uniquely-identified tradable commodity equal to one MWh of electricity generated or obtained from an eligible renewable energy resource. Generators and electricity suppliers may trade RECs using a Commission-approved system known as the Generation Attributes Tracking System ("GATS"). The GATS system is operated by PJM Environmental Information Services, Inc. ("PJM-EIS") and is designed to track the ownership and trading of generation attributes.[5] A REC has a three-year lifespan during which it may be transferred, sold, or redeemed. However, each electricity supplier must document annually the retirement of RECs equal to the percentage specified by the RPS Statute,[6] or pay an ACP commensurate with any shortfalls.

1. Registration of Renewable Energy Facilities

Facilities eligible for the Maryland RPS Program must be located in PJM (the wholesale bulk power control area in which Maryland resides)[7] or in a control area that is adjacent to the PJM region,[8] so long as the electricity produced is delivered into the PJM region. However, facilities generating electricity from solar energy, geothermal, poultry litter–to–energy, waste–to–energy, or refuse–derived fuel are eligible only if the facility is connected with the electric

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[4] Standard Offer Service ("SOS") is electricity supply purchased from an electric company by the company's retail customers who cannot or choose not to transact with a competitive supplier operating in the retail market. *See* PUA §§ 7-501(n), 7-510(c).

[5] An attribute is "a characteristic of a generator, such as location, vintage, emissions output, fuel, state RPS Program eligibility, etc." PJM-EIS, *GATS Operating Rules* (May 2014) at 3.

[6] Using the Tier 2 RPS requirement as an example, assume a hypothetical electricity supplier operating in the State had 100,000 MWh in retail electricity sales for 2017. In 2017, the Tier 2 requirement was 2.5%; therefore, the electricity supplier would have to either verify the purchase of 2,500 Tier 2 RECs or pay an ACP for deficits. Similar requirements apply to Tier 1 and Tier 1 Solar, although the percentage obligation and ACP denomination differs depending on the tier and calendar year, as outlined by the RPS Statute.

[7] The PJM wholesale market includes all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia.

[8] A control area is an "electric system or systems, bounded by interconnection metering and telemetry, capable of controlling generation to maintain its interchange schedule with other Control Areas and contributing to frequency regulation. For the purposes of this document, a Control Area is defined in broad terms to include transmission system operations, market, and load-serving functions within a single organization. A Control Area operator may be a system operator, a transmission grid operator, or a utility." PJM-EIS, Generation Attribute Tracking System *(GATS) Operating Rules* (September 2016) at 5. For example, the multi-state area controlled by the PJM Regional Transmission Operator is one control area, as is the adjacent Midwest Independent System Operator ("ISO") multi-state area, and the adjacent New York ISO.

distribution grid serving Maryland. Finally, energy from a thermal biomass system must be generated in Maryland to qualify for the RPS program.[9]

Before recommending certification of a Renewable Energy Facility ("REF"), Commission Staff must determine whether the facility meets the standards set forth by the RPS Statute and Commission regulations (COMAR 20.61). REF applicants who qualify under Maryland's RPS Program must complete the appropriate application for REF certification posted on the Commission's RPS website.[10] In addition to the geographic requirements, applicants must also meet the fuel source requirements associated with Tier 1 or Tier 2 (*see* Table 1, below). Verification of the fuel source is completed with the aid of Energy Information Administration Form 860 ("EIA-860") to validate each facility's rated nameplate capacity, fuel source(s), location, and commercial operation in-service date.[11] Facilities that co-fire a REC-eligible renewable fuel source with non-eligible fuel sources must also submit a formula or methodology to account for the proportion of total electricity generated by the eligible fuel sources, which then may be credited with RECs. In addition to obtaining Commission certification, all REFs must register with GATS to track and transact business related to RECs. The GATS account must be established with the certification number issued by the Commission upon approval of the REF application.

2. Maryland RPS Annual Percentage Requirements

To comply with the Maryland RPS Program, electricity suppliers must acquire RECs derived from Maryland-certified Tier 1 and Tier 2 renewable sources, as defined in PUA § 7-701. Eligible fuel sources for Tier 1 RECs and Tier 2 RECs are listed in Table 1; solar has its own standard within Tier 1.

[9] There are currently no thermal biomass facilities in Maryland.

[10] REF applications are maintained by the Commission and are accessible online, available at: http://www.psc.state.md.us/electricity/wp-content/uploads/sites/2/Application-for-Certification-as-a-Renewable-Energy-Facility.pdf.

[11] Submitting Form EIA-860 is a requirement under Section 13(b) of the Federal Energy Administration Act of 1974 ("FEAA") (Public Law 93-275) for generating plants, regulated and unregulated, which have a nameplate rating of 1 MW or more, are operating or plan to operate within 5 years, and are connected to the transmission grid.

Table 1: Eligible Tier 1 and Tier 2 Sources

Tier 1 Renewable Sources	Tier 2 Renewable Sources
• Solar, including energy from photovoltaic technologies and solar water heating systems • Wind • Qualifying Biomass • Methane from a landfill or wastewater treatment plant • Geothermal • Ocean • Fuel Cell that produces electricity from a Tier 1 source • Hydroelectric power plant less than 30 MW capacity • Poultry litter-to-energy • Waste-to-energy • Refuse–derived fuel • Thermal energy from a thermal biomass system	• Hydroelectric power other than pump storage generation *(Note: Tier 1 RECs may be used to satisfy Tier 2 obligations)*

As shown in the table below, there is a different percentage schedule corresponding to each tier and set-aside requirement comprising the Maryland RPS Program.

- The Tier 1 requirements gradually increase until peaking in 2020, after which they are maintained at those levels.

- The Tier 1 Solar set-aside requirement increases from 1.15 percent in 2017, to 2.50 percent by 2020.[12] This ramp-up period for the solar carve-out corresponds in part with the implementation of the three-year pilot program on community solar energy generating facilities, which was established by the passage of Senate Bill 398 and House Bill 1087 and signed into law in May, 2015. There is a potential that Solar Renewable Energy Credits ("SRECs") generated by eligible community solar facilities could serve to offset the increasing Tier 1 Solar set-aside in the coming years.

[12] "Tier 1 Solar set-aside" refers to the requirement to obtain RECs for energy derived from qualified solar energy facilities. The Tier 1 Solar set-aside requirement applies to retail electricity sales in the State by electricity suppliers and is a sub-set of the Tier 1 standard.

- Beginning in 2017, a constant Tier 1 Offshore Wind set-aside of up to 2.5 percent commences as part of the Tier 1 portfolio.[13] In Order No. 88192, the Commission established specific offshore wind carve-outs from 2021 through 2042 ranging from 0.60 percent to 2.03 percent.

- Maryland's Tier 2 requirement remains constant at 2.5 percent through compliance year 2018, after which time the Tier 2 obligation sunsets.

Table 2: Annual RPS Requirements by Tier

Compliance Year	Tier 1 Non-Solar	Tier 1 Solar	Offshore Wind	Tier 2	Total
2017	11.95%	1.15%	0.0%	2.50%	15.60%
2018	14.30%	1.50%	0.0%	2.50%	18.30%
2019	18.45%	1.95%	0.0%	N/A	20.40%
2020	22.50%	2.50%	0.0%	N/A	25.00%
2021+	20.47% - 21.90%	2.50%	0.60% - 2.03%[14]	N/A	25.00%

At certain renewable procurement cost thresholds, an electricity supplier can request that the Commission consider a delay in scheduled Tier 1 and Tier 1 Solar RPS percentages.[15] To date, no such request has been made by electricity suppliers operating in the Maryland marketplace.

3. Maryland RPS Alternative Compliance Payment Requirements

Electricity suppliers who do not meet their RPS obligation through the retirement of eligible RECs must submit an ACP for every unit of shortfall. Table 3 presents the ACP schedule separated by tiers for each compliance year of the RPS Program moving forward.

[13] The Maryland Offshore Wind Energy Act of 2013 (2013 Md. Laws, Ch. 003) established an offshore wind set-aside within the Tier 1 requirement. Beginning in 2017, Tier 1 may include a Commission-determined amount of offshore wind RECs ("ORECs"), not to exceed 2.5%. The project must be generating RECs in order for the obligation to begin. In the absence of a Commission-determined OREC obligation, electricity suppliers must satisfy the carve-out using RECs derived from other Tier 1 renewable sources.

[14] As defined by PUA § 7-703(b), beginning in 2017 the RPS requirements include "an amount set by the Commission…not to exceed 2.5%, derived from offshore wind energy." The Commission set the offshore wind energy carve-out in Order No. 88192. As "a payment may not be made for an OREC [Offshore Renewable Energy Credit] until electricity supply is generated by the offshore wind project," and as the RPS obligation must be established at least three years in advance of the calendar year in which the purchase obligation takes effect, the carve-out may begin no sooner than January 1, 2021.

