Introduction to the Renewable Energy Portfolio Standard

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Introduction to the Renewable Energy Portfolio Standard

Overview

In General

The renewable energy portfolio standard (RPS) requires that a specified portion of retail electricity sold by electricity suppliers in the State come from "renewable" sources, as statutorily defined.[1] Consequently, the RPS incentivizes renewable energy growth and market stability as well as greenhouse gas (GHG) emissions reductions. The RPS has been subject to significant legislative changes since its implementation in 2006. Generally, the current standard requires 52.5% of the State's energy be derived from renewable sources by 2030. The RPS is administered by the Public Service Commission (PSC). Subject to specified exemptions, the electricity suppliers required to comply with the RPS include electric companies (investor-owned utilities, electric cooperatives, and municipal electric utilities[2]), aggregators, brokers, and marketers of electricity.[3]

The eligible renewable energy sources, percentage requirements, and statutory changes are discussed in more detail below.

Eligible Sources

The energy sources that are eligible for compliance with the RPS are bifurcated into Tier 1 and Tier 2 renewable sources. Tier 1 sources include (1) solar energy; (2) wind energy; (3) qualifying biomass; (4) methane from anaerobic digestion in a landfill or wastewater treatment plant; (5) geothermal energy; (6) ocean energy; (7) a fuel cell that produces electricity from qualifying biomass or methane from anaerobic digestion; (8) small hydroelectric power plants; (9) poultry litter-to-energy; (10) waste-to-energy; (11) refuse-derived fuel; (12) thermal energy;

[1] The RPS is established under Title 7, Subtitle 7 of the Public Utilities Article.

[2] Electric cooperatives and municipal electric utilities are subject to slightly different RPS requirements from other electric companies. For electric cooperatives, the percentage of Tier 1 electricity in the RPS that must be derived from solar is 2.5% in 2020 and later. The RPS requirement that applies to municipal electric utilities for 2022 and later is 20.4% from Tier 1 sources, including 1.95% from solar and 2.5% from offshore wind energy.

[3] Under § 7-703 of the Public Utilities Article, the RPS does not apply to electricity sales at retail by any electricity supplier (1) in excess of 300,000,000 kilowatt-hours (or 300,000 megawatt-hours) of industrial process load to a single customer in a year; (2) to residential customers in regions of the State where the residential customer rates are subject to a freeze or cap contained in a specified settlement agreement; or (3) to a customer served by an electric cooperative under an electricity supplier purchase agreement that existed before October 1, 2004 (*i.e.*, Choptank Electric Cooperative). Furthermore, the portion of the RPS that represents offshore wind energy applies only to the distribution sales of electric companies and does not apply to distribution sales by an electric company in excess of 75,000,000 kilowatt-hours of industrial process load to a single customer in a year or 3,000 kilowatt-hours of electricity in a month for certain agricultural customers.

and (13) raw or treated wastewater used as a heat source or sink for heating or cooling systems.[4] Hydroelectric power, other than pump storage, is the only Tier 2 source in Maryland. Under statute, Tier 1 sources are eligible for meeting Tier 2 requirements.

Generally, a Tier 1 or Tier 2 source must be located (1) in the PJM region;[5] (2) outside of but adjacent to the PJM region if the electricity is delivered into the PJM region; or (3) on specified offshore wind lease sites. However, some sources have additional requirements. For example:

- solar, geothermal, poultry litter-to-energy, waste-to-energy, and refuse-derived fuel are eligible only if they are connected with the electric distribution grid that serves Maryland;
- energy from a thermal biomass system must be used in Maryland to qualify for the RPS;
- energy from wastewater used as a heat source or sink is eligible only if it is connected to the electric distribution grid that serves Maryland or processes wastewater from Maryland residents;
- small hydroelectric is only eligible if it is generated at a dam that existed as of January 1, 2004; and
- large hydroelectric is only eligible (for Tier 2) if it is generated at a system or facility that existed or was operational as of January 1, 2004.

