PUBLIC SERVICE COMMISSION OF MARYLAND

RENEWABLE ENERGY PORTFOLIO STANDARD REPORT

With Data for Calendar Year 2019

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 2019. 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 2019 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] Remaining calendar year 2019 RPS obligations were satisfied by compliance fees, also known as alternative compliance payments ("ACPs"). One supplier went out of business without satisfying its 2019 RPS obligations,[4] and two suppliers filed for bankruptcy without satisfying their 2019 RPS obligations.[5]

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 resources, 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

[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 2020, highlights data from electricity suppliers' 2019 compliance reports and other relevant 2019 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.

[4] The supplier failed to retire the required RECs or pay ACPs. Retail electric sales by this supplier represented less than 0.04% of total 2019 sales subject to compliance.

[5] The suppliers failed to retire the required RECs or ACPs. Retail electric sales by these suppliers represented 1.3% of total 2019 sales subject to compliance.

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").

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.[6] 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.[7] A REC has a three-year life span 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[8] 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)[9] or in a control area that is adjacent to the PJM region,[10] 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–

[6] 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).

[7] 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.

[8] 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 2019. In 2019, 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.

[9] 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.

[10] 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* (April 2018) 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.

to–energy, or refuse–derived fuel are eligible only if the facility is connected with the electric distribution grid serving Maryland. Finally, energy from a thermal biomass system must be used in Maryland to qualify for the RPS program.[11]

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.[12] 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 the 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.[13] 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.

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

[12] 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.

[13] 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 2030, after which they are maintained at those levels.

- The Tier 1 Solar set-aside requirement increases from 5.5 percent in 2019 to 14.5 percent by 2028.[14] This ramp-up period for the solar carve-out corresponds in part with the implementation of the 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. The three-year pilot program was extended through 2024 by House Bill 683, enacted in May, 2019. There is a potential that Solar Renewable Energy Credits ("SRECs") generated by eligible community solar facilities could serve to help meet the increasing Tier 1 Solar set-aside in the coming years.

- Beginning in 2017, a constant Tier 1 Offshore Wind set-aside of up to 2.5 percent commenced as part of the Tier 1 portfolio.[15] In Order No. 88192, the Commission

[14] "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.

[15] 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

established specific offshore wind carve-outs from 2021 through 2042 ranging from 0.60 percent to 2.03 percent. Senate Bill 516, enacted in May, 2019, increased the RPS requirements to 50% by 2030, and established additional offshore wind carve-outs beginning in 2027. The Commission will incorporate these increased carve-outs into the offshore wind RPS obligations as part of its review of Round 2 offshore wind project applications.

- Maryland's Tier 2 requirement was eliminated at the end of compliance year 2018. Senate Bill 516 re-established a 2.5 percent requirement beginning October 1, 2019 and extending through compliance year 2020, after which the Tier 2 obligation again sunsets.

Table 2 Annual RPS Requirements by Tier

Compliance Year	Tier 1 Non-Solar	Tier 1 Solar	Offshore Wind[16]	Tier 2	Total
Pre-SB516 2019[17]	18.45%	1.95%	0.0%	N/A	20.4%
Post-SB516 2019[18]	15.2%	5.5%	0.0%	2.5%	23.2%
2020	22.0%	6.0%	0.0%	2.5%	30.5%
2021	21.93%	7.5%	1.37%	N/A	30.8%
2022	23.24%	8.5%	1.36%	N/A	33.1%
2023	23.87%	9.5%	2.03%	N/A	35.4%
2024	25.19%	10.5%	2.01%	N/A	37.7%
2025	26.49%	11.5%	2.01%	N/A	40.0%
2026	28.01%	12.5%	1.99%	N/A	42.5%
2027	30.02%	13.5%	1.98%	N/A	45.5%
2028	31.04%	14.5%	1.96%	N/A	47.5%
2029	33.06%	14.5%	1.94%	N/A	49.5%
2030+	33.56% - 34.9%	14.5%	0.60% - 1.94%	N/A	50.0%

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.

[16] 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.

[17] Senate Bill 516, enacted into law in May, 2019, increased RPS targets beginning October 1, 2019.

[18] *Id.*

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.[19] 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.

Table 3 ACP Schedule ($/MWh)

Compliance Year	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	IPL[20] Tier 1
Pre-SB516 2019[21]	$37.50	$150	$15	$2
Post-SB516 2019[22]	$30	$100	$15	$2
2020	$30	$100	$15	$2
2021	$30	$80	N/A	$2
2022	$30	$60	N/A	$2
2023	$30	$45	N/A	$2
2024	$27.50	$40	N/A	$2
2025	$25	$35	N/A	$2
2026	$24.75	$30	N/A	$2
2027	$24.50	$25	N/A	$2
2028	$22.50	$25	N/A	$2
2029	$22.50	$22.50	N/A	$2
2030+	$22.35	$22.35	N/A	$2

ACPs are remitted to the Maryland SEIF. With the passage of Chapter 757 of 2019, Alternative Compliance Payment revenues under the RPS are now required to be used to benefit low-income renewable energy projects.[23]

[19] PUA § 7-705(e)-(f).

[20] 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 20.61.01.06E(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.

[21] Senate Bill 516, enacted into law in May, 2019, modified the ACP schedule beginning October 1, 2019.

[22] *Id.*

[23] State Government Article, § 9–20B–05(F-3)(i)(2).

II. ELECTRICITY SUPPLIER COMPLIANCE REPORTS

Calendar year 2019 marked the fourteenth compliance year for the Maryland RPS, and the twelfth 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.[24] RPS compliance reports were filed by 109 electricity suppliers, including: 81 competitive retail suppliers; 17 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 60.5 million MWh of total retail electricity sales in Maryland for 2019 (down from 61.5 million MWh in 2018); 59.4 million MWh of retail electricity sales were subject to RPS compliance, and 1.1 million MWh were exempt.[25] Maryland electricity suppliers retired about 11.4 million RECs in 2019, more than the 11.1 million RECs retired for compliance in 2018. The total cost of RECs retired in 2019 totaled $134.5 million, up from $84.8 million in 2018.

Table 4 displays the average cost per REC retired in each tier since 2008. The increase 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 upward price pressure coming from more expensive SRECs. The rise in SREC prices may be attributable to an increase in demand for SRECs due to the effects of the Clean Energy Jobs Act.

[24] 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.

[25] 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.

Table 4 Average Cost of RECs per Tier (2008 – 2019)

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	$0.48
2018	$6.54	$31.91	$0.66
2019	$7.77	$47.26	$1.05

As demonstrated by the table below, the aggregated cost of compliance with the Maryland RPS Program displayed a declining growth rate from 2014 through 2016, peaking at $136.2 million in 2016. In spite of increasing RPS percentage requirements in-State and greater demand for RECs within the surrounding region,[26] total REC costs in 2017 fell approximately 47 percent between 2017 and 2016. Despite the downward trends in 2017 continuing into 2018, in 2019 Tier 1 and Solar REC prices increased almost 19 percent and 48 percent in 2019, respectively, while Tier 2 REC prices increased by approximately 60 percent.

[26] In addition to Maryland, seven 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 two PJM states (IN, VA) have a voluntary RPS goal.

