

**PUBLIC SERVICE COMMISSION
OF MARYLAND**

**RENEWABLE ENERGY PORTFOLIO
STANDARD REPORT**

With Data for Calendar Year 2015

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

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January 2017

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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 2015. 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 February 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 2015 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 the remainder of the calendar year 2015 RPS requirements were satisfied by a small reliance on 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 meet 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”).

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 February 2017, highlights data from electricity suppliers’ 2015 compliance reports and other relevant 2015 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.

Each electricity supplier must document annually the retirement of RECs equal to the percentage specified by the RPS Statute,⁵ or pay an ACP commensurate with any shortfalls. 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.⁶ A REC has a three-year lifespan during which it may be transferred, sold, or redeemed.

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 distribution grid serving Maryland.

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 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 2015. In 2015, the Tier 2 requirement was 2.5%; therefore the electricity supplier would have to either verify the purchase of 2,500 Tier 2 RECs in satisfaction of the Tier 2 RPS obligation 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.

⁶ 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.

⁷ The PJM wholesale market includes all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, 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, *GATS Operating Rules* (May 2014) 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.

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 COMAR 20.61 – the Commission regulation by which the RPS Statute is implemented. REF applicants who may qualify under Maryland’s RPS Program initially work with Commission Staff and must complete the appropriate application for REF certification posted on the Commission’s RPS website.⁹ In addition to the geographic requirements, applicants must also meet the fuel source requirements associated with Tier 1 or Tier 2 REC creation. 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.¹⁰ Facilities that co-fire a REC-eligible renewable fuel source with non-eligible fuel sources must in addition 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 create and transact business related to RECs. The GATS account must be established with the State facility 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. Eligible fuel sources for Tier 1 RECs and Tier 2 RECs are listed in Table 1; solar has its own standard within Tier 1.

Table 1: Eligible Tier 1 and Tier 2 Sources

Tier 1 Renewable Sources	Tier 2 Renewable Sources
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Hydroelectric power other than pump storage generation <p style="text-align: center;"><i>(Note: Tier 1 RECs may be used to satisfy Tier 2 obligations)</i></p>

⁹ 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>.

¹⁰ 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.

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 2022, and are subsequently maintained at those levels in 2023 and beyond.
- The Tier 1 Solar set-aside requirement increases from 0.35% in 2015, to 2.00% by 2020.¹¹ 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.
- Beginning in 2017, a constant Tier 1 Offshore Wind set-aside of up to 2.5% commences as part of the Tier 1 portfolio.¹²
- Maryland’s Tier 2 requirement remains constant at 2.5% 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
2015	10.00%	0.50%	N/A	2.50%	13.00%
2016	12.00%	0.70%	N/A	2.50%	15.20%
2017	9.65%	0.95%	2.50%	2.50%	15.60%
2018	11.90%	1.40%	2.50%	2.50%	18.30%
2019	13.15%	1.75%	2.50%	N/A	17.40%
2020	13.50%	2.00%	2.50%	N/A	18.00%
2021	14.20%	2.00%	2.50%	N/A	18.70%
2022+	15.50%	2.00%	2.50%	N/A	20.00%

¹¹ “Tier 1 Solar set-aside” refers to the set-aside (or carve-out) of Tier 1 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.

¹² 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.

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.¹³ 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	IPL¹⁴ Tier 1
2015	\$40	\$350	\$15	\$2.50
2016	\$40	\$350	\$15	\$2.50
2017	\$40	\$200	\$15	\$2
2018	\$40	\$200	\$15	\$2
2019	\$40	\$150	N/A	\$2
2020	\$40	\$150	N/A	\$2
2021	\$40	\$100	N/A	\$2
2022	\$40	\$100	N/A	\$2
2023 +	\$40	\$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.¹⁵ 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.¹⁶

¹³ PUA § 7-705(e)-(f).

¹⁴ 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.

¹⁵ As a special, non-lapsing fund, the SEIF is also the depository of revenues generated through the sale of CO₂ allowances under the Regional Greenhouse Gas Initiative, the first market-based regulatory program in the United States to reduce greenhouse gas emissions.

¹⁶ State Gov’t § 9-20B-05(i).

II. ELECTRICITY SUPPLIER COMPLIANCE REPORTS

Calendar year 2015 marked the tenth compliance year for the Maryland RPS, and the eighth 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.¹⁷ RPS compliance reports were filed by 90 electricity suppliers, including: 65 competitive retail suppliers; 14 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 62.4 million MWh of total retail electricity sales in Maryland for 2015 (up from 61.0 million MWh in 2014); 61.2 million MWh of retail electricity sales were subject to RPS compliance, and 1.2 million MWh were exempt.¹⁸ Maryland electricity suppliers retired almost 8.0 million RECs in 2015, which was slightly more than the calculated obligation for the year and higher than the 7.8 million RECs retired in 2014. The total cost of RECs retired in 2015 totaled \$126.7 million, up from \$104.0 million in 2014.

Table 4 displays the average cost per REC retired in each tier since 2008. The increasing trend in Tier 1 REC prices likely reflects the growing need for new renewable generation to meet the regional RPS requirements; for the first several years of the program, the RPS requirements could largely be met with the output from existing renewable facilities. Conversely, 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.

¹⁷ 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.

¹⁸ 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 – 2015)

Tier	2008	2009	2010	2011	2012	2013	2014	2015
Tier 1 Non-Solar	\$0.94	\$0.96	\$0.99	\$2.02	\$3.19	\$6.70	\$11.64	\$13.87 (median \$14.25)
Tier 1 Solar	\$345.45	\$345.28	\$328.57	\$278.26	\$201.92	\$159.71	\$144.06	\$130.39 (median \$133.87)
Tier 2	\$0.56	\$0.43	\$0.38	\$0.45	\$0.44	\$1.81	\$1.81	\$1.71 (median \$1.25)

As demonstrated by the table below, the aggregated cost of compliance with the Maryland RPS Program has increased exponentially since 2011.¹⁹ In the span of five compliance years, the total cost of RECs has risen from \$14.7 million in 2011 to \$126.7 million in 2015. The increased compliance costs are attributable to both an increasing RPS percentage requirement in-State, as well as a greater demand for RECs within the surrounding region.²⁰

Table 5: Total Cost of RECs per Year (2011 – 2015)