[15] PUA § 7-705(e)-(f).

Table 3: ACP Schedule ($/MWh)

Compliance Year	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	IPL[16] Tier 1
2017	$37.50	$195	$15	$2
2018	$37.50	$175	$15	$2
2019	$37.50	$150	N/A	$2
2020	$37.50	$125	N/A	$2
2021	$37.50	$100	N/A	$2
2022	$37.50	$75	N/A	$2
2023	$37.50	$60	N/A	$2
2024 +	$37.50	$50	N/A	$2

ACPs are remitted to the Maryland SEIF as dedicated funds to provide for loans and grants that spur the creation of new Tier 1 renewable energy resources.[17] As outlined by statute, compliance fees may only be used to support the creation of new Tier 1 renewable energy resources in the State; the use of ACPs remitted to satisfy the Tier 1 Solar RPS obligation are further restricted to support the creation of new *solar* energy resources in Maryland.[18]

II. ELECTRICITY SUPPLIER COMPLIANCE REPORTS

Calendar year 2017 marked the twelfth compliance year for the Maryland RPS, and the tenth year for electricity suppliers to comply with the Tier 1 Solar set-aside. The RPS compliance reports submitted to the Commission by electricity suppliers, along with information obtained from GATS, provide information regarding the retired RECs and the underlying REFs (*e.g.*, type and location of generators) utilized by electricity suppliers to comply with Maryland RPS obligations.[19] RPS compliance reports were filed by 102 electricity suppliers, including: 76 competitive retail suppliers; 15 brokers or competitive electricity suppliers with zero retail electricity sales; and 11 electric companies, of which four are investor-owned utilities.

According to the filed compliance reports, there were approximately 59.1 million MWh of total retail electricity sales in Maryland for 2017 (down from 61.2 million MWh in 2016); 57.7 million MWh of retail electricity sales were subject to RPS compliance, and 1.4 million

[16] Industrial Process Load ("IPL") means the consumption of electricity by a manufacturing process at an establishment classified in the manufacturing sector under the North American Industry Classification System. Under PUA § 7-705(b)(2) and COMAR 20.61.01.06 E(5), a supplier sale for IPL is required to meet the entire Tier 1 obligation for electricity sales, including solar. However, the ACP for an IPL Tier 1 non-solar shortfall and a Tier 1 Solar shortfall is the same. For IPL, there is no ACP for Tier 2 shortfalls.

[17] As a special, non-lapsing fund, the SEIF is also the depository of revenues generated through the sale of CO_2 allowances under the Regional Greenhouse Gas Initiative, the first market-based regulatory program in the United States to reduce greenhouse gas emissions.

[18] State Gov't § 9-20B-05(i).

[19] According to PUA § 7-709, a REC can be diminished or extinguished before the expiration of three years by: the electricity supplier that received the credit; a nonaffiliated entity of the electricity supplier that purchased or otherwise received the transferred credit; or demonstrated noncompliance by the generating facility with the requirements of PUA § 7-704(f). In the PJM region, the regional term of art is "retirement," which describes the process of removing a REC from circulation by the REC owner, *i.e.*, the owner "diminishes or extinguishes the REC." PJM-EIS, *GATS Operating Rules* (May 2014) at 54-56.

MWh were exempt.[20] Maryland electricity suppliers retired over 9.0 million RECs in 2017, slightly less than both the calculated obligation for the year and the 9.1 million RECs retired for compliance in 2016. The total cost of RECs retired in 2017 totaled $72.0 million, down from $135.2 million in 2016.

Table 4 displays the average cost per REC retired in each tier since 2008. The decline in Tier 1 and Tier 2 REC prices likely reflects a combination of an increase in the number of renewable energy facilities capable of providing RECs and downward price pressure coming from cheaper SRECs. The drop in SREC prices may be attributable to decreasing solar technology costs and an increasing number of solar facilities eligible to meet the SREC requirements as compared to when the solar carve-out was first initiated.

Table 4: Average Cost of RECs per Tier (2008 – 2017)

Year	Tier 1 Non-Solar	Tier 1 Solar	Tier 2
2008	$0.94	$345.45	$0.56
2009	$0.96	$345.28	$0.43
2010	$0.99	$328.57	$0.38
2011	$2.02	$278.26	$0.45
2012	$3.19	$201.92	$0.44
2013	$6.70	$159.71	$1.81
2014	$11.64	$144.06	$1.81
2015	$13.87	$130.39	$1.71
2016	$12.22	$110.63	$0.96
2017	$7.14	$38.18	$0.47

As demonstrated by the table below, the aggregated cost of compliance with the Maryland RPS Program increased substantially between 2012 and 2014, but displayed a declining growth rate in 2015 and 2016.[21] In spite of increasing RPS percentage requirements in-State and greater demand for RECs within the surrounding region,[22] total REC costs in 2017 fell approximately 47 percent between 2017 and 2016, the first time that total cost has decreased year over year.

[20] According to PUA § 7-703(a)(2), exceptions for the RPS requirement may include: IPL which exceeds 300,000,000 kWh by a single customer in a year; regions where residential customer rates are subject to a freeze or cap (*see* PUA § 7-505); or electric cooperatives under a purchase agreement that existed prior to October 1, 2004, until the expiration of the agreement. COMAR 20.61.01.06(D) exempts any sale of electricity that is marketed or otherwise represented to customers as renewable or having characteristics of a Tier 1 renewable source or Tier 2 renewable source.

[21] Prior to 2011, total costs of RECs increased at a slower rate. In 2008 – the first year in which the Tier 1 Solar carve-out applied – the total cost of RECs amounted to just over $2 million; in 2009, $3.1 million; and in 2010, $7.6 million.

[22] In addition to Maryland, 7 other PJM states (DE, IL, MI, NJ, NC, OH, and PA) plus the District of Columbia have a RPS mandate outlined in statute, while an additional 2 PJM states (IN, VA) have a voluntary RPS goal.

Table 5: Total Cost of RECs per Year (2012 – 2017)

	Tier	2012	2013	2014	2015	2016	2017
Total REC Costs	Tier 1	$12,453,493	$32,664,171	$70,630,620	$85,054,001	$88,200,121	$50,045,621
	Solar	$11,346,967	$21,417,989	$29,372,737	$39,055,714	$45,556,987	$21,275,664
	Tier 2	$664,220	$2,751,643	$3,987,557	$2,617,917	$1,441,416	$687,785
	Total	**$24,464,680**	**$56,833,803**	**$103,990,914**	**$126,727,632**	**$135,198,524**	**$72,009,070**
Total RECs Retired	Tier 1	3,902,221	4,871,586	6,062,135	6,134,653	7,216,439	7,006,113
	Solar	56,194	134,124	203,884	299,525	411,787	557,224
	Tier 2	1,522,297	1,526,789	1,521,022	1,531,279	1,501,587	1,448,567
	Total	**5,480,712**	**6,532,499**	**7,787,041**	**7,965,457**	**9,129,813**	**9,011,904**
RPS % Required	Tier 1	6.40%	7.95%	9.95%	10.00%	12.00%	12.15%
	Solar	0.10%	0.25%	0.35%	0.50%	0.70%	0.95%
	Tier 2	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
	Total	**9.00%**	**10.70%**	**12.80%**	**13.00%**	**15.20%**	**15.60%**

Of the $72.0 million of total RPS compliance costs in 2017, ACPs accounted for only a small fraction of those costs ($55,032). The reliance on ACPs increased slightly in 2017 (compared to $33,933 in 2016). The majority of ACPs paid in 2017 were made in lieu of purchasing Tier 1 RECs to satisfy Industrial Process Load ("IPL") obligations.[23]

Table 6: Results of the 2017 RPS Compliance Reports

RPS Compliance Year		Tier 1 Non-Solar	Tier 1 Solar	Tier 1 IPL	Tier 2	Total
2017	RPS Obligation	7,004,181	556,929	25,116	1,442,923	**9,029,149**
	Retired RECs	7,006,113	557,224	0	1,448,567	**9,011,904**
	ACP Required	$3,375	$1,170	$50,232	$255	**$55,032**

Note: Some electricity suppliers retired more RECs than required.

RECs are valid to demonstrate RPS compliance for the calendar year in which they were generated and in the following two calendar years.[24] Figure 1 aggregates the Maryland RPS tiers on the basis of generation year. For the 2017 compliance year, 45.3 percent of the RECs retired for compliance were generated in 2017; 34.1 percent in 2016; and the remaining 20.6 percent were generated in 2015.

[23] The ACP for Tier 1 IPL obligations is $2 per MWh, significantly lower than the average non-solar Tier 1 REC ($7.14) and solar Tier 1 REC ($38.18).