Table 5 Total Cost of RECs per Year (2014 – 2019)

	Tier	2014	2015	2016	2017	2018	2019
Total REC Costs	Tier 1	$70,630,620	$85,054,001	$88,200,121	$50,045,621	$56,406,247	$79,320,505
	Solar	$29,372,737	$39,055,714	$45,556,987	$21,275,664	$27,351,388	$55,166,116
	Tier 2	$3,987,557	$2,617,917	$1,441,416	$687,785	$1,049,293	$58,899
	Total	**$103,990,914**	**$126,727,632**	**$135,198,523**	**$72,009,071**	**$84,806,928**	**$134,545,520**
Total RECs Retired	Tier 1	6,062,135	6,134,653	7,216,439	7,006,113	8,627,737	10,210,275
	Solar	203,884	299,525	411,787	557,224	857,232	1,167,329
	Tier 2	1,521,022	1,531,279	1,501,587	1,448,567	1,599,819	55,879
	Total	**7,787,041**	**7,965,457**	**9,129,813**	**9,011,904**	**11,084,788**	**11,433,483**
RPS % Required	Tier 1	9.95%	10.00%	12.00%	11.95%	14.30%	15.20%
	Solar	0.35%	0.50%	0.70%	1.15%	1.50%	5.50%
	Tier 2	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
	Total	**12.80%**	**13.00%**	**15.20%**	**15.60%**	**18.30%**	**23.20%**

ACPs accounted for only a small fraction ($7,730,223) of the total $134.5 million RPS compliance costs in 2019. Reliance on ACPs largely increased in 2019 (compared to $67,796 in 2018). This is due to two Companies filing for bankruptcy before being able to retire RECs. Many ACPs paid in 2019 were made in lieu of purchasing Tier 1 RECs to satisfy Industrial Process Load ("IPL") obligations.[27]

Table 6 Results of the 2019 RPS Compliance Reports

RPS Compliance Year		Tier 1 Non-Solar	Tier 1 Solar	Tier 1 IPL	Tier 2	Total
2019	RPS Obligation	10,076,186	1,141,734	15,707	205,611	**11,439,238**
	Retired RECs	10,210,275	1,167,329	-	55,879	**11,433,483**
	ACP Required	$4,981,178	$2,658,500	$31,414	$59,132	**$7,730,223**

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.[28] Figure 1 aggregates the Maryland RPS tiers on the basis of generation year. For the 2019 compliance year, 49.8 percent of RECs retired were generated in 2019; 39.5 percent were generated in 2018; and the remaining 10.7 percent were generated in 2017.

[27] The ACP for Tier 1 IPL obligations is $2 per MWh, significantly lower than the average non-solar Tier 1 REC ($6.54) and solar Tier 1 REC ($31.91).
[28] COMAR 20.61.03.01 C (unless the REC is diminished or extinguished before expiration).

Figure 1 RECs Retired in 2019 by Generation Year

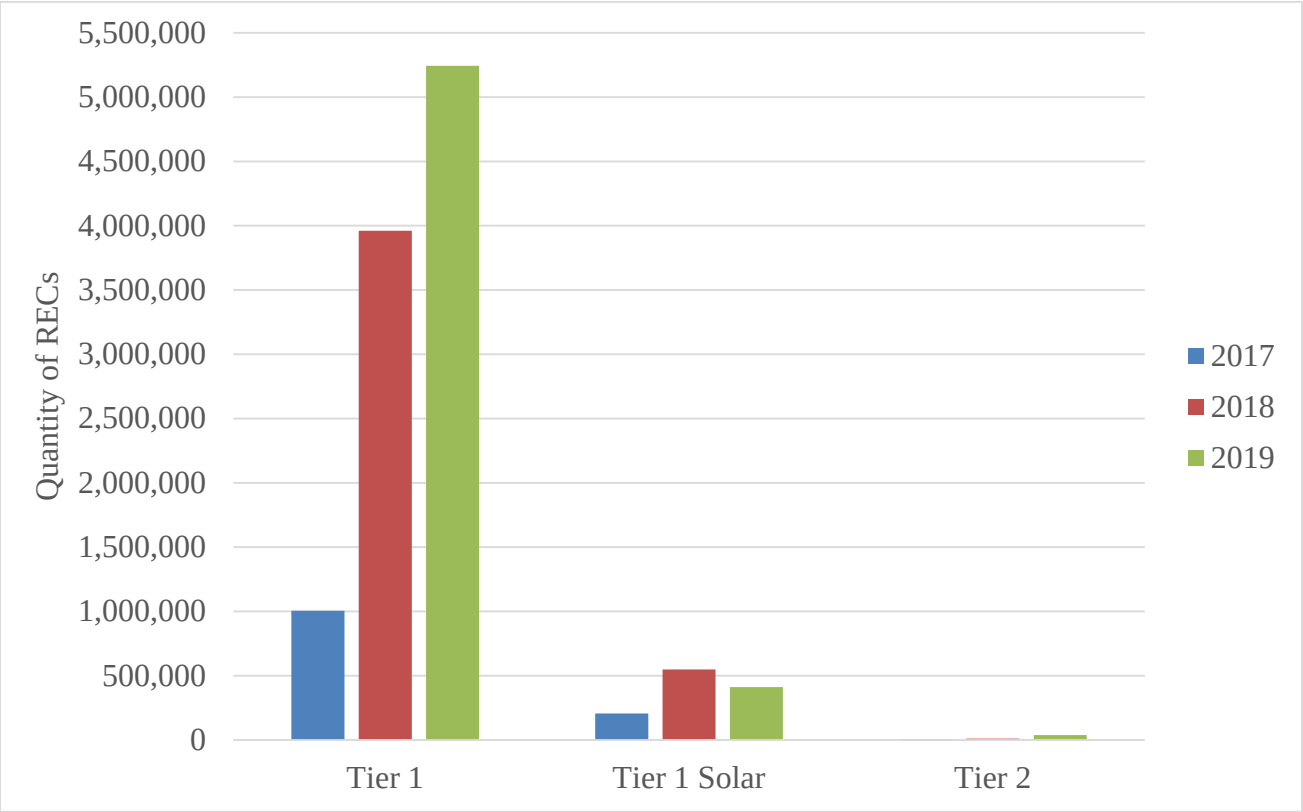
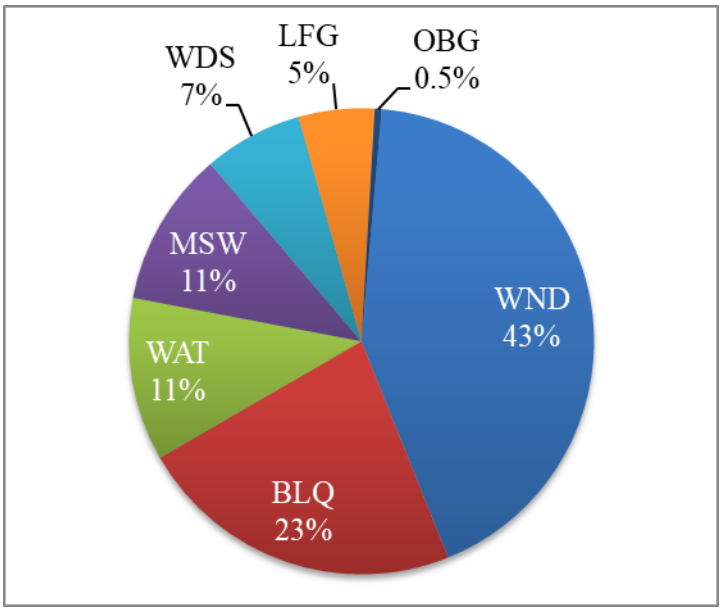


Figure 2 illustrates the fuel sources used to satisfy Tier 1 RPS requirements for the 2019 RPS compliance year. Of the Tier 1 RECs retired for 2019, the resources from which the RECs were sourced consisted primarily of wind, black liquor, and small hydroelectric plants. Although not pictured, Tier 2 RPS requirements for the 2019 RPS compliance year were satisfied exclusively by RECs derived from hydroelectric power.

Figure 2 2019 Tier 1 Retired RECs by Fuel Source[29]