Renewable Energy Portfolio Standard and Tier 1 Carve-Outs

Under the RPS, the percentage of electricity required to be supplied from Tier 1 sources increases incrementally each year, while Tier 2 remains steady at 2.5%. In addition to the requirement to supply specific amounts of energy annually through Tier 1 and Tier 2 sources, the RPS contains specific Tier 1 carve-outs for solar, offshore wind, and geothermal energy. While the solar and geothermal carve-outs have specific percentage requirements set in statute each year, the offshore wind energy carve-out is dependent on the annual creation of offshore wind renewable energy credits (ORECs), as determined by PSC.[6] Specific annual percentages for each of the tiers and carve-outs are shown in **Exhibit 1.**

[4] *See* the definition of "Tier 1 renewable source" in § 7-701 of the Public Utilities Article for additional details on Tier 1 renewable sources.

[5] "PJM region" is the wholesale bulk power region administered by PJM Interconnection, LLC, and includes 13 states, including Maryland, and the District of Columbia.

[6] *See* §§ 7-703(b)(12) – (25) and 7-704.2 of the Public Utilities Article.

Exhibit 1
Annual Renewable Energy Requirements

Year	Solar	Post 2022 Geothermal	Offshore Wind*	Other Tier 1	Tier 1 Total	Tier 2	Combined Total
2024	6.50%	0.15%	0.14%	26.91%	33.70%	2.50%	36.20%
2025	7.00%	0.25%	1.66%	26.59%	35.50%	2.50%	38.00%
2026	8.00%	0.50%	2.61%	26.89%	38.00%	2.50%	40.50%
2027	9.50%	0.75%	13.02%	18.23%	41.50%	2.50%	44.00%
2028	11.00%	1.00%	13.02%	17.98%	43.00%	2.50%	45.50%
2029	12.50%	1.00%	13.02%	22.98%	49.50%	2.50%	52.00%
2030+	14.50%	1.00%	13.02%	21.48%	50.00%	2.50%	52.50%

*This percentage includes only the commission-approved offshore wind energy carve-out from Order Nos. 88192 and 90011.

Source: Public Service Commission; Department of Legislative Services

Renewable Energy Credits

In General

To demonstrate compliance with RPS requirements, an electricity supplier must acquire renewable energy credits (RECs) equal to the RPS percentage specified in statute each year or pay an alternative compliance payment (ACP) equivalent to the supplier's shortfall. RECs identify the attributes associated with the production of one megawatt-hour (MWh) of electricity generated using eligible Tier 1 and Tier 2 sources.

Each REC has a unique identifier that prevents duplicative sales, ensures proper tracking, and assigns ownership rights. Thus, a REC proves that a supplier has rights to Tier 1 or Tier 2 renewable sources, either from producing the REC or purchasing the REC. Generally, the price of a REC fluctuates based on basic market principles of supply and demand. In 2022, the average cost of a REC was $17.80 for Tier 1 non-solar, $57.80 for Tier 1 solar (referred to as solar renewable energy credits, or SRECs), and $7.42 for Tier 2.

Under § 7-709 of the Public Utilities Article, a REC has a five-year life during which it can be transferred, sold, or used for RPS compliance.[7] The purchase, sale, and retirement of RECs is facilitated through the PSC-approved Generation Attributes Tracking System (GATS) operated by PJM. Using system data, GATS creates a REC for every MWh of electricity generated and assigns the REC a unique serial number.

[7] Chapter 595 of 2024 extended the lifespan of a REC from three years to five years.

Certified Solar Renewable Energy Credits

Solar energy generating systems that meet specified requirements and are certified by PSC may generate certified SRECs.[8] Certified SRECs have a compliance value of 150% of noncertified SRECs and may be used by electricity suppliers to meet the solar carve–out for the State RPS beginning with the 2025 compliance year. Certified systems are eligible to generate certified SRECs for 15 years after receiving certification from PSC or through January 1, 2040, whichever is later.