	Tier	2011	2012	2013	2014	2015
Total REC Costs	Tier 1	\$6,241,710	\$12,453,493	\$32,664,171	\$70,630,620	\$85,054,001
	Solar	\$7,769,279	\$11,346,967	\$21,417,989	\$29,372,737	\$39,055,714
	Tier 2	\$645,332	\$664,220	\$2,751,643	\$3,987,557	\$2,617,917
	Total	\$14,656,321	\$24,464,680	\$56,833,803	\$103,990,914	\$126,727,632
Total RECs Retired	Tier 1	3,083,141	3,902,221	4,871,586	6,062,135	6,134,653
	Solar	27,972	56,194	134,124	203,884	299,525
	Tier 2	1,565,945	1,522,297	1,526,789	1,521,022	1,531,279
	Total	4,677,058	5,480,712	6,532,499	7,787,041	7,965,457
RPS % Required	Tier 1	4.95%	6.40%	7.95%	9.95%	10.00%
	Solar	0.050%	0.100%	0.250%	0.350%	0.500%
	Tier 2	2.50%	2.50%	2.50%	2.50%	2.50%
	Total	7.50%	9.00%	10.70%	12.80%	13.00%

Of the \$126.7 million of total RPS compliance costs in 2015, ACPs accounted for only \$24,515. The reliance on ACPs decreased slightly in 2015 (compared to \$65,965 in 2014), and

¹⁹ Prior to 2011, total costs of RECs in preceding years 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.

²⁰ 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.

the vast majority of the ACPs paid in 2015 were the result of a single supplier meeting its entire RPS obligation by making compliance payments in lieu of purchasing RECs.

Table 6: Results of the 2015 RPS Compliance Reports

RPS Compliance Year		Tier 1 Non-Solar	Tier 1 Solar	Tier 2	Total
2015	RPS Obligation	6,131,624	299,456	1,531,193	7,962,273
	Retired RECs	6,134,653	299,525	1,531,279	7,965,457
	ACP Required	\$16,000	\$7,000	\$1,515	\$24,515

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.²¹ Figure 1 aggregates the Maryland RPS tiers on the basis of generation year. In 2015, 59.7% of the RECs retired for compliance were generated in 2015; 31.4% in 2014; and the balance (8.9%) in 2013.

Figure 1: RECs Retired in 2015 by Generation Year

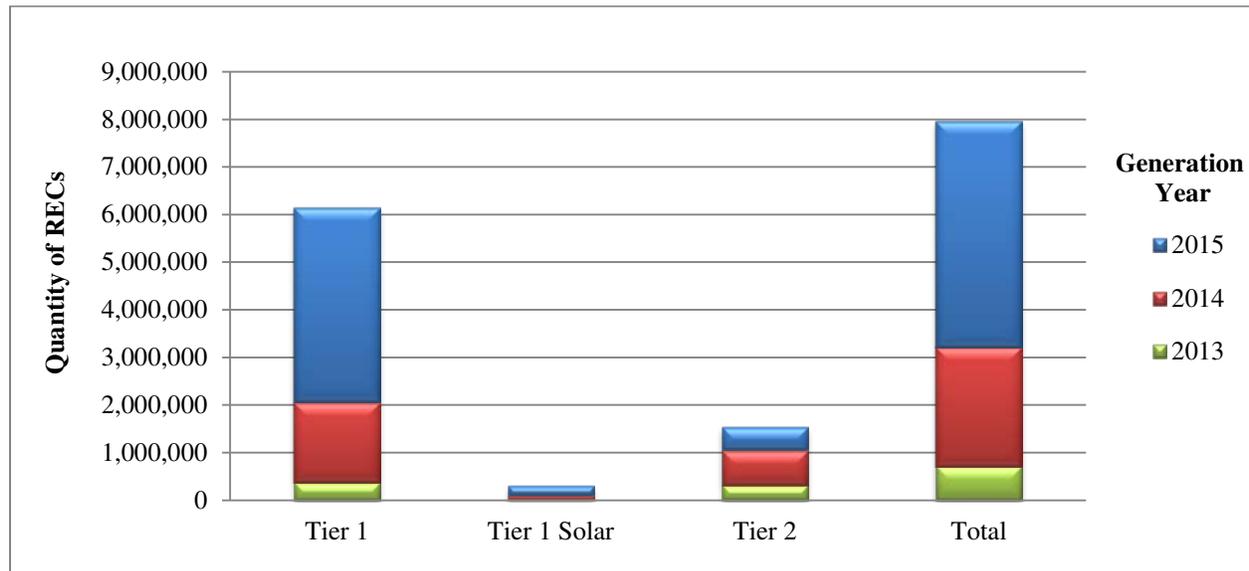
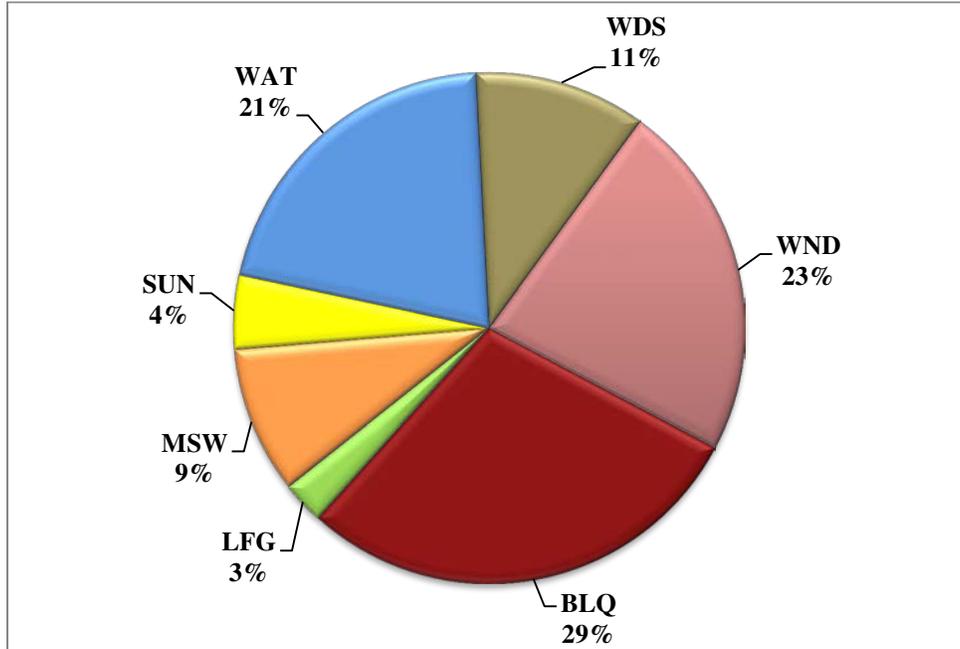


Figure 2 illustrates the fuel sources used to satisfy Tier 1 RPS requirements for the 2015 RPS compliance year. Of the Tier 1 RECs retired for 2015, the resources from which the RECs were sourced consisted primarily of black liquor, wind, and small hydroelectric plants. Although not pictured, Tier 2 RPS requirements for the 2015 RPS compliance year were satisfied exclusively by RECs derived from hydroelectric power.