[24] COMAR 20.61.03.01 C (unless the REC is diminished or extinguished before expiration).

Figure 1: RECs Retired in 2017 by Generation Year

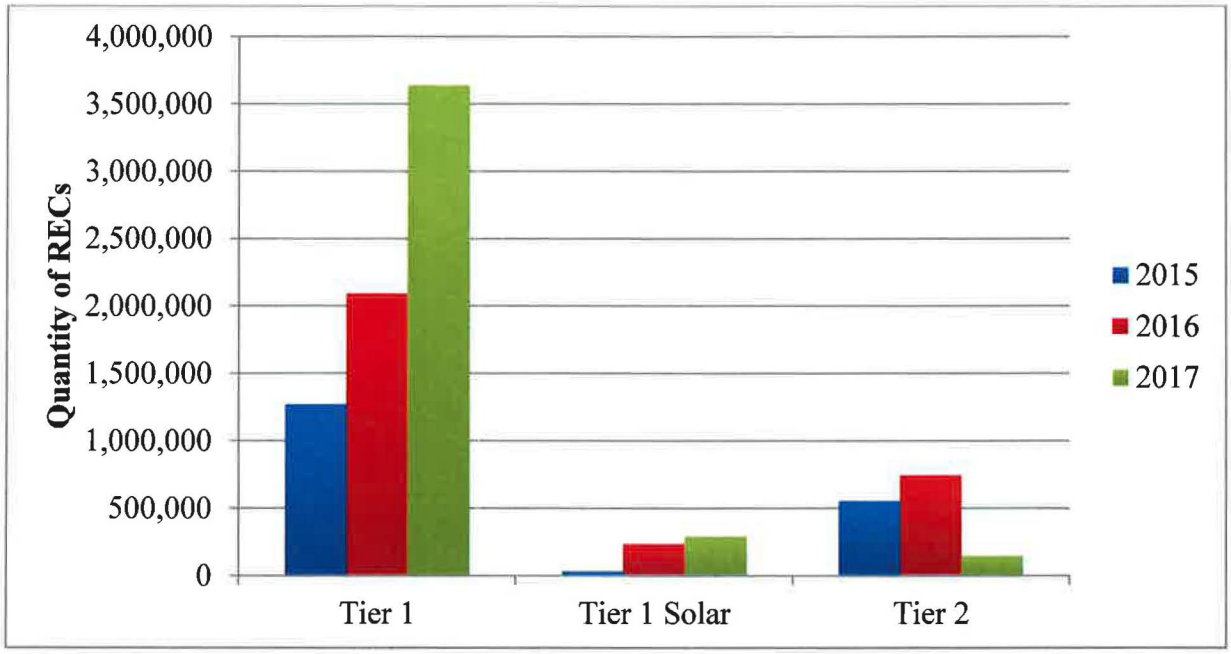
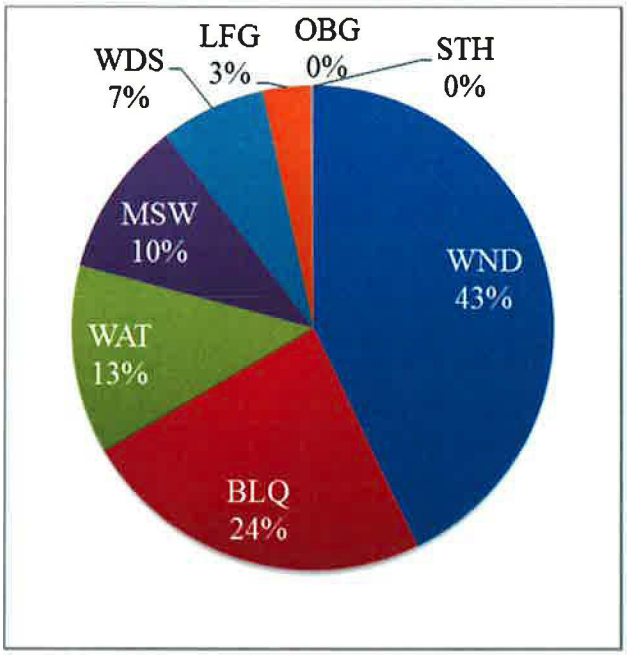


Figure 2 illustrates the fuel sources used to satisfy Tier 1 RPS requirements for the 2017 RPS compliance year. Of the Tier 1 RECs retired for 2017, the resources from which the RECs were sourced consisted primarily of wind, black liquor, and small hydroelectric plants. Although not pictured, Tier 2 RPS requirements for the 2017 RPS compliance year were satisfied exclusively by RECs derived from hydroelectric power.

Figure 2: 2017 Tier 1 Retired RECs by Fuel Source[25]

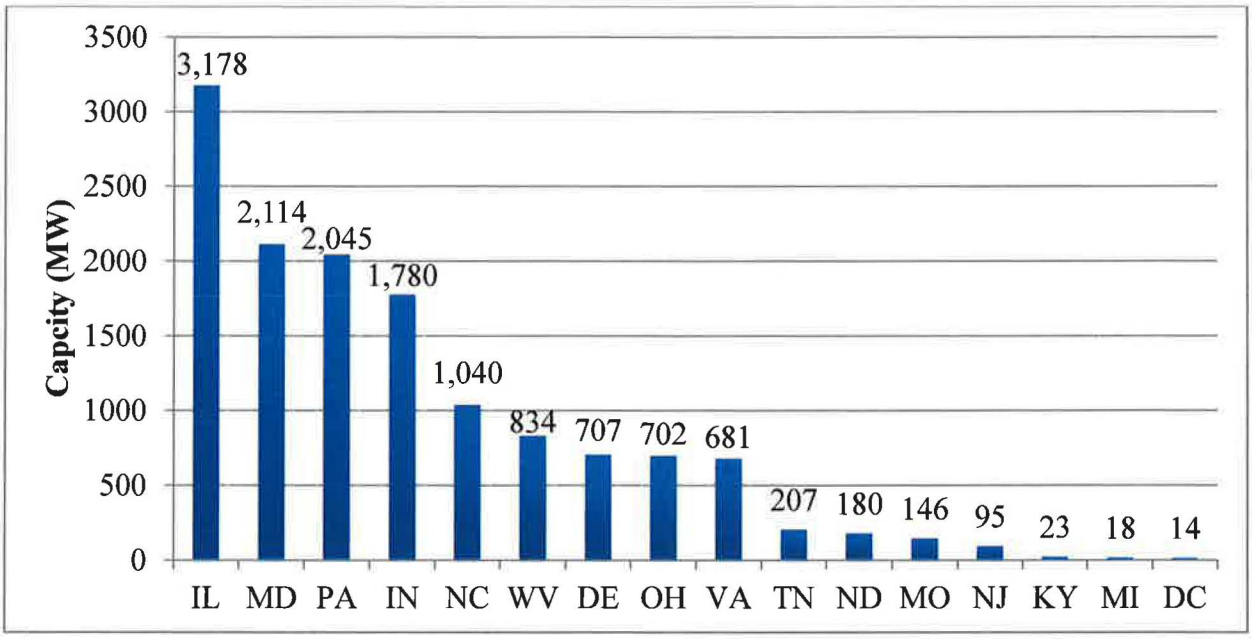


Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; OBG, Other Biomass Gas; STH, Solar Thermal; WAT, Small Hydroelectric; WDS, Wood and Waste Solids; WND, Wind.

Figure 3 presents the geographical location and the total generating capacity (13,764 MW, an increase from 12,759 MW in 2016) for all Maryland RPS-certified facilities regardless of Tier. RPS requirements also exist in the surrounding states, which generally support out-of-state and regional market participation. Of the renewable facilities that are eligible to participate in the Maryland RPS Program, 46.5 percent of the corresponding capacity is located in the Mid-Atlantic States. The locations of the remaining eligible resources span 10 states and in total contribute the other 53.5 percent of the State's eligible renewable resource capacity.

[25] WAT includes Tier 1 only. Qualifying biomass sourced from agricultural crops and geothermal contributed too few RECs to be seen on the chart.