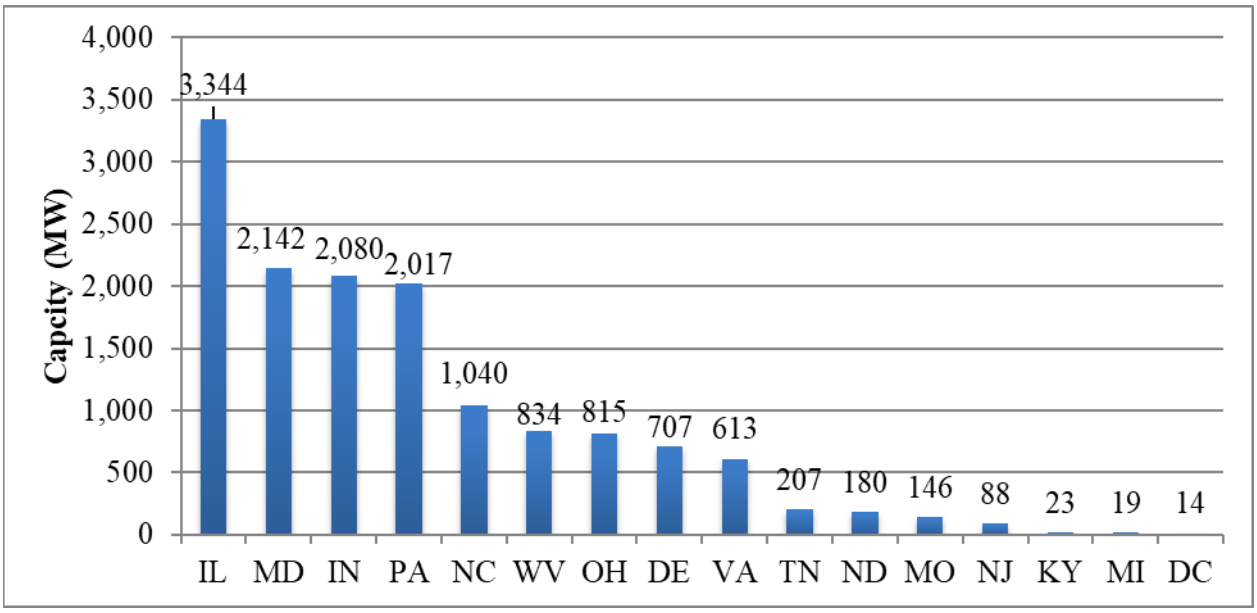


Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; OBG, Other Biomass Gas; WAT, Small Hydroelectric; WDS, Wood and Waste Solids; WND, Wind.

Figure 3 presents the geographical location and the total generating capacity (14,270 MW, a decrease from 14,288 MW in 2018) 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, 44 percent of the corresponding capacity is located in the Mid-Atlantic States. The remaining eligible resource capacity is distributed across nine other states.

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

Figure 3 Total Rated Capacity by State (MW) [30]



For the 2019 compliance year, Figure 4 displays aggregated REC data to convey general relationships among the States that contributed RECs. Virginia supplied the largest number of RECs purchased by retail electricity suppliers (24.3 percent), followed by Illinois (22.9 percent), Maryland (18.3 percent), and Pennsylvania (9.8 percent). The remaining 13 states contributed a total of 24.7 percent of all RECs retired in 2018. The majority of RECs from in-State generators were sourced from Tier 1 non-solar (44.2 percent) and solar photovoltaic (55.8 percent).

[30] PJM-EIS, Generation Attribute Tracking System, Database query, (June 1, 2020). 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 (2019)

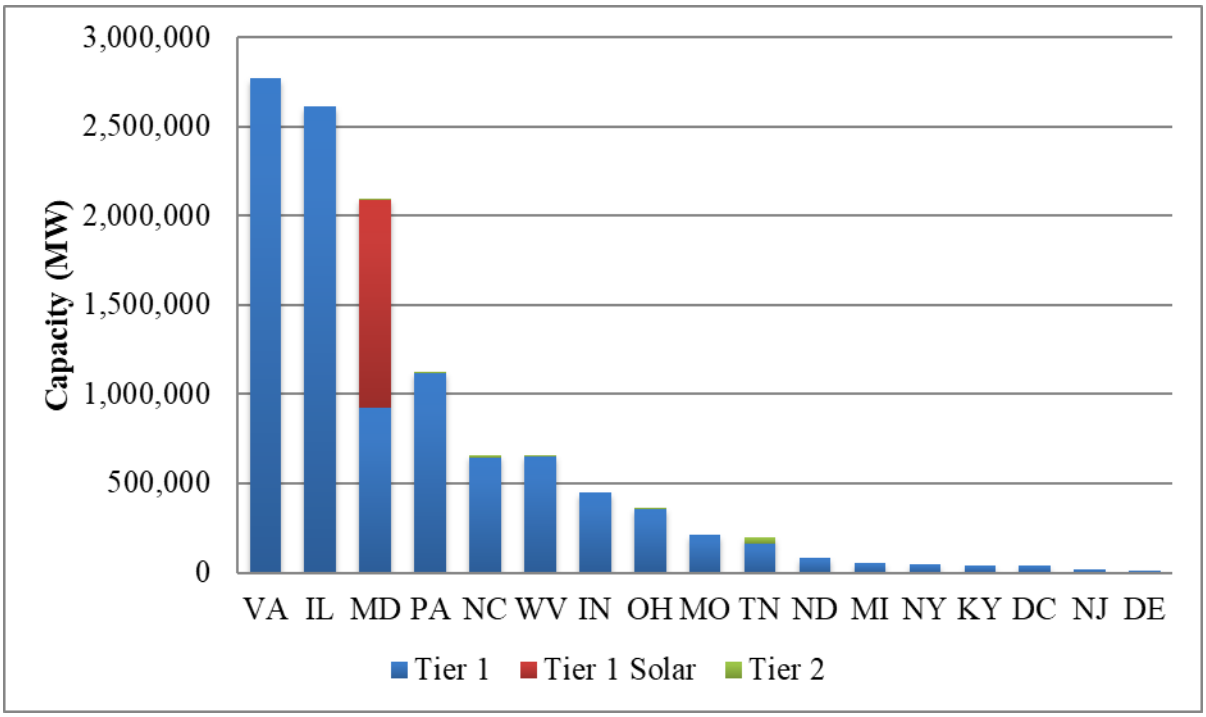


Table 7 and Table 8 provide the quantitative data in support of the previous figure. Table 7 provides the reported levels of RECs retired by Maryland electricity suppliers in 2019 on a Tier and aggregate basis, whereas Table 8 provides the information on a percentage basis. As noted above, Virginia-generated RECs, followed by Illinois, Maryland, and Pennsylvania were used in the largest aggregate amounts by Maryland electricity suppliers for 2019 RPS compliance.

Table 7 2019 REC Retirement by State

State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
VA	2,774,548	-	-	2,774,548
IL	2,616,811	-	-	2,616,811
MD	924,880	1,167,329	1,558	2,093,767
PA	1,119,319	-	5,281	1,124,600
NC	644,179	-	17,052	661,231
WV	653,597	-	1,645	655,242
IN	449,513	-	-	449,513
OH	353,388	-	19	353,407
MO	211,063	-	-	211,063
TN	165,191	-	30,324	195,515
ND	86,142	-	-	86,142
MI	50,635	-	-	50,635

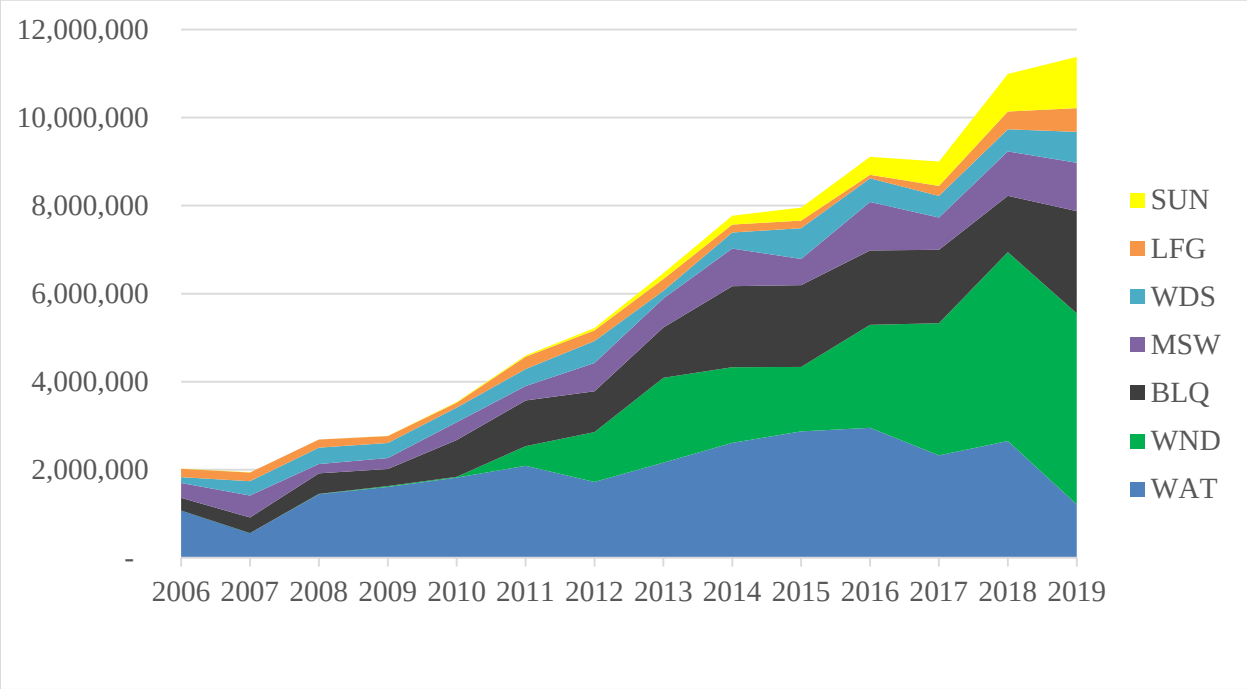
State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
NY	49,901	-	-	49,901
KY	40,538	-	-	40,538
DC	38,141	-	-	38,141
NJ	18,173	-	-	18,173
DE	14,256	-	-	14,256
Total	**10,210,275**	**1,167,329**	**55,879**	**11,433,483**