²¹ COMAR 20.61.03.01 C (unless the REC is diminished or extinguished before expiration).

Figure 2: 2015 Tier 1 Retired RECs by Fuel Source²²

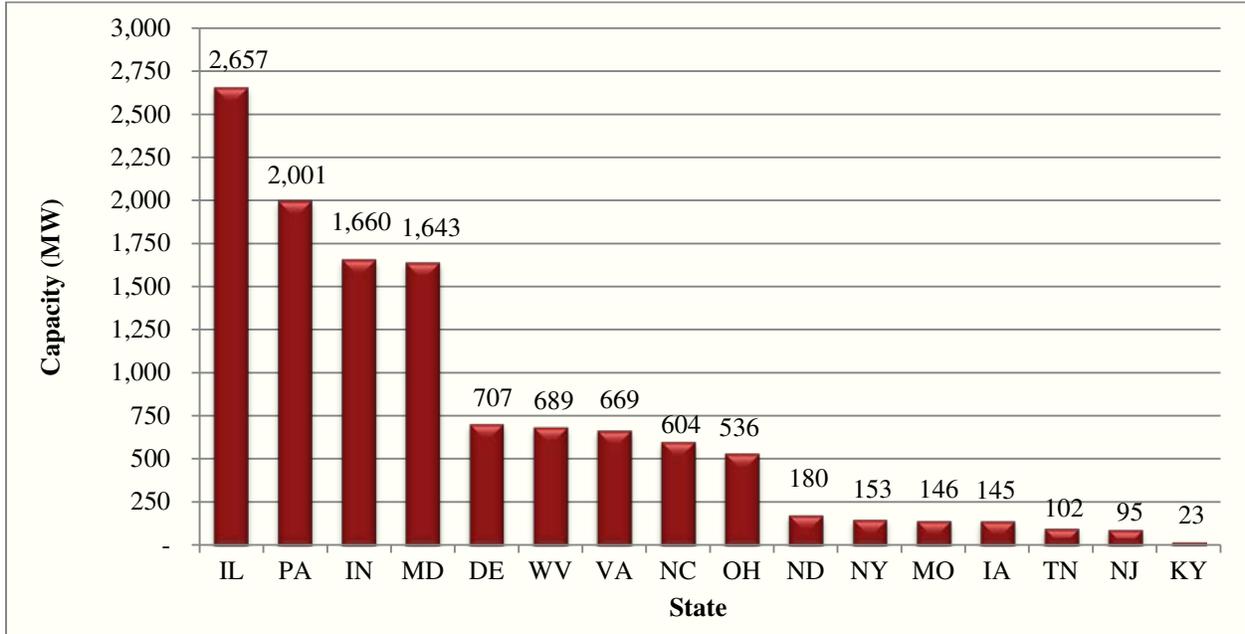


Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; OBG, Other Biomass Gas; SUN, Solar; WAT, Small Hydroelectric; WDS, Wood and Waste Solids; and WND, Wind.

Figure 3 presents the geographical location and the total generating capacity (12,025 MW, an increase from 10,376 MW in 2014) 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, 42.5% of the corresponding capacity is located in the Mid-Atlantic States. The locations of the remaining eligible resources span 12 states and in total contribute the other 57.5% of the State's eligible renewable resource capacity.

²² WAT includes Tier 1 only; SUN includes PV and solar hot water. Qualifying biomass sourced from agricultural crops, geothermal, and other biomass gas contributed too few RECs to be seen on the chart.

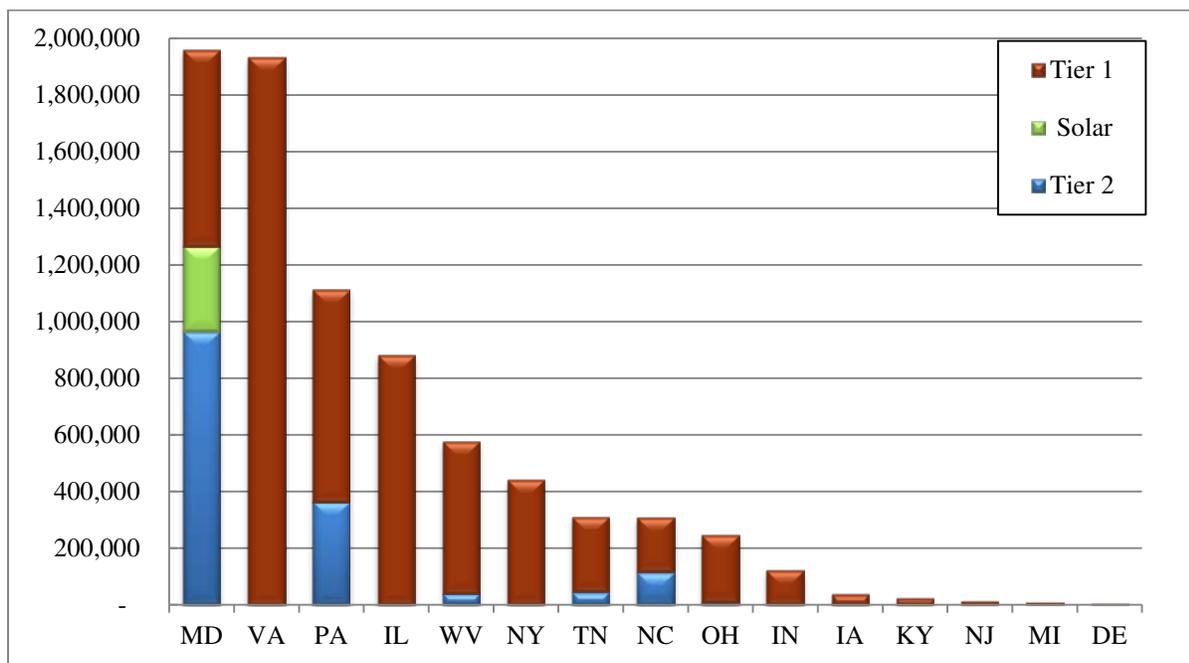
Figure 3: Total Rated Capacity by State (MW) ²³



For the 2015 compliance year, Figure 4 provides a visual display of aggregated REC data to convey general relationships among the States that contributed RECs in 2015. Maryland supplied the largest number of its own RECs purchased by retail electricity suppliers; with large hydroelectric (49.2%) and municipal solid waste (30.0%) contributing the majority of RECs from in-State generators. Virginia was the second highest source of RECs procured by Maryland electricity suppliers for 2015 compliance purposes, with Pennsylvania and Illinois also contributing a significant amount of RECs. The remaining 11 states contributed a total of 26.1% of all RECs retired in 2015.