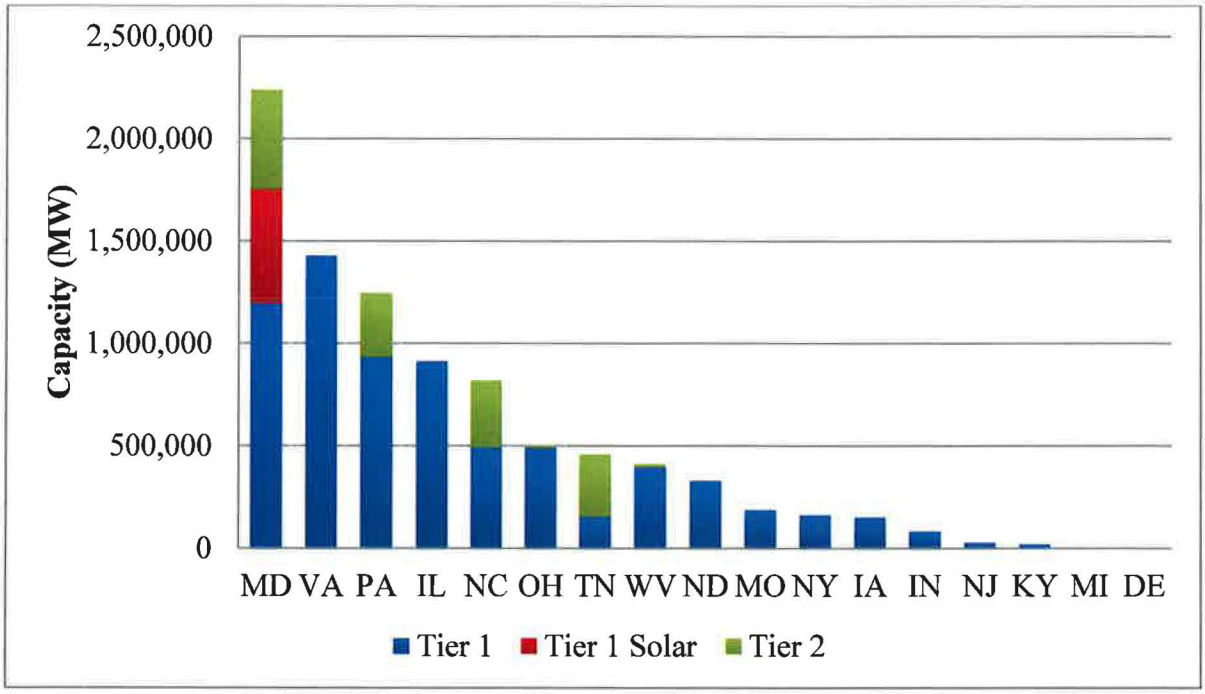
Figure 3: Total Rated Capacity by State (MW) [26]



For the 2017 compliance year, Figure 4 provides a visual display of aggregated REC data to convey general relationships among the States that contributed RECs. Maryland supplied the largest number of RECs purchased by retail electricity suppliers (24.9 percent), followed by Virginia (15.9 percent), Pennsylvania (13.8 percent), and Illinois (10.2 percent). The remaining 13 states contributed a total of 35.3 percent of all RECs retired in 2017. The majority of RECs from in-State generators were sourced from large hydroelectric (45.0 percent) and solar photovoltaic (20.4 percent).

[26] PJM-EIS, Generation Attribute Tracking System, Database query, (June 1, 2018). The information in this figure does not include Commission-authorized REFs that have not established a REC account with PJM GATS.

Figure 4: Number of RECs Retired by Facility Location (2017)



Tables 7 and 8 provide the quantitative data in support of the previous figure. Table 7 provides the reported levels of RECs retired by Maryland electricity suppliers in 2017 on a Tier and aggregate basis, whereas Table 8 provides the information on a percentage basis. As noted above, Maryland-generated RECs, followed by Virginia, Pennsylvania, and Illinois were used in the largest aggregate amounts by Maryland electricity suppliers for 2017 RPS compliance.

Table 7: 2017 REC Retirement by State

State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
MD	1,197,326	557,224	485,233	2,239,783
VA	1,429,866	-	-	1,429,866
PA	937,759	-	310,239	1,247,998
IL	915,765	-	-	915,765
NC	495,227	-	326,460	821,687
OH	492,457	-	9,703	502,160
TN	157,435	-	302,438	459,873
WV	398,214	-	14,494	412,708
ND	332,326	-	-	332,326
MO	188,895	-	-	188,895
NY	164,587	-	-	164,587
IA	153,089	-	-	153,089
IN	83,299	-	-	83,299

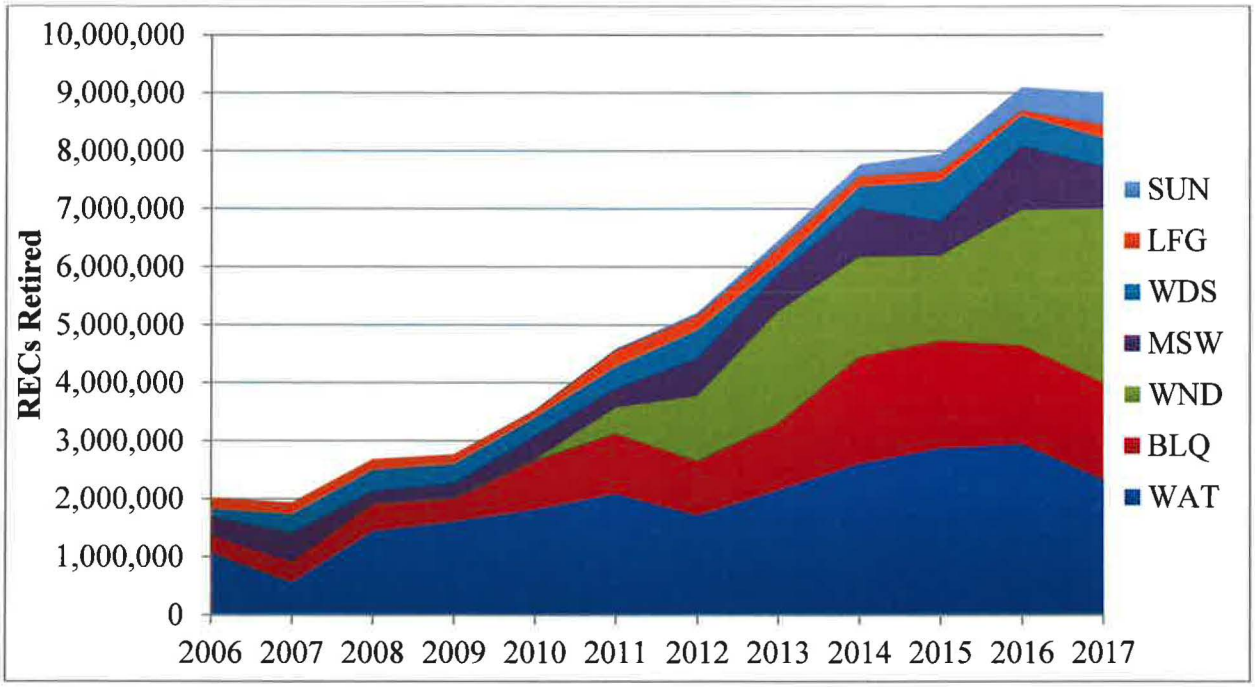
State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
NJ	29,709	-	-	29,709
KY	20,908	-	-	20,908
MI	5,454	-	-	5,454
DE	3,797	-	-	3,797
Total	**7,006,113**	**557,224**	**1,448,567**	**9,011,904**

Table 8: 2017 REC Retirement by State (%)

State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
MD	17.1%	100.0%	33.5%	24.9%
VA	20.4%	0.0%	0.0%	15.9%
PA	13.4%	0.0%	21.4%	13.8%
IL	13.1%	0.0%	0.0%	10.2%
NC	7.1%	0.0%	22.5%	9.1%
OH	7.0%	0.0%	0.7%	5.6%
TN	2.2%	0.0%	20.9%	5.1%
WV	5.7%	0.0%	1.0%	4.6%
ND	4.7%	0.0%	0.0%	3.7%
MO	2.7%	0.0%	0.0%	2.1%
NY	2.3%	0.0%	0.0%	1.8%
IA	2.2%	0.0%	0.0%	1.7%
IN	1.2%	0.0%	0.0%	0.9%
NJ	0.4%	0.0%	0.0%	0.3%
KY	0.3%	0.0%	0.0%	0.2%
MI	0.1%	0.0%	0.0%	0.1%
DE	0.1%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figure 5 illustrates the growth in RECs retired in total and by fuel type from the beginning of the RPS requirement in 2006. For the first time since the program's inception, wind ("WND") was the largest contributor of RECs as opposed to Hydroelectric ("WAT"). Note that the contributions from qualifying biomass sourced from agricultural crops, geothermal, other biomass liquid and gas, and solar thermal are too small to be seen on this chart.