Table 8 2019 REC Retirement by State (%)

State	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	All Tiers
VA	27.2%	0.0%	0.0%	24.3%
IL	25.6%	0.0%	0.0%	22.9%
MD	9.1%	100.0%	2.8%	18.3%
PA	11.0%	0.0%	9.5%	9.8%
NC	6.3%	0.0%	30.5%	5.8%
WV	6.4%	0.0%	2.9%	5.7%
IN	4.4%	0.0%	0.0%	3.9%
OH	3.5%	0.0%	0.0%	3.1%
MO	2.1%	0.0%	0.0%	1.8%
TN	1.6%	0.0%	54.3%	1.7%
ND	0.8%	0.0%	0.0%	0.8%
MI	0.5%	0.0%	0.0%	0.4%
NY	0.5%	0.0%	0.0%	0.4%
KY	0.4%	0.0%	0.0%	0.4%
DC	0.4%	0.0%	0.0%	0.3%
NJ	0.2%	0.0%	0.0%	0.2%
DE	0.1%	0.0%	0.0%	0.1%
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 third year in a row, wind ("WND") was the largest contributor of the total number of RECs. Total wind RECs retired for compliance have nearly tripled since 2015. In 2019, black liquor (BLQ) REC retirements grew to be the second largest contributor of RECs, with a year-over-year increase of about 81 percent. 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 – 2019)

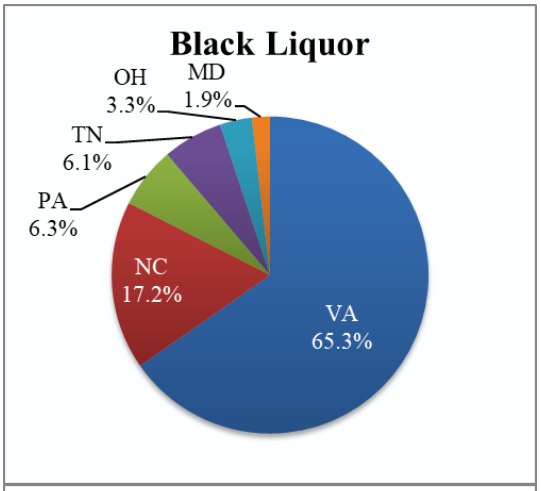


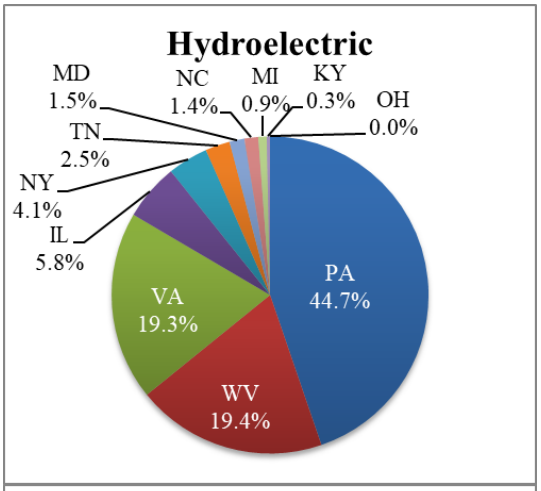
Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; SUN, Solar Photovoltaic; WAT, Hydroelectric; WDS, Wood and Waste Solids; WND, Wind.

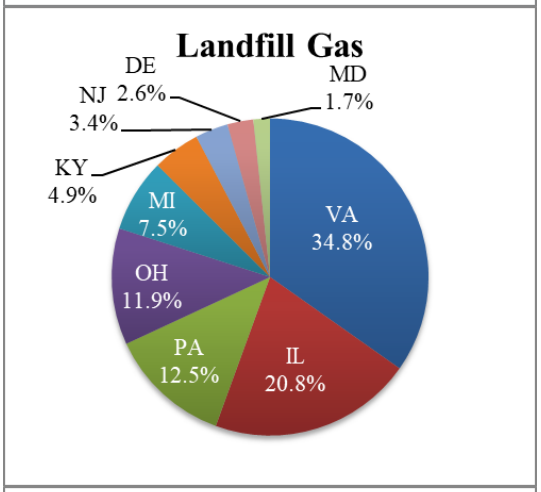
In 2019, all of the RECs retired from geothermal and solar sources originated in Maryland, while all of the qualifying biomass sourced from agricultural crops was located in North Carolina. The seven remaining fuels used to comply with Maryland's 2019 RPS requirements corresponded to RECs generated in multiple other states, and Figure 6 shows the percentage contribution from each state for each of these seven fuels. Facilities located in Maryland provided the majority of municipal solid waste RECs retired for compliance in 2019. Conversely, Maryland resources provided only 1.9 percent of black liquor RECs, 1.5 percent of hydroelectric RECs, 1.7 percent of landfill gas RECs, 1.2 percent of wind RECs, and 4.0 percent of wood and waste solids RECs. No other biomass gas RECs derived from in-state facilities were retired for RPS compliance.

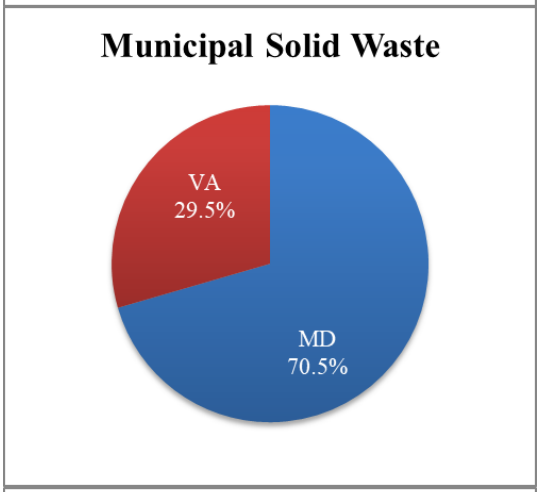
Figure 6 Percentage of RECs Generated in Each State, by Fuel (2019) [31]

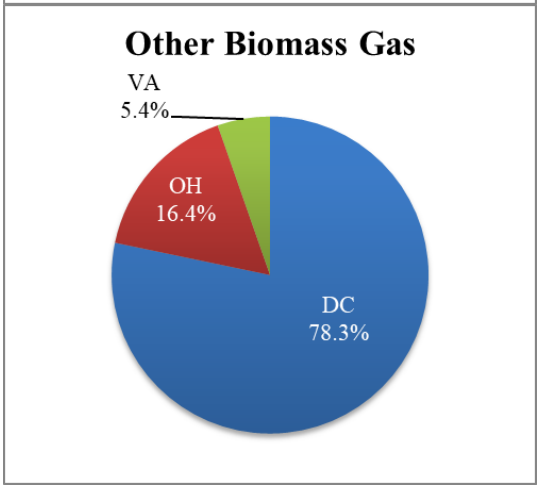
[31] Additional information pertaining to the source of renewable energy used to meet Maryland's 2019 RPS compliance requirements is presented in Appendices A and B. Appendix A provides a breakdown of the *number of RECs* used by electricity suppliers according to tier, fuel type, and facility location, while Appendix B presents the *number of facilities* by tier, fuel type, and facility location that provided RECs for compliance.