²³ PJM-EIS, Generation Attribute Tracking System, Database query, (June 29, 2016). 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 (2015)



Tables 7 and 8 provide the quantitative data in support of the previous figure.²⁴ Table 7 provides the reported levels of RECs retired by Maryland electricity suppliers in 2015 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 and Pennsylvania, were used in the largest aggregate amounts by Maryland electricity suppliers for 2015 RPS compliance.

²⁴ The aggregated REC values shown in the following tables may reflect slightly higher REC totals than included earlier in Table 5 and Table 6 due to different source data. Table 5 and Table 6 are populated from the RPS compliance reports submitted annually by Maryland electricity suppliers, while the remaining figures and tables in this Report are populated using data provided by PJM-GATS. The minor discrepancies in REC totals may be attributable to the fact that PJM-GATS data does not distinguish between RECs retired for compliance versus voluntary purposes, and thus may yield slightly higher numbers of retired RECs than what is reported annually to the Commission for purposes of RPS compliance.

Table 7: 2015 REC Retirement by State

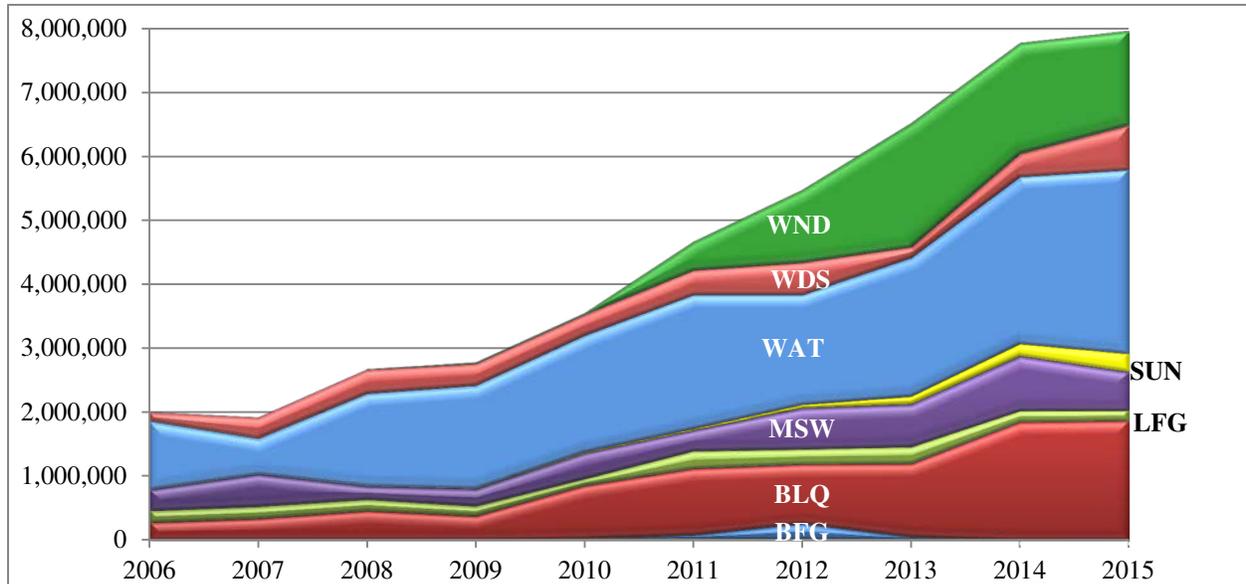
State	Tier 1 Non-Solar	Solar	Tier 2	Total
MD	696,180	299,534	964,881	1,960,595
VA	1,931,202	-	-	1,931,202
PA	751,559	-	361,722	1,113,281
IL	881,907	-	-	881,907
WV	539,397	-	38,901	578,298
NY	438,432	-	-	438,432
TN	267,086	-	43,682	310,768
NC	192,329	-	114,973	307,302
OH	238,689	-	7,146	245,835
IN	119,778	-	-	119,778
IA	34,876	-	-	34,876
KY	20,471	-	-	20,471
NJ	11,713	-	-	11,713
MI	6,879	-	-	6,879
DE	4,654	-	-	4,654
Total	6,135,152	299,534	1,531,305	7,965,991

Table 8: 2015 REC Retirement by State (%)

State	Tier 1 Non-Solar	Solar	Tier 2	Total
MD	11.3%	100.0%	63.0%	24.6%
VA	31.5%	0.0%	0.0%	24.2%
PA	12.3%	0.0%	23.6%	14.0%
IL	14.4%	0.0%	0.0%	11.1%
WV	8.8%	0.0%	2.5%	7.3%
NY	7.1%	0.0%	0.0%	5.5%
TN	4.4%	0.0%	2.9%	3.9%
NC	3.1%	0.0%	7.5%	3.9%
OH	3.9%	0.0%	0.5%	3.1%
IN	2.0%	0.0%	0.0%	1.5%
IA	0.6%	0.0%	0.0%	0.4%
KY	0.3%	0.0%	0.0%	0.3%
NJ	0.2%	0.0%	0.0%	0.1%
MI	0.1%	0.0%	0.0%	0.1%
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. Hydroelectric (“WAT”) has been the largest contributor in each of the ten years of the RPS, while wind (“WND”) has accounted for a significant portion only since 2011. Note that the contributions from qualifying biomass sourced from agricultural crops, geothermal, other biomass gas, and solar hot water are too small to be seen on this chart.