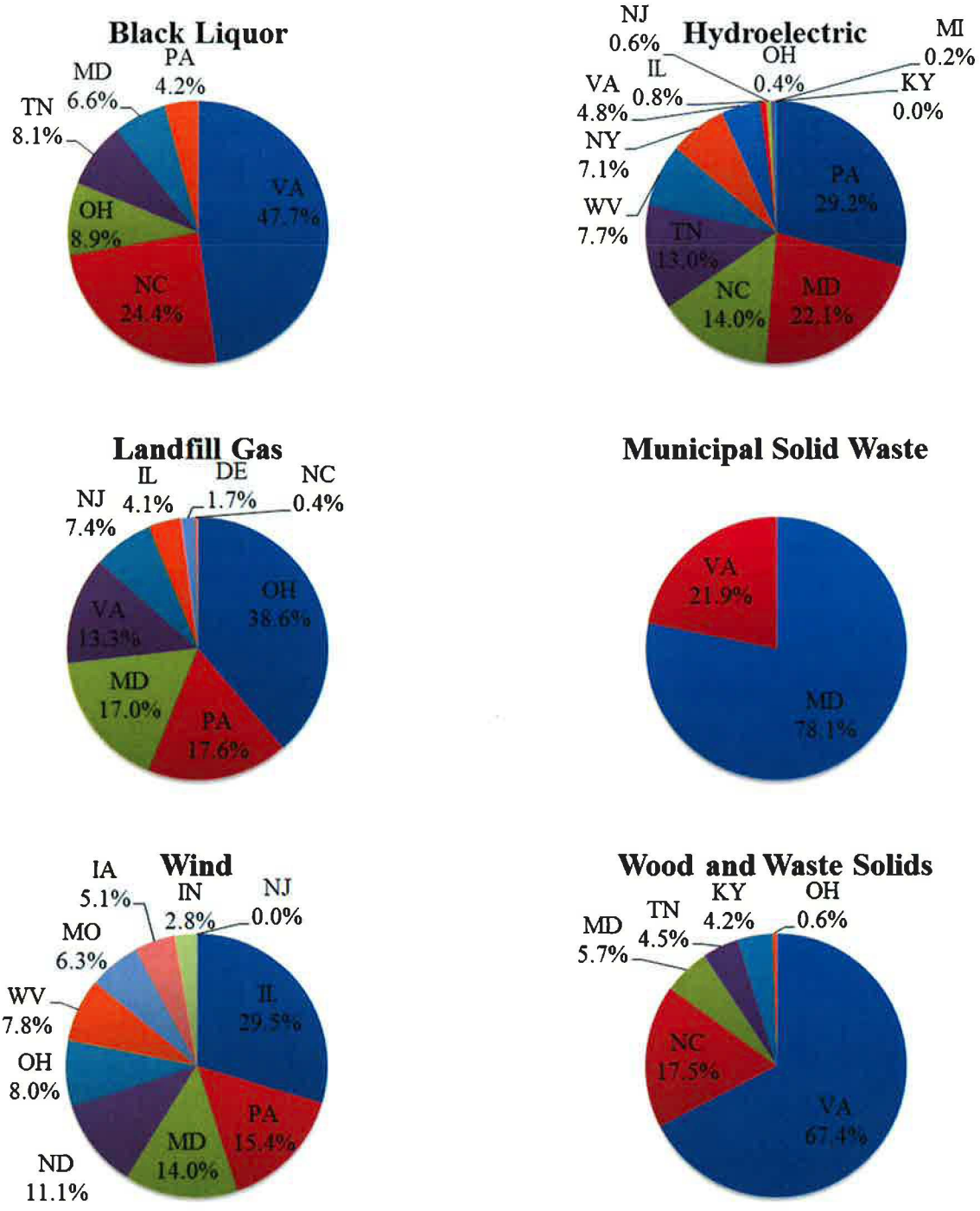
Figure 5: RECs Retired by Fuel Type (2006 – 2017)



Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; SUN, Solar Photovoltaic; WAT, Hydroelectric; WDS, Wood and Waste Solids; WND, Wind.

In 2017, all of the RECs retired from geothermal and solar sources originated in Maryland, while all of the "other biomass gas" sources were located in Ohio, and all of the qualifying biomass sourced from agricultural crops was located in North Carolina. The six remaining fuels used to comply with Maryland's 2017 RPS requirements corresponded to RECs generated in multiple other states, and Figure 6 shows the percentage contribution from each state for each of these six fuels. Facilities located in Maryland provided the majority of municipal solid waste RECs and the second largest percentage of hydroelectric RECs retired for compliance in 2017. Conversely, Maryland resources provided only 6.6 percent of black liquor RECs and 5.7 percent of the RECs derived from wood and waste solids.

Figure 6: Percentage of RECs Generated in Each State, by Fuel (2017) [27]



[27] Additional information pertaining to the source of renewable energy used to meet Maryland's 2017 RPS compliance requirements is presented in Appendices A and B. Appendix A provides a breakdown of the *number of RECs* used by electricity suppliers according to tier, fuel type, and facility location, while Appendix B presents the *number of facilities* by tier, fuel type, and facility location that provided RECs for compliance with the 2017 RPS Program.

III. MARYLAND RENEWABLE ENERGY FACILITIES

Implementation of the Maryland RPS Program can provide an incentive for renewable generators to locate in Maryland and generate electricity. The renewable requirement establishes a market for renewable energy, and to the extent Maryland's geography and natural resources can be utilized to generate renewable electricity, developers may locate projects within the State. This section of the report provides information about the REFs located in Maryland in 2017.[28] Renewable energy generated in Maryland can be used both in Maryland and in other states for RPS compliance purposes, and also can be sold in support of competitive retail electricity supplier product offerings (*i.e.*, green power products).[29] Green power products are generally offered to the public with higher concentrations electricity generated by renewable energy resources (*e.g.,* 50 or 100%) than required by State RPS requirements.

As shown in Table 9, approximately 1.5 million Tier 1 non-solar RECs, 0.9 million Tier 1 SRECs, and 1.9 million Tier 2 RECs were generated by eligible sources located within Maryland in 2017. Additional analysis pertaining to the Maryland-based renewable generators is presented in Appendices C through E. Appendix C shows the disposition of RECs generated in Maryland in 2017. Appendix D provides the number of renewable energy facilities by county that are both located in Maryland, and registered with GATS to participate in any one of the PJM States' RPS programs. Appendix E provides the total capacity of these facilities, broken out by county and tier.

[28] Specific information pertaining to the State's REFs as described herein was made available by PJM-EIS in the GATS State Agency Report.

[29] Facilities located in Maryland are not necessarily registered by the Commission for the Maryland RPS; rather, certain facilities may seek certification out-of-state in support of a long-term contract for the RECs from an out-of-state counterparty. Counterparties can include an electricity supplier operating in a different state and purchasing the RECs to satisfy the RPS requirement for another state or other entities, such as brokers that purchase the REC output for resale.

Table 9: 2017 Maryland Generated RECs by Fuel Source

Fuel Type		RECs (Quantity)	RECs (Percent)
Tier 1	Black Liquor	98,176	2.3%
	Geothermal	1,886	0.0%
	Land Fill Gas	83,845	1.9%
	Municipal Solid Waste	718,474	16.6%
	Solar Thermal	17	0.0%
	Small Hydro	24,703	0.6%
	Wood Waste	6,115	0.1%
	Wind	560,667	13.0%
Tier 1 Solar	Solar PV	884,328	20.4%
	Solar Thermal	3,899	0.1%
Tier 2	Large Hydro	1,946,421	45.0%
	Total	**4,328,531**	**100.0%**

Table 10 presents additional detail regarding the disposition of Maryland-generated RECs in calendar year 2017. Approximately 69 percent of the RECs generated by renewable facilities located within Maryland during 2017 are available for potential future sale in Maryland or in other states in subsequent compliance years. Slightly fewer than 30 percent of the RECs generated in Maryland were retired in 2017 to meet the RPS requirements in Maryland and various other PJM states. Labeled as "Other" in Table 10, just 1.1 percent of RECs were used for other purposes or may represent pending transfers between parties.

Table 10: Disposition of 2017 Maryland Generated RECs

REC Tier	Available	RPS Compliance	Other	Total
Tier 1 Non-Solar	656,801	834,280	2,802	1,493,883
Tier 1 Solar	592,492	295,143	592	888,227
Tier 2	1,748,313	155,875	42,233	1,946,421
Total	**2,997,606**	**1,285,298**	**45,627**	**4,328,531**
(%)	**69.3%**	**29.7%**	**1.1%**	**100.0%**

Source: PJM-EIS

Table 11 presents, on a state-by-state basis, the distribution of the RECs generated in-State that were retired for RPS compliance purposes. In 2017, Maryland-generated RECs were retired for compliance purposes in six jurisdictions: the District of Columbia, Delaware, Illinois, Maryland, New Jersey, and Pennsylvania. Approximately 82 percent of the RECs generated by in-State facilities in 2017 were retired for compliance purposes in Maryland, a 9 percent decrease from 2016 levels. In previous years, a much lower percentage of Maryland-generated RECs were used for compliance in Maryland.[30]

[30] For example, only 50.3% of RECs generated by in-State facilities in 2011 were retired for Maryland RPS purposes; and only 2.3% in 2010.