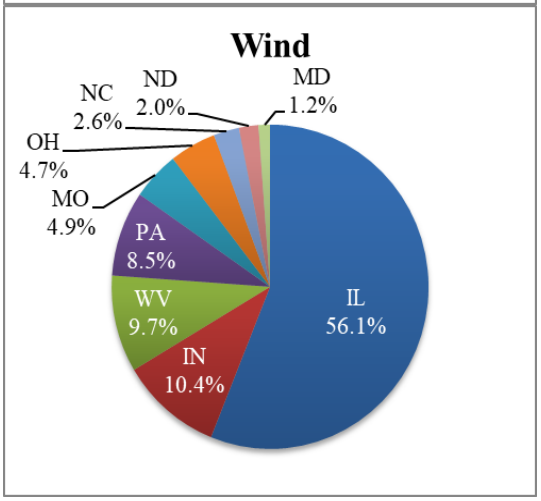

Black Liquor
OH 3.3%
MD 1.9%
TN 6.1%
PA 6.3%
NC 17.2%
VA 65.3%

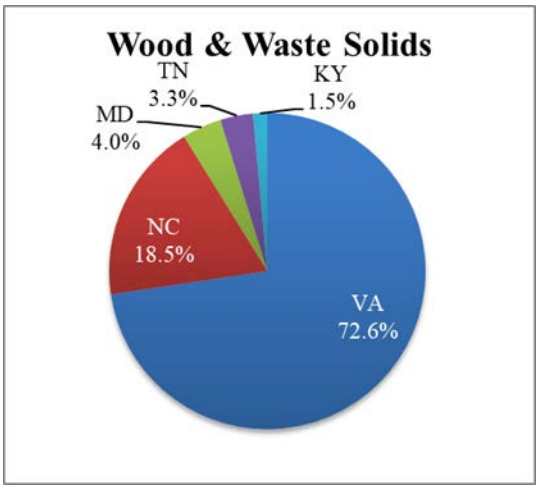

Hydroelectric
MD 1.5%
NC 1.4%
MI 0.9%
KY 0.3%
OH 0.0%
TN 2.5%
NY 4.1%
IL 5.8%
VA 19.3%
WV 19.4%
PA 44.7%


Landfill Gas
DE
NJ 2.6%
3.4%
MD 1.7%
KY 4.9%
MI 7.5%
OH 11.9%
PA 12.5%
IL 20.8%
VA 34.8%


Municipal Solid Waste
VA 29.5%
MD 70.5%


Other Biomass Gas
VA 5.4%
OH 16.4%
DC 78.3%


Wind
NC 2.6%
ND 2.0%
MD 1.2%
OH 4.7%
MO 4.9%
PA 8.5%
WV 9.7%
IN 10.4%
IL 56.1%



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 2019.[32] 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).[33] 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, in 2019 eligible sources located within Maryland generated approximately 1.3 million Tier 1 non-solar RECs, 1.3 million Tier 1 SRECs, and 2.2 million Tier 2 RECs. 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 2019. 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.

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

[33] 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 2019 Maryland Generated RECs by Fuel Source

Fuel Type		RECs (Quantity)	RECs (Percent)
Tier 1	Black Liquor	41,746	0.9%
	Geothermal	2,042	0.0%
	Land Fill Gas	72,341	1.5%
	Municipal Solid Waste	647,809	13.7%
	Solar Thermal[34]	16	0.0%
	Small Hydro	16,818	0.4%
	Wood Waste	16,814	0.4%
	Wind	520,224	11.0%
Tier 1 Solar	Solar PV	1,251,466	26.4%
	Solar Thermal	3,488	0.1%
Tier 2	Large Hydro	2,161,849	45.7%
	Total	**4,734,613**	**100.0%**

Table 10 presents additional detail regarding the disposition of Maryland-generated RECs in calendar year 2019. Approximately 78 percent of the RECs generated by renewable facilities located within Maryland during 2019 are available for potential future sale in Maryland or in other states in subsequent compliance years. Just under 21 percent of all RECs generated in Maryland were retired in 2019 to meet the RPS requirements in Maryland and various other PJM states. Labeled as "Other" in Table 10, less than one percent of RECs were used for other purposes, which may include pending transfers between parties.

Table 10 Disposition of 2019 Maryland Generated RECs

REC Tier	Available	RPS Compliance	Other	Total
Tier 1 Non-Solar	739,959	577,805	46	1,317,810
Tier 1 Solar	840,967	413,815	172	1,254,954
Tier 2	2,135,392	0	26,457	2,161,849
Total	**3,716,318**	**991,620**	**26,675**	**4,734,613**
(%)	**78.5%**	**20.9%**	**0.6%**	**100.0%**

Source: PJM-EIS

Table 11 presents, on a state-by-state basis, the distribution of the RECs both generated in-State and retired for RPS compliance purposes. In 2019, Maryland-generated RECs were retired for compliance purposes in six jurisdictions: the District of Columbia, Delaware, Illinois, Maryland, New Jersey, and Pennsylvania. Approximately 37 percent of the RECs generated by in-State facilities in 2019 were retired for compliance purposes in Maryland, a 4 percent increase from 2018 levels.

[34] Tier 1 Solar RECs may be used to satisfy Tier 1 obligations.

Table 11 2019 Maryland Generated RECs Retired for RPS Compliance by State

Tier	Fuel Type	DC	DE	MD	NJ	PA	Total
Tier 1 Non-solar	Black Liquor	-	-	30,000	-	-	30,000
	Geothermal	-	-	1,734	-	-	1,734
	Land Fill Gas	-	-	3,854	-	1,437	5,291
	Municipal Solid Waste	-	-	438,293	-	-	438,293
	Small Hydro	-	-	16,818	-	-	16,818
	Solar Thermal	-	-	3	-	-	3
	Wood Waste	-	-	11,877	-	-	11,877
	Wind	-	49,427	13,123	11,242	-	73,792
	Subtotal	**-**	**49,427**	**515,699**	**11,242**	**1,437**	**577,805**
	Percentage	**0.0%**	**8.6%**	**89.3%**	**1.9%**	**0.2%**	**100.0%**
Tier 1 Solar	Solar PV	2,014	-	410,715	-	-	412,729
	Solar Thermal	-	-	1,086	-	-	1,086
	Subtotal	**2,014**	**-**	**411,801**	**-**	**-**	**413,815**
	Percentage	**0.5%**	**0.0%**	**99.5%**	**0.0%**	**0.0%**	**100.0%**
Tier 2	Large Hydro	-	-	-	-	-	-
	Subtotal	**-**	**-**	**-**	**-**	**-**	**-**
	Percentage	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
All Tiers	**Grand Total**	**2,014**	**49,427**	**927,500**	**11,242**	**1,437**	**991,620**
	Percentage	**0.2%**	**5.0%**	**93.5%**	**1.1%**	**0.1%**	**100.0%**

Source: PJM-EIS.

IV. CONCLUSION

The electricity supplier compliance reports for 2019, verified by the Commission, indicate that nearly all the Maryland RPS obligations were met via the purchase and retirement of RECs, with only $7,730,223 in ACPs owed for compliance purposes. Approximately 18 percent of RECs used for compliance in 2019 came from in-State resources, down from 19 percent in 2018. RECs derived from two fuel types—wind (42.5 percent) and black liquor (22.8 percent)—were the predominant sources of non-solar Tier 1 compliance in 2019, with those RECs sourced primarily from Illinois and Virginia, respectively. 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 2.8 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 2019 Retired RECs by Facility