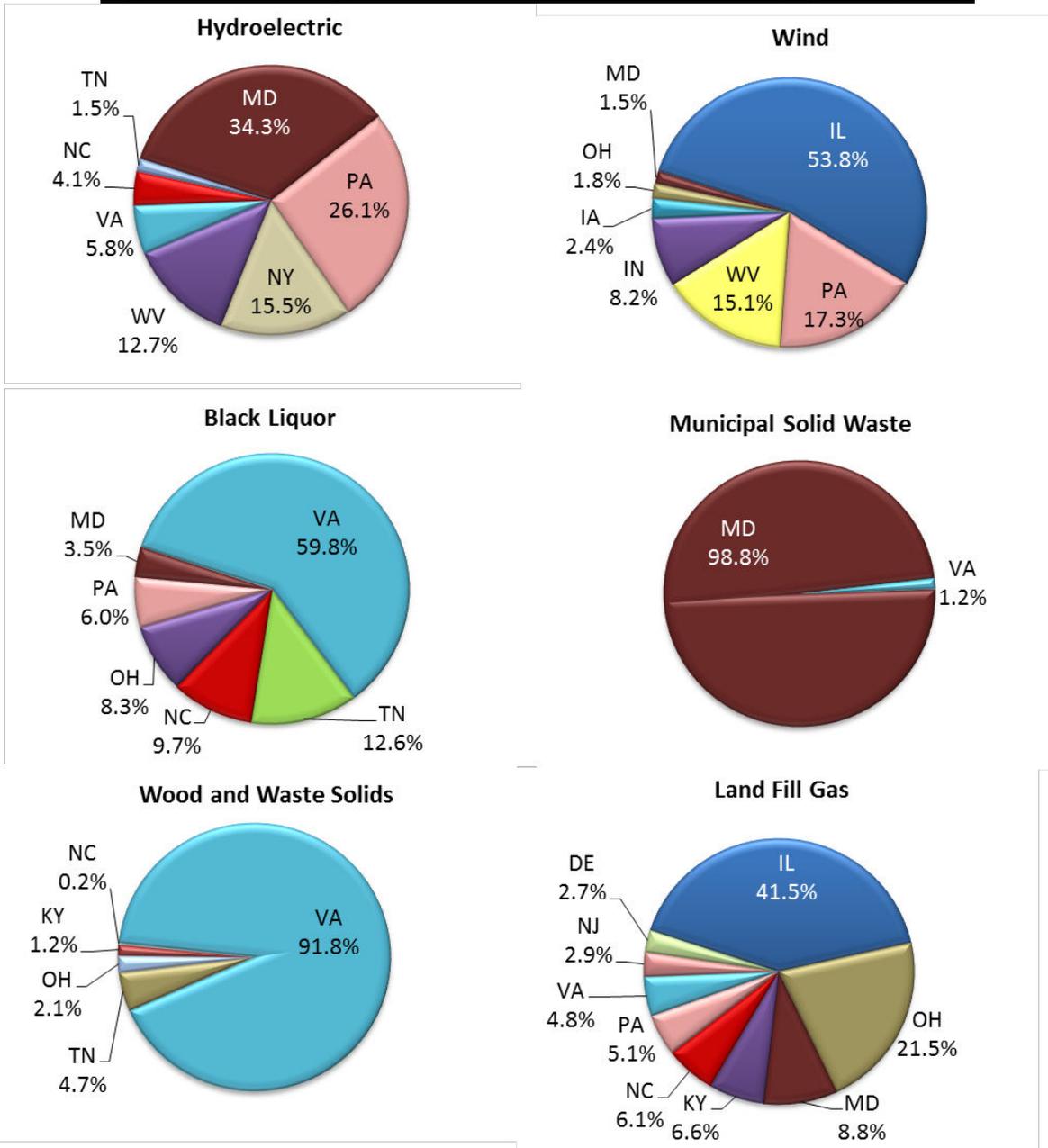
Figure 5: RECs Retired by Fuel Type (2006 – 2015)



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

In 2015, all of the RECs retired from geothermal and solar sources were located 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 2015 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 vast majority of municipal solid waste RECs; along with a meaningful portion of hydroelectric RECs retired for compliance in 2015. Conversely, Maryland resources provided only 8.8% of landfill gas RECs, 3.5% of black liquor RECs, 1.5% of the wind RECs, and none of the RECs derived from wood and waste solids retired for compliance in 2015.

Figure 6: Percentage of RECs Generated in Each State, by Fuel (2015) ²⁵



²⁵ Additional information pertaining to the source of renewable energy used to meet Maryland’s 2015 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 2015 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 2015.²⁶ 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).²⁷ Green power products are offered to the public with higher concentrations of renewable energy than required by State RPS requirements.

As shown in Table 9, almost 1.7 million Tier 1 RECs and approximately 1.6 million Tier 2 RECs were generated by eligible sources located within Maryland in 2015. 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 2015. 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.

Table 9: 2015 Maryland Generated RECs by Fuel Source

Fuel Type	Tier I										Tier II	Grand Total
	BLQ	GEO	LFG	MSW	WAT	SUN	STH	WND	WDS	Total	WAT	
Quantity of RECs	89,648	1,046	84,583	711,795	27,492	353,773	4,267	421,037	5,840	1,699,481	1,563,988	3,263,469
%	5.3%	0.1%	5.0%	41.9%	1.6%	20.8%	0.3%	24.8%	0.3%	100.0%	100.0%	100.0%

Abbreviations: BLQ = Black Liquor; GEO = Geothermal; LFG = Landfill Gas; MSW = Municipal Solid Waste; STH = Solar Thermal; SUN = Photovoltaic; WAT = Hydroelectric; WND = Wind; and WDS = Wood Waste.

Table 10 presents additional detail regarding the disposition of Maryland-generated RECs in calendar year 2015. Over 62% of the RECs generated by renewable facilities located within Maryland during 2015 are available for potential future sale in Maryland or in other states in subsequent compliance years. Almost 38% of the RECs generated in Maryland were retired in 2015 to meet the RPS requirements in Maryland and various other PJM states. Labeled as “Other” in Table 10, just 0.2% of RECs were used for other purposes or may represent pending transfers between parties.

²⁶ Specific information pertaining to the State’s REFs as described herein was made available by PJM-EIS in the GATS State Agency Report.

²⁷ 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 10: Disposition of 2015 Maryland Generated RECs

	Available	RPS Compliance	Other	Total
Tier 1 Non-Solar	725,369	610,579	5,493	1,341,441
Tier 1 Solar	152,785	205,101	154	358,040
Tier 2	1,152,448	411,540	0	1,563,988
Total	2,030,602	1,227,220	5,647	3,263,469
(%)	62.2%	37.6%	0.2%	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 2015, Maryland-generated RECs were retired for compliance purposes in six jurisdictions: the District of Columbia, Delaware, Maryland, New Jersey, Pennsylvania, and Virginia. Almost 88% of the RECs generated by in-State facilities in 2015 were retired for compliance purposes in Maryland, which constituted a 1.2% decrease from 2014 levels. In previous years, however, a much lower percentage of Maryland-generated RECs were used for compliance in Maryland.²⁸

Table 11: 2015 Maryland Generated RECs Retired for RPS Compliance by State

	Fuel	DC	DE	MD	NJ	PA	VA	TOTAL
Tier 1	Black Liquor	0	0	60,144	0	0	0	60,144
	Geothermal	0	0	40	0	0	0	40
	Land Fill Gas	0	0	814	14,267	1,907	876	17,864
	Municipal Solid Waste	0	0	444,087	0	0	0	444,087
	Small Hydro	0	0	5,000	0	0	0	5,000
	Solar PV	1,162	0	200,803	0	0	0	201,965
	Solar Thermal	0	0	3,136	0	0	0	3,136
	Wind	0	82,652	339	0	453	0	83,444
	Tier 1 Total	1,162	82,652	714,363	14,267	2,360	876	815,680
	Percentage	0.1%	10.1%	87.6%	1.7%	0.3%	0.1%	100.0%
Tier 2	Large Hydro	103,306	0	308,234	0	0	0	411,540
	Tier 2 Total	103,306	0	308,234	0	0	0	411,540
	Percentage	25.1%	0.0%	74.9%	0.0%	0.0%	0.0%	100.0%
Tiers 1 & 2	Grand Total	104,468	82,652	1,022,597	14,267	2,360	876	1,227,220
	Percentage	8.5%	6.7%	83.3%	1.2%	0.2%	0.1%	100.0%

Source: PJM-EIS.