Table 11: 2017 Maryland Generated RECs Retired for RPS Compliance by State

Tier	Fuel Type	DC	DE	IL	MD	NJ	PA	Total
Tier 1 Non-solar	Black Liquor	-	-	-	50,356	-	-	50,356
	Geothermal	-	-	-	538	-	-	538
	Land Fill Gas	-	-	-	11,275	952	-	12,227
	Municipal Solid Waste	-	-	-	437,181	-	2,926	440,107
	Small Hydro	-	-	-	18,144	652	-	18,796
	Wood Waste	-	-	-	6,115	-	-	6,115
	Wind	-	59,737	-	246,379	25	-	306,141
	Subtotal	-	59,737	-	769,988	1,629	2,926	834,280
	Percentage	0.0%	7.2%	0.00%	92.3%	0.2%	0.4%	100.0%
Tier 1 Solar	Solar PV	946	-	-	290,369	-	2,835	294,150
	Solar Thermal	-	-	-	993	-	-	993
	Subtotal	946	-	-	291,362	-	2,835	295,143
	Percentage	0.3%	0.0%	0.00%	98.7%	0.0%	1.0%	100.0%
Tier 2	Large Hydro	-	-	155,875	-	-	-	155,875
	Subtotal	-	-	155,875	-	-	-	155,875
	Percentage	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
All Tiers	**Grand Total**	946	59,737	155,875	1,061,350	1,629	5,761	1,285,298
	Percentage	0.1%	4.6%	12.13%	82.6%	0.1%	0.4%	100.0%

Source: PJM-EIS.

IV. CONCLUSION

The electricity supplier compliance reports for 2017, verified by the Commission, indicate that nearly all of the Maryland RPS obligations were met via the purchase and retirement of RECs, with only $55,032 in ACPs remitted for compliance purposes. Nearly 25 percent of RECs used for compliance in 2017 came from in-State resources, up from approximately 20 percent in 2016. RECs derived from three fuel types – wind (42.9 percent), black liquor (23.8 percent), and small hydroelectric (12.5 percent) – were the predominant sources of Tier 1 compliance in 2017, with those RECs sourced primarily from Illinois, Virginia, and Pennsylvania, respectively. In 2017, the Tier 1 Solar carve-out was met by the retirement of RECs generated exclusively in Maryland. Companies demonstrated Tier 2 compliance by purchasing RECs derived from large hydroelectric sources, with 33.5 percent of the Tier 2 RECs sourced from Maryland REFs.

Throughout this next year, the Commission will continue to: review applications from facilities requesting certification as a Maryland REF; oversee the RPS Program; and verify that the electricity suppliers in Maryland procure a sufficient amount of electricity generated by renewable resources.

APPENDICES

Appendix A: 2017 Retired RECs by Facility

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**BLQ %**	**Tier 1**
AEP W Kingsport	BLQ	TN	135,106	8.10%	1.93%
Chillicothe	BLQ	OH	148,892	8.93%	2.13%
Covington	BLQ	VA	222,955	13.36%	3.18%
Domtar Paper	BLQ	NC	264,008	15.83%	3.77%
Franklin Mill	BLQ	VA	181,495	10.88%	2.59%
Hopewell	BLQ	VA	137,942	8.27%	1.97%
Johnsonburg	BLQ	PA	21,920	1.31%	0.31%
Kapstone Kraft	BLQ	NC	143,861	8.62%	2.05%
Luke Mill	BLQ	MD	109,598	6.57%	1.56%
Spring Grove	BLQ	PA	48,603	2.91%	0.69%
West Point	BLQ	VA	253,851	15.22%	3.62%
		Total	**1,668,231**	**100.00%**	**23.81%**
Facility Name	**Fuel**	**State**	**Quantity**	**LFG %**	**Tier 1**
AEP Cloyds	LFG	VA	998	0.44%	0.01%
AP Arden	LFG	PA	15,353	6.75%	0.22%
AP Reichs	LFG	MD	113	0.05%	0.00%
AP Upton	LFG	PA	569	0.25%	0.01%
Archbald	LFG	PA	4,628	2.04%	0.07%
BC Alpha Ridge	LFG	MD	2,662	1.17%	0.04%
BC Millersville	LFG	MD	9,538	4.19%	0.14%
Blue Ridge	LFG	PA	7,194	3.16%	0.10%
Broad Mountain	LFG	PA	3,832	1.69%	0.05%
BWWTP	LFG	MD	5,306	2.33%	0.08%
Croda Atlas Point	LFG	DE	20	0.01%	0.00%
DPL Central	LFG	DE	1,191	0.52%	0.02%
DPL NWLND	LFG	MD	834	0.37%	0.01%
DPL Southern	LFG	DE	2,586	1.14%	0.04%
Easton LFG	LFG	MD	5,086	2.24%	0.07%
Fairless Hills	LFG	PA	514	0.23%	0.01%
FE Carbon Alum	LFG	OH	43,645	19.19%	0.62%
FE Erie County	LFG	OH	1,254	0.55%	0.02%
FE Lorain	LFG	OH	28,074	12.35%	0.40%
FE Ottawa	LFG	OH	4,587	2.02%	0.07%
Lakeview Gas	LFG	PA	4,183	1.84%	0.06%
Lorain	LFG	OH	10,120	4.45%	0.14%
New Bern	LFG	NC	968	0.43%	0.01%
O'Brien, E.	LFG	NJ	5,000	2.20%	0.07%
Orchard	LFG	IL	348	0.15%	0.00%
PE SE CHES	LFG	PA	3,758	1.65%	0.05%
Pep Oaks	LFG	MD	5,783	2.54%	0.08%
PEP Ritchie Brwn	LFG	MD	8,616	3.79%	0.12%
PEP Ritchie PG	LFG	MD	792	0.35%	0.01%
Rochelle Energy	LFG	IL	5,205	2.29%	0.07%
Sayrevil	LFG	NJ	11,801	5.19%	0.17%
Settlers Hill	LFG	IL	2,296	1.01%	0.03%
Streator	LFG	IL	1,393	0.61%	0.02%
Suffolk	LFG	VA	1,607	0.71%	0.02%
VP Bethel	LFG	VA	13,795	6.07%	0.20%
VP Brunswick	LFG	VA	123	0.05%	0.00%
VP Chester	LFG	VA	2,226	0.98%	0.03%
VP Henrico	LFG	VA	832	0.37%	0.01%
VP King	LFG	VA	1,341	0.59%	0.02%
VP Northeast	LFG	VA	23	0.01%	0.00%
VP Peninsula	LFG	VA	9,190	4.04%	0.13%
VP Virg Beach	LFG	VA	9	0.00%	0.00%
		Total	**227,393**	**100.00%**	**3.25%**