Offshore Renewable Energy Credits

Unlike RECs, § 7-704.1 of the Public Utilities Article requires that the price for ORECs be bundled to include the price of the offshore wind energy, capacity, ancillary services, and environmental attributes. Furthermore, ORECs are procured by a developer at a fixed price according to a pricing schedule, as opposed to RECs which fluctuate in price based on market demand.[9]

Alternative Compliance Payments

If an electricity supplier does not meet its RPS obligations in a compliance year, the supplier must make an ACP for the shortfall.[10] The ACP serves as both a penalty for noncompliance with REC requirements and as an alternative to purchasing RECs when specific renewable sources are scarce. The ACP varies for shortfalls from Tier 1 sources (excluding solar and geothermal), solar energy, geothermal systems, and Tier 2 sources.[11] ACPs are paid into the Strategic Energy Investment Fund (SEIF), administered by the Maryland Energy Administration, and generally must be used to provide grants and loans to support the creation of new Tier 1 sources in specified communities.[12]

Under § 7-712 of the Public Utilities Article, PSC must submit a report on the RPS for each compliance year. The report must cover the implementation of the RPS, the availability of Tier 1 resources, projects supported by SEIF, and additional pertinent information. **Exhibit 2** provides a summary of annual RPS compliance costs and average REC prices in recent years.

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[8] *See* § 7-709.1 of the Public Utilities Article.

[9] RECs may also be purchased at fixed or pre-established prices as determined in a contract between private parties; the general distinction is that OREC prices are established by PSC order. Under Chapter 431 of 2024, Round 1 offshore wind projects may seek approval from the Public Service Commission to amend previously approved projects to increase the maximum amount of ORECs sold. Chapter 431 also authorizes Round 2 offshore wind projects to seek approval to revise a previously approved project to adjust, among other things, OREC pricing.

[10] *See* § 7-705 of the Public Utilities Article.

[11] There is also a separate ACP for industrial process load shortfalls from Tier 1 sources. *See* § 7-705 of the Public Utilities Article.

[12] *See* § 9-20B-05 of the State Government Article.

Exhibit 2
RPS Compliance Costs and REC Prices
2017-2022

	2017	2018	2019	2020	2021	2022
Compliance Costs ($ Millions)						
Tier 1 Nonsolar RECs	$50.0	$56.4	$79.3	$99.8	$187.3	$246.5
Tier 1 SRECs	21.3	27.4	55.2	122.9	144.4	101.4
Tier 2 RECs	0.7	1.0	0.06	0.4	1.0	4.4
ACPs	0.1	0.1	7.7	0.1	77.1	86.6
Total	**$72.1**	**$84.9**	**$142.3**	**$223.2**	**$409.8**	**$438.8**
Average REC Price ($)						
Tier 1 Nonsolar	$7.14	$6.54	$7.77	$8.24	$14.36	$17.80
Tier 1 Solar	38.18	31.91	47.26	66.10	72.59	57.80
Tier 2	0.48	0.66	1.05	1.06	6.45	7.42

ACP: alternative compliance payment
REC: renewable energy credit
RPS: Renewable Energy Portfolio Standard
SREC: solar renewable energy credit

Note: Numbers may not sum to total due to rounding. The vast majority of ACPs in 2021 and 2022 ($76.9 million and $85.9 million, respectively) were due to a shortfall of SRECs.

Source: Public Service Commission

Major Legislative Changes

The State RPS has undergone several rounds of significant changes since its creation in 2004 – notably to alter source eligibility, establish carve-outs, increase overall percentage requirements, and adjust ACPs. **Exhibit 3** summarizes the most significant changes by chapter law and year. Additional visualizations of the RPS and changes to its components over time are included in **Appendix 1.**

Exhibit 3
History of Major Legislative Changes to the Renewable Energy Portfolio Standard and Alternative Compliance Payments
Current Through 2024 Legislative Session