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**GEO %**	**Tier 1**
Baratta	GEO	MD	21	1.10%	0.00%
Benigni, C.	GEO	MD	19	0.99%	0.00%
Bird, J.	GEO	MD	80	4.18%	0.00%
Bird, W.	GEO	MD	18	0.94%	0.00%
Brackett	GEO	MD	127	6.64%	0.00%
Brenny, M.	GEO	MD	16	0.84%	0.00%
Cipriani, A. 1	GEO	MD	17	0.89%	0.00%
Cipriani, A. 2	GEO	MD	13	0.68%	0.00%
Custer, C.	GEO	MD	23	1.20%	0.00%
Daly, M.	GEO	MD	26	1.36%	0.00%
Dickerson, L.	GEO	MD	27	1.41%	0.00%
Dixon, T.	GEO	MD	45	2.35%	0.00%
Dorman, K.	GEO	MD	59	3.08%	0.00%
Field, J.	GEO	MD	76	3.97%	0.00%
Gilotra, R.	GEO	MD	49	2.56%	0.00%
Graziani	GEO	MD	36	1.88%	0.00%
Gugerty, B.	GEO	MD	60	3.14%	0.00%
Harding, A.	GEO	MD	26	1.36%	0.00%
Harrison, H.	GEO	MD	14	0.73%	0.00%
Hendrickson	GEO	MD	31	1.62%	0.00%
Hucht	GEO	MD	16	0.84%	0.00%
Jack	GEO	MD	24	1.25%	0.00%
Jackson, C.	GEO	MD	41	2.14%	0.00%
Jarboe	GEO	MD	37	1.93%	0.00%
Jocic, B.	GEO	MD	13	0.68%	0.00%
Kawalek, J.	GEO	MD	31	1.62%	0.00%
Keeney, A.	GEO	MD	49	2.56%	0.00%
Lee, A.	GEO	MD	36	1.88%	0.00%
Lehr, M.	GEO	MD	43	2.25%	0.00%
Leung	GEO	MD	53	2.77%	0.00%
Loudermilk, G.	GEO	MD	98	5.12%	0.00%
MacInnes	GEO	MD	15	0.78%	0.00%
Martin, D.	GEO	MD	20	1.05%	0.00%
McPartland, K.	GEO	MD	54	2.82%	0.00%
McWilliams	GEO	MD	40	2.09%	0.00%
Menning, J.	GEO	MD	38	1.99%	0.00%
Mignini, A.	GEO	MD	30	1.57%	0.00%
Overstreet	GEO	MD	71	3.71%	0.00%
Parker	GEO	MD	20	1.05%	0.00%
Parlegreco, D.	GEO	MD	45	2.35%	0.00%
Patel, K.	GEO	MD	36	1.88%	0.00%
Richardson, J.	GEO	MD	17	0.89%	0.00%
Ryan, J.	GEO	MD	13	0.68%	0.00%
Santin, D.	GEO	MD	16	0.84%	0.00%
Shriner	GEO	MD	15	0.78%	0.00%
Smith, H.	GEO	MD	52	2.72%	0.00%
Smith, J.	GEO	MD	18	0.94%	0.00%
Snyderman, C.	GEO	MD	23	1.20%	0.00%
Sotzen	GEO	MD	41	2.14%	0.00%
Spies, J.	GEO	MD	26	1.36%	0.00%
Traber, T.	GEO	MD	13	0.68%	0.00%
Verde, J.	GEO	MD	18	0.94%	0.00%
Vorhauer	GEO	MD	19	0.99%	0.00%
Wissel, J.	GEO	MD	47	2.46%	0.00%
Yarrington, M.	GEO	MD	2	0.10%	0.00%
		Total	**1,913**	**100.00%**	**0.02%**

Tier 1*					
Facility Name	**Fuel**	**State**	**Quantity**	**LFG %**	**Tier 1**
ACE Cumberland	LFG	NJ	283	0.05%	0.00%
AEP Cloyds	LFG	VA	1,665	0.31%	0.02%
AP Arden	LFG	PA	1,382	0.26%	0.01%
AP Reichs Ford	LFG	MD	569	0.11%	0.01%
AP Upton DG	LFG	PA	6,234	1.16%	0.06%
Bavarian	LFG	KY	10,515	1.95%	0.10%
Beecher	LFG	IL	13,833	2.57%	0.14%
Blue Ridge	LFG	PA	12,820	2.38%	0.13%
Broad Mountain	LFG	PA	7,555	1.40%	0.07%
Central	LFG	DE	4,394	0.82%	0.04%
CID LFG	LFG	IL	8,319	1.54%	0.08%
Countryside	LFG	IL	9,359	1.74%	0.09%
Easton LFG	LFG	MD	3,960	0.74%	0.04%
Fairless Hills	LFG	PA	10,939	2.03%	0.11%
FE Carbon Alum	LFG	OH	10,657	1.98%	0.10%
FE Erie County	LFG	OH	5,447	1.01%	0.05%
FE Geneva	LFG	OH	43	0.01%	0.00%
FE Lorain	LFG	OH	26,326	4.89%	0.26%
Frey Farm	LFG	PA	2,365	0.44%	0.02%
Green Valley	LFG	KY	3,883	0.72%	0.04%
Greene Valley	LFG	IL	8,529	1.58%	0.08%
Hardin County	LFG	KY	945	0.18%	0.01%
Lake Gas	LFG	IL	4,657	0.86%	0.05%
Lakeview Gas	LFG	PA	1,537	0.29%	0.02%
Laurel Ridge	LFG	KY	5,557	1.03%	0.05%
Lorain County	LFG	OH	21,537	4.00%	0.21%
Lycoming	LFG	PA	8,204	1.52%	0.08%
Martinsville	LFG	VA	2,473	0.46%	0.02%
ME Lebanon	LFG	PA	969	0.18%	0.01%
Middlesex	LFG	NJ	243	0.05%	0.00%
Monmouth	LFG	NJ	8,324	1.54%	0.08%
Newland Park	LFG	MD	4,586	0.85%	0.04%
O'Brien Edgeboro	LFG	NJ	8,427	1.56%	0.08%
Orchard Hills	LFG	MI	40,253	7.47%	0.39%
Pendleton County	LFG	KY	5,262	0.98%	0.05%
Pennsauken	LFG	NJ	872	0.16%	0.01%
PEP Ritchie Bwn	LFG	MD	9	0.00%	0.00%
PL Pine Grove	LFG	PA	204	0.04%	0.00%
PN Northern Tier	LFG	PA	2,580	0.48%	0.03%
PN Shippensburg	LFG	PA	212	0.04%	0.00%
Prairie View	LFG	IL	25,803	4.79%	0.25%
Rochelle Energy	LFG	IL	9,896	1.84%	0.10%
Settlers Hill	LFG	IL	19,321	3.59%	0.19%
Southern	LFG	DE	9,862	1.83%	0.10%
Suffolk Energy	LFG	VA	8,665	1.61%	0.08%
Tullytown	LFG	PA	12,398	2.30%	0.12%
VP Amelia	LFG	VA	9,325	1.73%	0.09%
VP Bethel	LFG	VA	26,898	4.99%	0.26%
VP Brunswick	LFG	VA	4,724	0.88%	0.05%
VP Charles City	LFG	VA	24,101	4.47%	0.24%
VP Chesterfield	LFG	VA	18,149	3.37%	0.18%
VP Henrico	LFG	VA	2,773	0.51%	0.03%
VP King Queen	LFG	VA	13,961	2.59%	0.14%
VP King George	LFG	VA	42,504	7.89%	0.42%
VP Peninusla	LFG	VA	32,023	5.94%	0.31%
VP VA Beach	LFG	VA	122	0.02%	0.00%
Westchester	LFG	IL	4,909	0.91%	0.05%
Woodland	LFG	IL	7,413	1.38%	0.07%
		Total	**538,775**	**100.00%**	**5.28%**

Appendix A 2019 Retired RECs by Facility (Cont'd)