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**GEO %**	**Tier 1**
Baratta	GEO	MD	27	1.44%	0.00%
Benigni, C.	GEO	MD	24	1.28%	0.00%
Bird, J.	GEO	MD	54	2.87%	0.00%
Bird, W.	GEO	MD	23	1.22%	0.00%
Brenny, M.	GEO	MD	5	0.27%	0.00%
Cipriani, A. 1	GEO	MD	21	1.12%	0.00%
Cipriani, A. 2	GEO	MD	11	0.59%	0.00%
Custer, C.	GEO	MD	8	0.43%	0.00%
Daly, M.	GEO	MD	12	0.64%	0.00%
Dickerson, L.	GEO	MD	33	1.76%	0.00%
Dixon	GEO	MD	56	2.98%	0.00%
Field, J.	GEO	MD	37	1.97%	0.00%
Gilotra, R.	GEO	MD	62	3.30%	0.00%
Graziani	GEO	MD	46	2.45%	0.00%
Gugerty, B.	GEO	MD	13	0.69%	0.00%
Harding, A.	GEO	MD	31	1.65%	0.00%
Harrison, H.	GEO	MD	16	0.85%	0.00%
Hendrickson	GEO	MD	39	2.07%	0.00%
Hucht	GEO	MD	20	1.06%	0.00%
Jack	GEO	MD	40	2.13%	0.00%
Jackson, C.	GEO	MD	47	2.50%	0.00%
Jarboe	GEO	MD	47	2.50%	0.00%
Jocic, B.	GEO	MD	9	0.48%	0.00%
Kawalek	GEO	MD	39	2.07%	0.00%
Keeney	GEO	MD	61	3.24%	0.00%
Lehr, M.	GEO	MD	33	1.76%	0.00%
Leung	GEO	MD	65	3.46%	0.00%
Loudermilk	GEO	MD	131	6.97%	0.00%
MacInnes	GEO	MD	19	1.01%	0.00%
Martin, D.	GEO	MD	24	1.28%	0.00%
McPartland, K.	GEO	MD	11	0.59%	0.00%
McWilliams	GEO	MD	49	2.61%	0.00%
Menning	GEO	MD	47	2.50%	0.00%
Mignini, A.	GEO	MD	37	1.97%	0.00%
Overstreet	GEO	MD	95	5.05%	0.00%
Parker	GEO	MD	24	1.28%	0.00%
Parlegreco	GEO	MD	56	2.98%	0.00%
Patel	GEO	MD	44	2.34%	0.00%
Richardson, J.	GEO	MD	21	1.12%	0.00%
Ryan	GEO	MD	16	0.85%	0.00%
Santin, D.	GEO	MD	20	1.06%	0.00%
Scheihing, P.	GEO	MD	4	0.21%	0.00%
Shriner	GEO	MD	19	1.01%	0.00%
Smith, H.	GEO	MD	47	2.50%	0.00%
Smith, J.	GEO	MD	24	1.28%	0.00%
Snyderman, C.	GEO	MD	93	4.95%	0.00%
Sotzen	GEO	MD	51	2.71%	0.00%
Traber, T.	GEO	MD	11	0.59%	0.00%
Verde	GEO	MD	23	1.22%	0.00%
Vorhauer	GEO	MD	41	2.18%	0.00%
Wissel	GEO	MD	59	3.14%	0.00%
Yarrington, M.	GEO	MD	35	1.86%	0.00%
		Total	**1,880**	**100.00%**	**0.03%**
Facility Name	**Fuel**	**State**	**Quantity**	**MSW %**	**Tier 1**
Covanta Fairfax	MSW	VA	160,179	21.87%	2.29%
MG County	MSW	MD	321,092	43.84%	4.58%
Wheelabrator	MSW	MD	251,153	34.29%	3.58%
		Total	**732,424**	**100.00%**	**10.45%**

Appendix A: 2017 Retired RECs by Facility (Cont'd)

Tier 1 (Cont'd)*

Facility Name	Fuel	State	Quantity	WDS %	Tier 1
AEP W Kingsport	WDS	TN	22,329	4.54%	0.32%
Coshocton Mill	WDS	OH	2,927	0.60%	0.04%
Covington	WDS	VA	80,707	16.42%	1.15%
Cox Waste	WDS	KY	20,716	4.21%	0.30%
Domtar Paper	WDS	NC	84,957	17.28%	1.21%
East Correctional	WDS	MD	28,131	5.72%	0.40%
Hopewell	WDS	VA	21,342	4.34%	0.30%
Kapstone Kraft	WDS	NC	1,088	0.22%	0.02%
Multitrade	WDS	VA	18,596	3.78%	0.27%
VP South Boston	WDS	VA	171,612	34.91%	2.45%
West Point	WDS	VA	39,222	7.98%	0.56%
		Total	**491,627**	**100.00%**	**7.02%**

Facility Name	Fuel	State	Quantity	WAT %	Tier 1
AEP Buck	WAT	VA	54,265	6.15%	0.77%
AEP Fries	WAT	VA	20,011	2.27%	0.29%
AEP Glen Ferris	WAT	WV	24,510	2.78%	0.35%
Allegheny River	WAT	PA	130,349	14.78%	1.86%
Allegheny River	WAT	PA	85,298	9.67%	1.22%
Beardslee	WAT	NY	7,611	0.86%	0.11%
Beebee Island	WAT	NY	3,011	0.34%	0.04%
Big Shoals	WAT	VA	1,174	0.13%	0.02%
Black River	WAT	NY	2,872	0.33%	0.04%
Brasfield	WAT	VA	3,323	0.38%	0.05%
Coleman Falls	WAT	VA	5,434	0.62%	0.08%
Conemaugh	WAT	PA	15,696	1.78%	0.22%
Cushaw	WAT	VA	3,282	0.37%	0.05%
Deep Creek	WAT	MD	30,088	3.41%	0.43%
Deferiet	WAT	NY	10,183	1.15%	0.15%
Dixon	WAT	IL	7,154	0.81%	0.10%
E.J. West	WAT	NY	24,329	2.76%	0.35%
French paper	WAT	MI	5,454	0.62%	0.08%
Granby	WAT	NY	2,454	0.28%	0.04%
Great Falls	WAT	NJ	12,863	1.46%	0.18%
Halifax	WAT	VA	1,318	0.15%	0.02%
Holcomb Rock	WAT	VA	5,993	0.68%	0.09%
Inghams	WAT	NY	2,077	0.24%	0.03%
KC Brighton	WAT	MD	411	0.05%	0.01%
Lakeview	WAT	VA	513	0.06%	0.01%
Lockport	WAT	IL	10,664	1.21%	0.15%
London	WAT	WV	40,836	4.63%	0.58%
Lyons Falls	WAT	NY	3,196	0.36%	0.05%
Marmet	WAT	WV	46,850	5.31%	0.67%
Mother Ann Lee	WAT	KY	192	0.02%	0.00%
Prospect	WAT	NY	20,974	2.38%	0.30%
Schoolfield	WAT	VA	4,417	0.50%	0.06%
Snowden	WAT	VA	8,764	0.99%	0.13%
Soft Maple	WAT	NY	3,756	0.43%	0.05%
Trenton	WAT	NY	84,124	9.54%	1.20%
Upper Sterling	WAT	IL	1,566	0.18%	0.02%
VP Emporia	WAT	VA	3,327	0.38%	0.05%
Winfield	WAT	WV	53,271	6.04%	0.76%
York Haven	WAT	PA	107,013	12.13%	1.53%
Yough	WAT	PA	33,491	3.80%	0.48%
		Total	**882,114**	**100.00%**	**12.59%**

Facility Name	Fuel	State	Quantity	AB %	Tier 1
Kapstone Kraft	AB	NC	345	100.00%	0.00%
		Total	**345**	**100.00%**	**0.00%**

Tier 1 (Cont'd)*

Facility Name	Fuel	State	Quantity	OBG %	Tier 1
Buckeye BioGas	OBG	OH	2,684	23.79%	0.04%
Central Ohio	OBG	OH	2,840	25.17%	0.04%
French Creek	OBG	OH	432	3.83%	0.01%
Haviland	OBG	OH	4,347	38.52%	0.06%
Wooster	OBG	OH	683	6.05%	0.01%
Zanesville	OBG	OH	298	2.64%	0.00%
		Total	**11,284**	**100.00%**	**0.16%**

Facility Name	Fuel	State	Quantity	WND %	Tier 1
AE Ontario	WND	NJ	45	0.00%	0.00%
AEP Blue Creek	WND	OH	229,303	7.64%	3.27%
AEP Fowler	WND	IN	15,040	0.50%	0.21%
AEP Fowler	WND	IN	23,549	0.78%	0.34%
AEP Meadow	WND	IN	29,459	0.98%	0.42%
AEP Meadow	WND	IN	5,251	0.17%	0.07%
AEP Paulding	WND	OH	12,162	0.41%	0.17%
AEP Wildcat	WND	IN	10,000	0.33%	0.14%
AP Beech Ridge	WND	WV	10,200	0.34%	0.15%
AP Criterion	WND	MD	10,980	0.37%	0.16%
AP Fourmile	WND	MD	216,290	7.20%	3.09%
AP Greenland	WND	WV	55,668	1.85%	0.79%
AP Pinnacle	WND	WV	166,879	5.56%	2.38%
AP Roth Rock	WND	MD	26,357	0.88%	0.38%
Big Sky	WND	IL	112,607	3.75%	1.61%
Bishop Hill	WND	IL	480,000	15.99%	6.85%
Camp Grove	WND	IL	18,500	0.62%	0.26%
Cayuga Ridge	WND	IL	166,921	5.56%	2.38%
Crystal Lake	WND	IA	27,551	0.92%	0.39%
Crystal Lake	WND	IA	125,538	4.18%	1.79%
Eco Grove	WND	IL	1,115	0.04%	0.02%
Fair Wind	WND	MD	167,500	5.58%	2.39%
Farmer City	WND	MO	188,895	6.29%	2.70%
Grand Ridge	WND	IL	2,183	0.07%	0.03%
Grand Ridge	WND	IL	2,114	0.07%	0.03%
Havilard	WND	OH	209	0.01%	0.00%
High Trail	WND	IL	1	0.00%	0.00%
Klondike Rd	WND	MD	113	0.00%	0.00%
Meyersdale	WND	PA	14,592	0.49%	0.21%
Minonk	WND	IL	9,612	0.32%	0.14%
Old Trail	WND	IL	20,206	0.67%	0.29%
Pilot Hill	WND	IL	48,434	1.61%	0.69%
PL Locust Ridge	WND	PA	4,762	0.16%	0.07%
PN Allegheny	WND	PA	44,541	1.48%	0.64%
PN Armenia	WND	PA	1	0.00%	0.00%
PN Highland	WND	PA	585	0.02%	0.01%
PN Lookout	WND	PA	127,988	4.26%	1.83%
PN Mehoopany	WND	PA	100,127	3.33%	1.43%
PN Patton	WND	PA	21,257	0.71%	0.30%
PN Sandy Ridge	WND	PA	17,608	0.59%	0.25%
PN Stony Creek	WND	PA	70,695	2.35%	1.01%
Providence Hts	WND	IL	5,224	0.17%	0.07%
SP Twin Ridges	WND	PA	59,754	1.99%	0.85%
Tatanka	WND	ND	332,326	11.07%	4.74%
Top Crop	WND	IL	20,246	0.67%	0.29%
		Total	**3,002,388**	**100.00%**	**42.85%**