Year	Chapter(s)	Summary
2004	Chapters 487 and 488	RPS established. Percentage requirement set at 3.5% in 2006 (1.0% from Tier 1 and 2.5% from Tier 2), increasing to 7.5% from Tier 1 in 2019 and later (Tier 2 originally terminated after 2018). ACP established and set at $20 for each Tier 1 MWh of shortfall and $15 for each Tier 2 MWh of shortfall. Separate ACP established for industrial process load shortfalls from Tier 1, set at $8/MWh in 2006, decreasing to $2/MWh in 2017 and later.
2007	Chapters 119 and 120	Established requirement that a percentage of Tier 1 electricity under the RPS be derived from solar energy (solar carve-out); carve-out set at 0.005% in 2008, increasing to 2.0% in 2022 and later. Increased percentage of electricity required to be derived from Tier 1 renewable sources under the RPS to 9.5% in 2022 and later. ACP established for solar carve-out and set at $450/MWh of shortfall in 2008, decreasing to $50/MWh of shortfall in 2023 and later.
2008	Chapters 125 and 126	Increased the Tier 1 RPS, beginning with 5% in 2011, increasing to 20% in 2022. These percentages include the 2% solar carve-out. Revised geographic eligibility of facilities eligible to generate RECs. Increased Tier 1 ACP to $40/MWh.
	Chapters 135 and 136	Defined poultry litter-to-energy as a Tier 1, rather than a Tier 2, renewable source. The poultry litter-to-energy source must be connected with the electric distribution grid serving Maryland to be eligible for meeting the RPS.

Year	Chapter(s)	Summary
2010	Chapter 494	Increased solar carve-out for years 2011-2016, beginning with 0.05% in 2011, increasing to 0.5% in 2016. Increased Solar ACP for years 2011-2016, beginning with $400/MWh of shortfall in 2011, decreasing to $350/MWh of shortfall in 2016.
2011	Chapters 407 and 408	Defined solar water heating systems as Tier 1 sources under the RPS; energy from these systems qualifies for the solar carve-out.
	Chapter 519	Defined waste-to-energy as a Tier 1, rather than Tier 2, renewable source. Also defined refuse-derived fuel as a Tier 1 source. Both sources must be connected with the electric distribution grid serving Maryland to be eligible to meet the RPS.
2012	Chapters 556 and 557	Added geothermal heating and cooling systems as a Tier 1 source. Modified eligibility of geothermal energy to meet the RPS to require that the source be connected with the electric distribution grid serving Maryland.
	Chapters 583 and 584	Accelerated RPS solar carve-out, beginning with 0.25% in 2013 and increasing to 2% in 2020.
	Chapter 635	Added thermal energy from biomass systems that use animal waste, food waste, or qualifying biomass as a Tier 1 source.
2013	Chapter 3	Established requirement that, beginning in 2017, 2.5% of Tier 1 electricity in the RPS be derived from offshore wind energy (offshore wind carve-out). Established ORECs and an ACP for shortfalls from the offshore wind carve-out.
2017	Chapters 1 and 2	Increased percentage of electricity required to be derived from Tier 1 renewable sources and the solar carve-out to 25% and 2.5%, respectively, by 2020.

Year	Chapter(s)	Summary
		Decreased Tier 1 ACP to $37.50/MWh of shortfall in 2017. Decreased solar ACP for 2017, 2018, 2020, and 2022 but increased to $60/MWh of shortfall for 2023.
2019	Chapter 757	Increased the distance off the coast of the State that a Tier 1 or Tier 2 renewable source may be located to qualify for a renewable energy credit. Established a "Round 2" process requiring ORECs from additional offshore wind capacity, beginning with 400 MW in 2026, 800 MW in 2028, and 1,200 MW in 2030 and later. Increased percentage of electricity required to be derived from Tier 1 renewable sources to 50% by 2030, including increasing the solar carve-out to 14.5% and requiring at least 1,200 MW from Round 2 offshore wind projects. Extended Tier 2 RPS requirement of 2.5% to apply in 2019 and 2020. Set solar carve-out of 2.5% in 2020 and later for electric cooperatives' RPS. Decreased Tier 1 ACP to $22.35/MWh in 2030 and beyond. Decreased solar ACP to $22.35/MWh in 2030 and later.
2021	Chapter 164	Established requirement that percentage of Tier 1 electricity under the RPS be derived from post-2022 geothermal systems (geothermal carve-out); carve-out set at 0.05% in 2023, increasing to 1% in 2028 and later. Certain portion of geothermal carve-out must be derived from systems installed at low- and moderate-income housing or institutions that serve low- and moderate-income individuals and families. ACP established for geothermal carve-out set at $100/MWh in 2023, decreasing to $65/MWh in 2028 and later.