Tier 1 (Cont'd)*					
Facility Name	**Fuel**	**State**	**Quantity**	**WND %**	**Tier 1**
Adam	WND	IL	2,175	0.05%	0.02%
AE Ontario	WND	NJ	24	0.00%	0.00%
AEP Blue Creek	WND	OH	44,568	1.03%	0.44%
AEP Bluff Point	WND	IN	46,600	1.07%	0.46%
AEP Fowler R1A	WND	IN	15,307	0.35%	0.15%
AEP Fowler R3	WND	IN	5,937	0.14%	0.06%
AEP Fowler R4	WND	IN	43,941	1.01%	0.43%
AEP Hog Creek	WND	OH	97,287	2.24%	0.95%
AEP Meadow L1	WND	IN	32,316	0.74%	0.32%
AEP Meadow L2	WND	IN	24,660	0.57%	0.24%
AEP Meadow L3	WND	IN	84,486	1.95%	0.83%
AEP Meadow L4	WND	IN	21,886	0.50%	0.21%
AEP Meadow L5	WND	IN	111,002	2.56%	1.09%
AEP Meadow L6	WND	IN	1,429	0.03%	0.01%
AEP Trishe	WND	OH	50,324	1.16%	0.49%
AEP Wildcat	WND	IN	35,211	0.81%	0.34%
AMP	WND	OH	18	0.00%	0.00%
AP Beech Ridge	WND	WV	9,537	0.22%	0.09%
AP Criterion	WND	MD	2,532	0.06%	0.02%
AP Fair Wind	WND	MD	7,064	0.16%	0.07%
AP 4-Mile Ridge	WND	MD	8,000	0.18%	0.08%
AP Greenland	WND	WV	119,226	2.75%	1.17%
AP Laurel Mtn.	WND	WV	719	0.02%	0.01%
AP Pinnacle	WND	WV	207,676	4.78%	2.03%
AP Roth Rock	WND	MD	33,189	0.76%	0.33%
AP Twin Ridges	WND	PA	28,214	0.65%	0.28%
Big Sky	WND	IL	85,758	1.98%	0.84%
Bishop Hill	WND	IL	357,450	8.23%	3.50%
Camp Grove 1	WND	IL	77,325	1.78%	0.76%
Cayuga Ridge	WND	IL	305,598	7.04%	2.99%
Crescent Ridge	WND	IL	1,076	0.02%	0.01%
Eco Grove	WND	IL	12,976	0.30%	0.13%
Farmer City	WND	MO	211,063	4.86%	2.07%
Findlay	WND	OH	943	0.02%	0.01%
Fowler Ridge	WND	IN	26,738	0.62%	0.26%
Grand Ridge 1	WND	IL	25,063	0.58%	0.25%
Grand Ridge 2	WND	IL	30,400	0.70%	0.30%
Grand Ridge 3	WND	IL	23,099	0.53%	0.23%
Grand Ridge 4	WND	IL	280	0.01%	0.00%
Greenville	WND	OH	2,021	0.05%	0.02%
Harpster	WND	OH	406	0.01%	0.00%
High Trail	WND	IL	64,671	1.49%	0.63%
Hilltopper	WND	IL	22,120	0.51%	0.22%
Kelly Creek	WND	IL	172,554	3.97%	1.69%
Marion	WND	OH	2,161	0.05%	0.02%
Mendota Hills	WND	IL	47,005	1.08%	0.46%
Meyersdale	WND	PA	47,513	1.09%	0.47%
Minonk	WND	IL	237,766	5.48%	2.33%
Old Trail	WND	IL	99,219	2.29%	0.97%
Ottawa	WND	OH	2,320	0.05%	0.02%
Pilot Hill	WND	IL	9,139	0.21%	0.09%
PL Locust Ridge	WND	PA	25,360	0.58%	0.25%
PN Allegheny	WND	PA	31,032	0.71%	0.30%
PN Armenia Mtn	WND	PA	11,559	0.27%	0.11%
PN Casselman	WND	PA	42,280	0.97%	0.41%
PN Lookout	WND	PA	45,030	1.04%	0.44%
PN Mehoopany 1	WND	PA	46,267	1.07%	0.45%
PN N. Allegheny	WND	PA	38,113	0.88%	0.37%
PN Sandy Ridge	WND	PA	24,263	0.56%	0.24%
PN Stony Creek	WND	PA	30,134	0.69%	0.30%

Tier 1 (Cont'd)*					
Facility Name	**Fuel**	**State**	**Quantity**	**WND %**	**Tier 1**
Providence Hgt.	WND	IL	72,538	1.67%	0.71%
Radfords Run	WND	IL	82,753	1.91%	0.81%
Tatanka	WND	ND	86,142	1.98%	0.84%
Top Crop 1	WND	IL	122,806	2.83%	1.20%
Top Crop 2	WND	IL	104,187	2.40%	1.02%
Tullytown	WND	OH	3,947	0.09%	0.04%
VP Desert	WND	NC	113,686	2.62%	1.11%
VP New Creek	WND	WV	82,845	1.91%	0.81%
Walnut Ridge	WND	IL	380,876	8.77%	3.73%
Wbrook	WND	IL	97,855	2.25%	0.96%
Zephyr	WND	OH	1,392	0.03%	0.01%
		Total	**4,341,057**	**100.00%**	**42.52%**

Facility Name	**Fuel**	**State**	**Quantity**	**WAT %**	**Tier 1**
AEP Buck	WAT	VA	89,251	7.73%	0.87%
AEP Fries	WAT	VA	12,543	1.09%	0.12%
AEP Glen Ferris	WAT	WV	5,000	0.43%	0.05%
Allegheny	WAT	PA	44,201	3.83%	0.43%
Allegheny Rvr 6	WAT	PA	49,371	4.27%	0.48%
Allegheny Rvr 8	WAT	PA	86,880	7.52%	0.85%
Allegheny Rvr 9	WAT	PA	118,688	10.28%	1.16%
AP Misc	WAT	WV	44,651	3.87%	0.44%
Beardslee	WAT	NY	6,558	0.57%	0.06%
Big Shoals	WAT	VA	837	0.07%	0.01%
Brasfield	WAT	VA	15,220	1.32%	0.15%
Coleman Falls	WAT	VA	3,217	0.28%	0.03%
Conemaugh	WAT	PA	6,686	0.58%	0.07%
Cushaw	WAT	VA	11,044	0.96%	0.11%
Deep Creek 32	WAT	MD	16,978	1.47%	0.17%
Deferiet	WAT	NY	4,881	0.42%	0.05%
Dixon	WAT	IL	18,947	1.64%	0.19%
French Paper	WAT	MI	10,382	0.90%	0.10%
Granby	WAT	NY	6,315	0.55%	0.06%
Halifax	WAT	VA	3,162	0.27%	0.03%
Holcomb Rock	WAT	VA	3,697	0.32%	0.04%
Lakeview Hydro	WAT	VA	68	0.01%	0.00%
Lockport	WAT	IL	35,574	3.08%	0.35%
London	WAT	WV	66,883	5.79%	0.66%
Marmet	WAT	WV	49,223	4.26%	0.48%
Moomaws Dam	WAT	VA	2,622	0.23%	0.03%
Mother Ann Lee	WAT	KY	4,028	0.35%	0.04%
Niagara	WAT	VA	8,491	0.74%	0.08%
Pinnacles	WAT	VA	35,152	3.04%	0.34%
Prospect	WAT	NY	5,170	0.45%	0.05%
Reusens	WAT	VA	15,042	1.30%	0.15%
Schoolfield	WAT	VA	20,236	1.75%	0.20%
Snowden	WAT	VA	5,485	0.47%	0.05%
Soft Maple	WAT	NY	1,971	0.17%	0.02%
Trenton	WAT	NY	25,006	2.17%	0.24%
Upper Sterling	WAT	IL	15,562	1.35%	0.15%
VP Emporia	WAT	VA	7,398	0.64%	0.07%
Winfield	WAT	WV	67,837	5.87%	0.66%
York Haven	WAT	PA	143,708	12.44%	1.41%
Yough	WAT	PA	86,934	7.53%	0.85%
		Total	**1,154,899**	**100.00%**	**11.31%**

Appendix A 2019 Retired RECs by Facility (Cont'd)

Tier 1 (Cont'd)*

Facility Name	Fuel	State	Quantity	MSW %	Tier 1
Covanta Fairfax	MSW	VA	323,901	29.48%	3.17%
Montgomery	MSW	MD	416,880	37.95%	4.08%
Wheelabrator	MSW	MD	357,764	32.57%	3.50%
		Total	**1,098,545**	**100.00%**	**10.76%**

Facility Name	Fuel	State	Quantity	AB %	Tier 1
Kapstone Kraft	AB	NC	946	100.00%	0.01%
		Total	**946**	**100.00%**	**0.01%**

Facility Name	Fuel	State	Quantity	BLQ %	Tier 1
AEP W Kingsport	BLQ	TN	141,858	6.11%	1.39%
Chillicothe	BLQ	OH	76,015	3.27%	0.74%
Covington	BLQ	VA	484,966	20.88%	4.75%
Domtar Paper	BLQ	NC	246,109	10.59%	2.41%
Franklin Mill	BLQ	VA	392,536	16.90%	3.84%
Hopewell	BLQ	VA	217,935	9.38%	2.13%
Johnsonburg Mill	BLQ	PA	56,289	2.42%	0.55%
Kapstone Kraft	BLQ	NC	153,392	6.60%	1.50%
Luke Mill	BLQ	MD	43,055	1.85%	0.42%
Spring Grove	BLQ	PA	89,398	3.85%	0.88%
West Point	BLQ	VA	421,567	18.15%	4.13%
		Total	**2,323,120**	**100.00%**	**22.75%**