Appendix A: 2017 Retired RECs by Facility (Cont'd)

Tier 2					
Facility Name	**Fuel**	**State**	**Quantity**	**WAT %**	**Tier 2**
AEP Summerville	WAT	WV	638	0.04%	0.04%
Conowingo	WAT	MD	485,233	33.44%	33.50%
Covanta	WAT	WV	13,856	0.95%	0.96%
Falls	WAT	NC	10,250	0.71%	0.71%
Gaston	WAT	NC	7,304	0.50%	0.50%
High Rock	WAT	NC	13,781	0.95%	0.95%
Lake Lynn	WAT	PA	66,343	4.57%	4.58%
Narrows	WAT	NC	38,471	2.65%	2.66%
Piney	WAT	PA	33,016	2.28%	2.28%
Racine	WAT	OH	9,703	0.67%	0.67%
Roanoke	WAT	NC	3,168	0.22%	0.22%
Safe Harbor	WAT	PA	210,926	14.54%	14.56%
Tuckertown	WAT	NC	34,740	2.39%	2.40%
XIC Calderwood	WAT	TN	303,571	20.92%	20.96%
XIC Cheoah	WAT	NC	219,950	15.16%	15.18%
		Total	**1,450,950**	**100.00%**	**100.16%**

Summary

Tier 1 REC Total	7,006,113
SREC Total	557,224
Tier 2 REC Total	1,448,567
Grand Total	9,011,904

*Solar facilities are not represented in this table. In 2017, 45,319 facilities produced 557,224 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 B: Location of Facilities that Provided RECs for 2017 RPS Compliance

	DE	IA	IL	IN	KY	MD	MI	MO	NC	ND	NJ	NY	OH	PA	TN	VA	WV	Total
Tier 1 Non-solar																		
Agricultural Byproduct	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**1**
Black Liquor	-	-	-	-	-	1	-	-	2	-	-	-	1	2	1	4	-	**11**
Geothermal	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	**52**
Land Fill Gas	3	-	4	-	-	9	-	-	1	-	2	-	5	8	-	10	-	**42**
Municipal Solid Waste	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	**3**
Other Biomass Gas	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	**6**
Solar Thermal	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	**1**
Solar PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Small Hydro	-	-	3	-	1	2	1	-	-	-	1	11	-	5	-	12	4	**40**
Wood Waste	-	-	-	-	1	1	-	-	2	-	-	-	1	-	1	5	-	**11**
Wind	-	2	13	5	-	5	-	1	-	1	1	-	3	11	-	-	3	**45**
Tier 1 Solar																		
Solar PV	-	-	-	-	-	44,539	-	-	-	-	-	-	-	-	-	-	-	**44,539**
Solar Thermal	-	-	-	-	-	780	-	-	-	-	-	-	-	-	-	-	-	**780**
Tier 2																		
Large Hydro	-	-	-	-	-	1	-	-	7	-	-	-	1	3	1	-	2	**15**
Total	**3**	**2**	**20**	**5**	**2**	**45,393**	**1**	**1**	**13**	**1**	**4**	**11**	**17**	**29**	**3**	**32**	**9**	**45,546**

Note: In order to prevent double counting, facilities using multiple fuels are only listed under their primary fuel.

Appendix C: Disposition of 2017 Vintage RECs Generated in Maryland

Fuel Type and Tier	RECs Retired for RPS Compliance by State							Available	Other	Total RECs Generated
	DC	DE	IL	MD	NJ	PA	Total			
Black Liquor	-	-	-	50,356	-	-	50,356	47,820	-	**98,176**
Geothermal	-	-	-	538	-	-	538	1,348	-	**1,886**
Land Fill Gas	-	-	-	11,275	952	-	12,227	69,118	2,500	**83,845**
Municipal Solid Waste	-	-	-	437,181	-	2,926	440,107	278,367	-	**718,474**
Small Hydro	-	-	-	18,144	652	-	18,796	5,907	-	**24,703**
Solar Thermal	-	-	-	-	-	-	-	17	-	**17**
Wind	-	59,737	-	246,379	25	-	306,141	254,224	302	**560,667**
Wood Waste	-	-	-	6,115	-	-	6,115	-	-	**6,115**
Tier 1 Non-solar Total	**-**	**59,737**	**-**	**769,988**	**1,629**	**2,926**	**834,280**	**656,801**	**2,802**	**1,493,883**
Solar PV	946	-	-	290,369	-	2,835	294,150	589,586	592	**884,328**
Solar Thermal	-	-	-	993	-	-	993	2,906	-	**3,899**
Tier 1 Solar Total	**946**	**-**	**-**	**291,362**	**-**	**2,835**	**295,143**	**592,492**	**592**	**888,227**
Large Hydro	-	-	155,875	-	-	-	155,875	1,748,313	42,233	**1,946,421**
Tier 2 Total	**-**	**-**	**155,875**	**-**	**-**	**-**	**155,875**	**1,748,313**	**42,233**	**1,946,421**
Grand Total	**946**	**59,737**	**155,875**	**1,061,350**	**1,629**	**5,761**	**1,285,298**	**2,997,606**	**45,627**	**4,328,531**

Appendix D: Number of Renewable Energy Facilities Located in Maryland

Maryland County	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	Total
Allegany	1	48	-	49
Anne Arundel	31	7,029	-	7,060
Baltimore	9	5,909	-	5,918
Baltimore City	1	982	-	983
Calvert	-	696	-	696
Caroline	-	227	-	227
Carroll	-	1,862	-	1,862
Cecil	-	1,015	-	1,015
Charles	-	2,378	-	2,378
Dorchester	-	226	-	226
Frederick	6	2,485	-	2,491
Garrett	6	55	-	61
Harford	7	3,309	1	3,317
Howard	13	3,013	-	3,026
Kent	1	276	-	277
Montgomery	14	8,709	1	8,724
Prince George's	6	14,115	-	14,121
Queen Anne's	2	530	-	532
Somerset	8	191	-	199
St. Mary's	-	1,203	-	1,203
Talbot	4	174	-	178
Washington	3	1,024	-	1,027
Wicomico	2	754	-	756
Worcester	1	393	-	394
Total	**115**	**56,603**	**2**	**56,720**

Note: This list includes all renewable generators that are both: 1) located within Maryland, and 2) registered to participate in any one of the PJM states' renewable energy programs as of April 5, 2018.

Appendix E: Capacity of Renewable Energy Facilities Located in Maryland (MW)

Maryland County	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	Total
Allegany	65.0	2.7	-	67.7
Anne Arundel	3.9	68.7	-	72.6
Baltimore	192.5	77.9	-	270.4
Baltimore City	0.1	13.3	-	13.3
Calvert	-	7.8	-	7.8
Caroline	-	7.1	-	7.1
Carroll	-	22.1	-	22.1
Cecil	-	25.1	-	25.1
Charles	-	42.9	-	42.9
Dorchester	-	11.7	-	11.7
Frederick	4.1	79.3	-	83.4
Garrett	210.0	3.6	-	213.6
Harford	1.4	59.3	474.0	534.7
Howard	1.3	34.0	-	35.3
Kent	3.0	12.3	-	15.3
Montgomery	81.1	98.9	42.0	222.0
Prince George's	13.5	151.3	-	164.8
Queen Anne's	0.1	32.4	-	32.5
Somerset	375.1	108.8	-	483.9
St. Mary's	-	13.1	-	13.1
Talbot	70.3	8.1	-	78.4
Washington	6.5	63.8	-	70.3
Wicomico	6.0	34.8	-	40.8
Worcester	0.0	7.9	-	7.9
Total	**1,033.8**	**987.0**	**516.0**	**2,536.8**

Note: This list includes all renewable generators that are both: 1) located within Maryland, and 2) registered to participate in any one of the PJM states' renewable energy programs as of April 5, 2018.