²⁸ 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.

IV. CONCLUSION

The electricity supplier compliance reports of 2015, verified by the Commission, indicate that nearly all of the Maryland RPS obligations were met via the purchase and retirement of RECs, with only \$24,515 in ACPs remitted for compliance purposes. Similar to 2014, almost a quarter of RECs used for compliance in 2015 came from in-State resources. RECs derived from two fuel types – wind (22.75%) and black liquor (28.88%) – were the predominant sources of Tier 1 compliance in 2015, with those RECs sourced primarily from Illinois and Virginia, respectively. In 2015, the Tier 1 Solar carve-out was met by the retirement of RECs generated exclusively in Maryland; although a negligible ACP (\$7,000) was remitted. In 2015, Tier 2 compliance was demonstrated by the purchase of RECs derived from large hydroelectric sources, with over 63% 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 adequate renewable resources.

APPENDICES

Appendix A: 2015 Retired RECs by Facility

Tier 1*						Tier 1*					
Facility Name	Resource	State	Quantity	WND %	Tier 1	Facility Name	Resource	State	Quantity	WAT %	Tier 1
Adam	WND	IL	1,772	0.12%	0.03%	AEP Buck	WAT	VA	60,318	4.50%	0.94%
AEP Blue Creek	WND	OH	22,440	1.53%	0.35%	AEP Fries	WAT	VA	16,086	1.20%	0.25%
AEP Fowler Ridge	WND	IN	70,540	4.82%	1.10%	AEP Glen Ferris	WAT	WV	19,766	1.48%	0.31%
AEP Meadow Lake	WND	IN	13,176	0.90%	0.20%	Allegheny	WAT	PA	60,559	4.52%	0.94%
AEP Wildcat	WND	IN	973	0.07%	0.02%	Allegheny Lock	WAT	PA	64,497	4.81%	1.00%
AP Beech Ridge	WND	WV	27,650	1.89%	0.43%	Allegheny River	WAT	PA	199,448	14.89%	3.10%
AP Criterion	WND	MD	239	0.02%	0.00%	AP Misc Hydro	WAT	WV	71,338	5.33%	1.11%
AP Greenland	WND	WV	36,067	2.46%	0.56%	Beardslee	WAT	NY	37,681	2.81%	0.59%
AP Lural	WND	WV	5,458	0.37%	0.08%	Beebee	WAT	NY	23,383	1.75%	0.36%
AP Pinnacle	WND	WV	151,232	10.33%	2.35%	Big Shoals	WAT	VA	2,000	0.15%	0.03%
AP Roth Rock	WND	MD	21,494	1.47%	0.33%	Black River	WAT	NY	22,175	1.66%	0.34%
AP South Chestnut	WND	PA	2,985	0.20%	0.05%	Brasfield	WAT	VA	8,387	0.63%	0.13%
Armenia Mt.	WND	PA	13,790	0.94%	0.21%	Coleman Falls	WAT	VA	8,273	0.62%	0.13%
Bishop Hill	WND	IL	350,000	23.90%	5.44%	Conemaugh	WAT	PA	4,889	0.36%	0.08%
Camp Grove	WND	IL	433	0.03%	0.01%	Cushaw	WAT	VA	8,816	0.66%	0.14%
Cayuga Ridge	WND	IL	384,970	26.29%	5.98%	Deep Creek	WAT	MD	5,000	0.37%	0.08%
Crystal Lake	WND	IA	19,235	1.31%	0.30%	Deferiet	WAT	NY	53,202	3.97%	0.83%
Crystal Lake Wind	WND	IA	15,641	1.07%	0.24%	Dixon	WAT	IL	13,593	1.01%	0.21%
Eco Grove	WND	IL	5,557	0.38%	0.09%	E.J. West	WAT	NY	38,911	2.90%	0.60%
Fowler Ridge	WND	IN	35,089	2.40%	0.55%	French Paper	WAT	MI	6,879	0.51%	0.11%
Grand Ridge	WND	IL	19,722	1.35%	0.31%	Granby	WAT	NY	33,740	2.52%	0.52%
Haviland Wind	WND	OH	3,974	0.27%	0.06%	Great Falls	WAT	NJ	6,681	0.50%	0.10%
Klondike Rd	WND	MD	169	0.01%	0.00%	Halifax	WAT	VA	2,214	0.17%	0.03%
Laurel Hills	WND	PA	1,776	0.12%	0.03%	Holcomb Rock	WAT	VA	10,975	0.82%	0.17%
Locust Ridge	WND	PA	6,338	0.43%	0.10%	Inghams	WAT	NY	11,011	0.82%	0.17%
Lookout	WND	PA	53,590	3.66%	0.83%	Lakeview	WAT	VA	1,633	0.12%	0.03%
Mehoopany	WND	PA	99,224	6.78%	1.54%	London	WAT	WV	70,155	5.24%	1.09%
Minonk	WND	IL	20,502	1.40%	0.32%	Lyons Falls	WAT	NY	10,289	0.77%	0.16%
Patton	WND	PA	1,360	0.09%	0.02%	Marmet	WAT	WV	63,698	4.76%	0.99%
Stony Creek	WND	PA	74,607	5.10%	1.16%	Mother Ann Lee	WAT	KY	338	0.03%	0.01%
Top Crop	WND	IL	4,135	0.28%	0.06%	Niagara	WAT	VA	5,505	0.41%	0.09%
Total			1,464,138	100.00%	22.75%	Prospect	WAT	NY	73,240	5.47%	1.14%
Facility Name	Resource	State	Quantity	BLQ %	Tier 1	Schoolfield	WAT	VA	13,528	1.01%	0.21%
AEP W Kingsport	BLQ	TN	234,402	12.61%	3.64%	Snowden	WAT	VA	17,579	1.31%	0.27%
Chillicothe	BLQ	OH	154,392	8.31%	2.40%	Soft Maple	WAT	NY	18,894	1.41%	0.29%
Covington	BLQ	VA	419,126	22.56%	6.51%	Trenton	WAT	NY	115,906	8.65%	1.80%
Franklin Mill	BLQ	VA	220,076	11.84%	3.42%	Upper Sterling	WAT	IL	9,491	0.71%	0.15%
Hopewell Mill	BLQ	VA	187,071	10.07%	2.91%	VP Emporia	WAT	VA	7,783	0.58%	0.12%
Johnsonburg	BLQ	PA	30,208	1.63%	0.47%	Winfield	WAT	WV	94,033	7.02%	1.46%
Kapstone Kraft Pape	BLQ	NC	179,995	9.69%	2.80%	York Haven	WAT	PA	47,676	3.56%	0.74%
Luke Mill	BLQ	MD	65,887	3.55%	1.02%	Total			1,339,570	100.00%	20.82%
Spring Grove	BLQ	PA	81,811	4.40%	1.27%	Facility Name	Resource	State	Quantity	GEO %	Tier 1
West Point Mill	BLQ	VA	285,235	15.35%	4.43%	Florenzo	GEO	MD	34	27.87%	0.00%
Total			1,858,203	100.00%	28.88%	Freeman	GEO	MD	13	10.66%	0.00%
Facility Name	Resource	State	Quantity	OBG %	Tier 1	Massey	GEO	MD	43	35.25%	0.00%
AEP Zanesville	OBG	OH	28	0.43%	0.00%	Sakakihara	GEO	MD	7	5.74%	0.00%
Buckeye BioGas	OBG	OH	1,037	16.04%	0.02%	Wise	GEO	MD	25	20.49%	0.00%
Central Ohio	OBG	OH	833	12.89%	0.01%	Total			122	100.00%	0.00%
French Creek	OBG	OH	232	3.59%	0.00%	Facility Name	Resource	State	Quantity	MSW %	Tier 1
Haviland	OBG	OH	1,229	19.01%	0.02%	Covanta Fairfax	MSW	VA	7,440	1.25%	0.12%
Van Erk Dairy	OBG	OH	460	7.12%	0.01%	Montgomery County	MSW	MD	339,710	57.04%	5.28%
Wooster	OBG	OH	2,366	36.60%	0.04%	Wheelabrator	MSW	MD	248,377	41.71%	3.86%
Zanesville	OBG	OH	279	4.32%	0.00%	Total			595,527	100.00%	9.25%
Total			6,464	100.00%	0.10%						