Facility Name	Fuel	State	Quantity	OBG %	Tier 1
Atlantic Trtmnt	OBG	VA	2,613	5.36%	0.03%
Buckeye BioGas	OBG	OH	2,278	4.67%	0.02%
DC Water Bailey	OBG	DC	38,141	78.27%	0.37%
French Creek	OBG	OH	276	0.57%	0.00%
Haviland	OBG	OH	4,631	9.50%	0.05%
Zanesville	OBG	OH	791	1.62%	0.01%
		Total	**48,730**	**100.00%**	**0.48%**

Facility Name	Fuel	State	Quantity	WDS %	Tier 1
AEP W Kingsport	WDS	TN	23,333	3.32%	0.23%
Covington	WDS	VA	175,528	24.99%	1.72%
Cox Waste	WDS	KY	10,348	1.47%	0.10%
Domtar Paper	WDS	NC	100,007	14.24%	0.98%
ECI	WDS	MD	28,381	4.04%	0.28%
Hopewell	WDS	VA	35,822	5.10%	0.35%
Kapstone Kraft	WDS	NC	30,039	4.28%	0.29%
Pittyslvania	WDS	VA	16,391	2.33%	0.16%
VP South Boston	WDS	VA	254,267	36.21%	2.49%
West Point	WDS	VA	28,174	4.01%	0.28%
		Total	**702,290**	**100.00%**	**6.88%**

Tier 2

Facility Name	Fuel	State	Quantity	WAT %	Tier 2
Belleville	WAT	WV	650	1.16%	1.16%
Conowingo	WAT	MD	1,558	2.79%	2.79%
Covanta	WAT	WV	766	1.37%	1.37%
Falls	WAT	NC	2,126	3.80%	3.80%
High Rock	WAT	NC	666	1.19%	1.19%
Lake Lynn	WAT	PA	2,990	5.35%	5.35%
Narrows	WAT	NC	5,007	8.96%	8.96%
Piney	WAT	PA	311	0.56%	0.56%
Racine	WAT	OH	19	0.03%	0.03%
Safe Harbor 1	WAT	PA	1,980	3.54%	3.54%
Summersville	WAT	WV	229	0.41%	0.41%
Tuckertown	WAT	NC	52	0.09%	0.09%
XIC Calderwood	WAT	TN	30,324	54.27%	54.27%
XIC Cheoah	WAT	NC	9,201	16.47%	16.47%
		Total	**55,879**	**100.00%**	**100.00%**

Summary

Tier 1 REC Total	10,210,275
SREC Total	1,167,329
Tier 2 REC Total	55,879
Grand Total	11,433,483

*Solar facilities are not represented in this table. In 2019, SRECs were retired from 61,085 facilities.

Resource Definitions

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

Appendix B Location of Facilities that Provided RECs for 2019 RPS Compliance

	DC	IA	IL	IN	KY	MD	MI	MO	NC	ND	NJ	NY	OH	PA	TN	VA	WV	Total
Tier 1 Non-solar																		
Agricultural Byproduct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Black Liquor	-	-	-	-	-	1	-	-	2	-	-	-	1	2	1	4	-	**11**
Geothermal	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	**55**
Landfill Gas	-	2	10	-	5	4	1	-	-	-	5	-	5	13	-	13	-	**58**
Municipal Solid Waste	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	**3**
Other Biomass Gas	1	-	-	-	-	-	-	-	-	-	-	-	4	-	-	1	-	**6**
Solar Thermal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Small Hydro	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Wood Waste	-	-	3	-	1	1	1	-	-	-	-	6	-	7	-	16	5	**40**
Wind	-	-	-	-	1	1	-	-	2	-	-	-	-	-	1	5	-	**10**
Tier 1 Solar																		
Solar PV	-	-	-	-	-	60,358	-	-	-	-	-	-	-	-	-	-	-	**60,358**
Solar Thermal	-	-	-	-	-	727	-	-	-	-	-	-	-	-	-	-	-	**727**
Tier 2																		
Large Hydro	-	-	-	-	-	1	-	-	5	-	-	-	1	3	1	-	3	**14**
Total	**1**	**2**	**37**	**12**	**7**	**61,154**	**2**	**1**	**10**	**1**	**6**	**6**	**22**	**36**	**3**	**40**	**13**	**61,353**

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

Appendix C Disposition of 2019 Vintage RECs Generated in Maryland

Fuel Type and Tier	RECs Retired for RPS Compliance by State						Available	Other	Total RECs Generated
	DC	DE	MD	NJ	PA	Total			
Black Liquor	-	-	30,000	-	-	30,000	11,746	-	**41,746**
Geothermal	-	-	1,734	-	-	1,734	308	-	**2,042**
Landfill Gas	-	-	3,854	-	1,437	5,291	67,004	46	**73,774**
Municipal Solid Waste	-	-	438,293	-	-	438,293	209,516	-	**647,809**
Small Hydro	-	-	16,818	-	-	16,818	-	-	**16,818**
Solar Thermal	-	-	-	-	-	-	16	-	**16**
Wind	-	49,427	13,123	11,242	-	73,792	446,432	-	**520,240**
Wood Waste	-	-	11,877	-	-	11,877	4,937	-	**16,814**
Tier 1 Non-solar Total	**-**	**49,427**	**515,699**	**11,242**	**1,437**	**577,805**	**739,959**	**46**	**1,319,259**
Solar PV	2,014	-	410,715	-	-	412,729	838,565	172	**1,251,466**
Solar Thermal	-	-	1,086	-	-	1,086	2,402	-	**3,488**
Tier 1 Solar Total	**2,014**	**-**	**411,801**	**-**	**-**	**413,815**	**840,967**	**172**	**1,254,954**
Large Hydro	-	-	-	-	-	413,815	2,135,392	26,457	2,161,849
Tier 2 Total	**-**	**-**	**-**	**-**	**-**	-	2,135,392	26,457	2,161,849
Grand Total	**2,014**	**49,427**	**927,500**	**11,242**	**1,437**	**991,620**	**3,716,318**	**26,675**	**4,734,613**

Appendix D Number of Renewable Energy Facilities Located in Maryland

Maryland County	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	Total
Allegany	1	54	-	55
Anne Arundel	31	8,729	-	8,760
Baltimore	9	7,589	-	7,598
Baltimore City	1	1,151	-	1,152
Calvert	-	846	-	846
Caroline	-	339	-	339
Carroll	-	2,272	-	2,272
Cecil	-	1,547	-	1,547
Charles	-	2,894	-	2,894
Dorchester	1	340	-	341
Frederick	6	2,774	-	2,780
Garrett	6	57	-	63
Harford	3	3,975	1	3,979
Howard	11	3,784	-	3,795
Kent	-	348	-	348
Montgomery	12	11,097	-	11,109
Prince Georges	6	18,433	-	18,439
Queen Annes	4	677	-	681
Somerset	1	289	-	290
St Marys	-	1,451	-	1,451
Talbot	4	241	-	245
Washington	2	1,100	-	1,102
Wicomico	1	1,082	-	1,083
Worcester	-	516	-	516
Total	**99**	**71,585**	**1**	**71,685**

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 August 1, 2020.

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	103.9	-	107.9
Baltimore	66.5	100.1	-	166.5
Baltimore City	0.1	15.7	-	15.7
Calvert	-	9.7	-	9.7
Caroline	-	10.4	-	10.4
Carroll	-	36.3	-	36.3
Cecil	-	36.6	-	36.6
Charles	-	47.8	-	47.8
Dorchester	0.0	13.5	-	13.5
Frederick	2.1	87.3	-	89.4
Garrett	210.0	3.6	-	213.6
Harford	0.1	71.6	474.0	545.7
Howard	1.3	51.2	-	52.4
Kent	-	16.1	-	16.1
Montgomery	81.0	129.7	-	210.7
Prince George's	13.5	221.5	-	234.9
Queen Anne's	0.1	42.4	-	42.5
Somerset	3.8	110.0	-	113.8
St. Mary's	-	16.1	-	16.1
Talbot	70.3	13.0	-	83.4
Washington	0.1	69.6	-	69.7
Wicomico	6.0	42.6	-	48.6
Worcester	-	22.5	-	22.5
Total	**523.7**	**1,273.9**	**474.0**	**2,271.6**

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 August 1, 2020.