Appendix A: 2015 Retired RECs by Facility (Cont'd)

Tier 1 (Cont'd)*						Tier 2					
Facility Name	Resource	State	Quantity	AB %	Tier 1	Facility Name	Resource	State	Quantity	WAT %	Tier 2
Kapstone Kraft	AB	NC	317	100.00%	0.00%	AEP Summerville	WAT	WV	5,559	0.36%	0.36%
Total			317	100.00%	0.00%	Conowingo	WAT	MD	964,881	63.01%	63.01%
Facility Name	Resource	State	Quantity	WDS %	Tier 1	Covanta	WAT	WV	33,342	2.18%	2.18%
AEP W Kingsport	WDS	TN	32,684	4.68%	0.51%	Falls	WAT	NC	9,087	0.59%	0.59%
Coshocton Mill	WDS	OH	14,319	2.05%	0.22%	Gaston	WAT	NC	7,525	0.49%	0.49%
Covington	WDS	VA	160,732	23.02%	2.50%	High Rock	WAT	NC	40,789	2.66%	2.66%
Cox Waste	WDS	KY	8,681	1.24%	0.13%	Lake Lynn	WAT	PA	111,900	7.31%	7.31%
Hopewell Mill	WDS	VA	22,966	3.29%	0.36%	Narrows	WAT	NC	680	0.04%	0.04%
Kapstone Kraft	WDS	NC	1,565	0.22%	0.02%	Piney	WAT	PA	43,570	2.85%	2.85%
MultiTrade	WDS	VA	65,873	9.44%	1.02%	Racine	WAT	OH	7,146	0.47%	0.47%
VP South Boston	WDS	VA	332,971	47.70%	5.17%	Roanoke	WAT	NC	32,367	2.11%	2.11%
West Point Mill	WDS	VA	58,307	8.35%	0.91%	Safe Harbor	WAT	PA	206,252	13.47%	13.47%
Total			698,098	100.00%	10.85%	Tuckertown	WAT	NC	4,656	0.30%	0.30%
Facility Name	Resource	State	Quantity	LFG %	Tier 1	XIC Calderwood	WAT	TN	43,682	2.85%	2.85%
AP Arden	LFG	PA	1,685	0.98%	0.03%	XIC Cheoah	WAT	NC	19,869	1.30%	1.30%
Bavarian	LFG	KY	5,264	3.05%	0.08%	Total			1,531,305	100.00%	100.00%
BC Millersville	LFG	MD	2,087	1.21%	0.03%	Tier 1 REC Total	6,135,152				
Broad Mountain	LFG	PA	875	0.51%	0.01%	SREC Total	299,534				
CID	LFG	IL	7,417	4.29%	0.12%	Tier 2 REC Total	1,531,305				
Croda Atlas Point	LFG	DE	4,654	2.69%	0.07%	Grand Total	7,965,991				
DPL NWLND	LFG	MD	8,218	4.76%	0.13%	Resource Definitions					
Fairless Hills	LFG	PA	1,670	0.97%	0.03%	Agriculture Crops	AB	Municipal Solid Waste	MSW		
FE Carbon	LFG	OH	7,604	4.40%	0.12%	Black Liquor	BLQ	Other Biomass Gas	OBG		
FE Erie County	LFG	OH	2,018	1.17%	0.03%	Geothermal	GEO	Wood/Waste Solids	WDS		
FE Lorain	LFG	OH	8,641	5.00%	0.13%	Landfill Gas	LFG	Wind	WND		
FE Mahoning	LFG	OH	2,104	1.22%	0.03%	Hydroelectric	WAT				
Green Valley	LFG	KY	2,409	1.39%	0.04%	*Solar facilities are not represented in this table. In 2015, 16,172 facilities produced 299,534 SRECs.					
Greene Valley	LFG	IL	16,602	9.61%	0.26%						
Hardin County	LFG	KY	677	0.39%	0.01%						
Lake Gas Recovery	LFG	IL	9,525	5.51%	0.15%						
Laurel Ridge	LFG	KY	1,686	0.98%	0.03%						
Lorain County	LFG	OH	16,733	9.69%	0.26%						
Mallard Lake	LFG	IL	3,247	1.88%	0.05%						
Monmouth	LFG	NJ	1,746	1.01%	0.03%						
New Bern	LFG	NC	10,452	6.05%	0.16%						
O'brien Edgeboro	LFG	NJ	3,286	1.90%	0.05%						
PE SE Ches Co	LFG	PA	19	0.01%	0.00%						
Pendleton County	LFG	KY	1,416	0.82%	0.02%						
PEP Oaks	LFG	MD	711	0.41%	0.01%						
PEP Ritchie Brown	LFG	MD	2,747	1.59%	0.04%						
PEP Ritchie PG	LFG	MD	1,419	0.82%	0.02%						
PL Archbald	LFG	PA	223	0.13%	0.00%						
Prairie View	LFG	IL	1,685	0.98%	0.03%						
Rochelle Energy	LFG	IL	1,866	1.08%	0.03%						
Settlers Hill	LFG	IL	4,978	2.88%	0.08%						
Tullytown	LFG	PA	4,329	2.51%	0.07%						
VP Amelia	LFG	VA	1,392	0.81%	0.02%						
VP Brunswick	LFG	VA	1,526	0.88%	0.02%						
VP King	LFG	VA	77	0.04%	0.00%						
VP Northeast	LFG	VA	4,323	2.50%	0.07%						
VP Peninsula	LFG	VA	990	0.57%	0.02%						
Woodland	LFG	IL	26,412	15.29%	0.41%						
Total			172,713	100.00%	2.68%						

Appendix B: Location of Facilities that Provided RECs for 2015 RPS Compliance

	DE	IA	IL	IN	KY	MD	MI	NC	NJ	NY	OH	PA	TN	VA	WV	Total
<i>Tier 1</i>																
Black Liquor	-	-	-	-	-	1	-	1	-	-	1	2	-	1	-	6
Geothermal	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	5
Land Fill Gas	1	-	8	-	5	5	-	1	2	-	5	6	-	5	-	38
Mun. Solid Waste	-	-	-	-	-	2	-	-	-	-	-	-	-	1	-	3
Biomass Gas	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	7
Small Hydro	-	-	2	-	1	1	1	-	1	11	-	6	-	13	5	41
Solar (Photovoltaic)	-	-	-	-	-	15,401	-	-	-	-	-	-	-	-	-	15,401
Solar Hot Water	-	-	-	-	-	771	-	-	-	-	-	-	-	-	-	771
Waste Wood	-	-	-	-	1	-	-	-	-	-	1	-	1	5	-	8
Wind	-	2	9	6	-	3	-	-	-	-	2	8	-	-	4	34
<i>Tier 2</i>																
Large Hydro	-	-	-	-	-	1	-	7	-	-	1	3	1	-	2	15
Total	1	2	19	6	7	16,190	1	9	3	11	17	25	2	25	11	16,329

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

Appendix C: Disposition of 2015 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	VA	Total			
Black Liquor	0	0	60,144	0	0	0	60,144	29,504	0	89,648
Geothermal	0	0	40	0	0	0	40	1,006	0	1,046
Land Fill Gas	0	0	814	14,267	1,907	876	17,864	62,228	4,491	84,583
Mun. Solid Waste	0	0	444,087	0	0	0	444,087	267,708	0	711,795
Small Hydro	0	0	5,000	0	0	0	5,000	22,492	0	27,492
Solar PV	1,162	0	200,803	0	0	0	201,965	151,654	154	353,773
Solar Thermal	0	0	3,136	0	0	0	3,136	1,131	0	4,267
Wind	0	82,652	339	0	453	0	83,444	336,591	1,002	421,037
Wood Waste	0	0	0	0	0	0	0	5,840	0	5,840
<i>Tier 1 Total</i>	1,162	82,652	714,363	14,267	2,360	876	815,680	878,154	5,647	1,699,481
Large Hydro	103,306	0	308,234	0	0	0	411,540	1,152,448	0	1,563,988
<i>Tier 2 Total</i>	103,306	0	308,234	0	0	0	411,540	1,152,448	0	1,563,988
<i>Grand Total</i>	104,468	82,652	1,022,597	14,267	2,360	876	1,227,220	2,030,602	5,647	3,263,469

Appendix D: Number of Renewable Energy Facilities Located in Maryland

Maryland County	Tier 1 Non-Solar	Tier 1 Solar	Tier 2	Total
Allegany	1	31	-	32
Anne Arundel	9	4,048	-	4,057
Baltimore	9	2,563	-	2,572
Baltimore City	1	452	-	453
Calvert	-	409	-	409
Caroline	-	96	-	96
Carroll	-	1,100	-	1,100
Cecil	-	444	-	444
Charles	-	1,314	-	1,314
Dorchester	-	104	-	104
Frederick	4	1,464	-	1,468
Garrett	6	35	-	41
Harford	3	2,297	1	2,301
Howard	11	2,002	-	2,013
Kent	-	161	-	161
Montgomery	8	4,245	-	4,253
Prince George's	5	6,213	-	6,218
Queen Anne's	2	311	-	313
Somerset	1	79	-	80
St. Mary's	-	696	-	696
Talbot	3	108	-	111
Washington	1	509	-	510
Wicomico	3	312	-	315
Worcester	1	198	-	199
Grand Total	68	29,191	1	29,260

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 June 29, 2016.

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	0.4	-	65.4
Anne Arundel	3.4	41.1	-	44.5
Baltimore	195.4	40.9	-	236.3
Baltimore City	0.1	9.1	-	9.1
Calvert	-	4.3	-	4.3
Caroline	-	5.4	-	5.4
Carroll	-	13.7	-	13.7
Cecil	-	18.5	-	18.5
Charles	-	33.4	-	33.4
Dorchester	-	7.4	-	7.4
Frederick	4.0	57.9	-	61.9
Garrett	210.0	0.2	-	210.2
Harford	1.3	44.5	474.0	519.7
Howard	1.3	24.7	-	26.0
Kent	-	10.5	-	10.5
Montgomery	81.7	47.2	-	128.9
Prince George's	13.4	68.2	-	81.6
Queen Anne's	0.1	15.4	-	15.5
Somerset	3.8	7.5	-	11.3
St. Mary's	-	7.7	-	7.7
Talbot	69.3	4.7	-	74.1
Washington	0.0	51.2	-	51.2
Wicomico	6.0	28.2	-	34.3
Worcester	0.0	5.4	-	5.4
Grand Total	654.8	547.5	474.0	1,676.3

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 June 29, 2016.