Year	Chapter(s)	Summary
	Chapters 174 and 175	Limited Tier 1 RPS percentage requirements for municipal electric utilities to 20.4% in 2021 and later, with carve-outs for solar and offshore wind.
	Chapter 673	Decreased percentage of electricity required to be derived from Tier 1 renewable sources and the solar carve-out beginning in 2022 through 2029, but maintained same Tier 1 and solar carve-outs for 2030 and later. Permanently extended Tier 2 beginning in 2021. Increased solar ACP to $60/MWh in 2023, decreasing to $22.50/MWh in 2030 and later. Removed black liquor, or any product derived from black liquor, from Tier 1 beginning with the 2022 compliance year.
	Chapter 691	Added raw or treated wastewater used as a heat source or sink for a heating or cooling system as a Tier 1 source. To be eligible for inclusion in the RPS, the system must be connected with the electric distribution grid serving Maryland or process wastewater from Maryland residents.
2022	Chapter 578	Altered OREC collection mechanism under the RPS such that electric companies, instead of electricity suppliers, must purchase ORECs to meet the requirements of the RPS.
2024	Chapter 431	Requires PSC to open a revised Round 2 offshore wind project proceeding that is limited to evaluating revised project schedules, sizes, or pricing, including OREC pricing, for a previously approved Round 2 project. Allows any Round 1 offshore wind project to seek PSC approval to amend its previously approved Round 1 project order to increase the maximum amount of ORECs and modify its project schedule.
	Chapter 537	Establishes that electricity may not be marketed as "green power" in the State unless the electricity exceeds certain RPS requirements and PSC approves the price of the electricity being marketed as green power, subject to specified requirements.

Year	Chapter(s)	Summary
	Chapter 595	Establishes "certified SRECs" that have a compliance value of 150% of noncertified SRECs. Extends the duration of all RECs from 3 years to 5 years. Authorizes the Maryland Energy Administration to use up to 10% of solar ACP revenues for the administration of SEIF. Requires, through June 30, 2027, at least 20% of solar ACP revenues received by SEIF to be used to provide grants to support the installation of new solar energy generating systems under the Customer-Sited Solar Program established under Chapter 595.

ACP: alternative compliance payment
MWh: megawatt-hour
OREC: offshore wind renewable energy credit
PSC: Public Service Commission
REC: renewable energy credit
RPS: Renewable Energy Portfolio Standard
SEIF: Strategic Energy Investment Fund
SREC: solar renewable energy credit

Source: Department of Legislative Services

Recent State Initiatives with Implications for the Renewable Energy Portfolio Standard

In recent years the State has set multiple goals, requirements, and standards to reduce GHG emissions and increase the use and generation of clean energy, all of which rely on or impact the RPS. The legislature, many State agencies, and the Governor's Office have conducted studies and developed plans to achieve these goals, requirements, and standards. A summary of notable initiatives are discussed below.

Pathway to 100% Clean Energy Study

Chapter 757 of 2019, the most recent significant increase in overall RPS requirements, directed the Power Plant Research Program (PPRP) within the Department of Natural Resources to conduct a study on, among other things, the feasibility, costs, and benefits of increasing the RPS

to a goal of 100% renewable energy by 2040. The Act also directed PPRP to identify industries and communities that could be negatively impacted by a 100% RPS and to evaluate transition arrangements for affected workers and communities. In addition, PPRP studied what a 100% clean energy requirement would look like based on the Clean and Renewable Energy Standard legislation that was introduced, but not enacted, in the 2020 and 2021 legislative sessions.[13]

According to the Department of Natural Resources, a report on the results of the study are in the final approval process, though in May 2023 PPRP did release preliminary results for four scenarios that were modeled for the period from 2020 through 2040 ("forecast period"): (1) a base case/business as usual (BAU) scenario; (2) a 100% RPS without Calvert Cliffs nuclear facility scenario; (3) a 100% RPS with Calvert Cliffs scenario; and (4) a 100% clean energy scenario. The preliminary results identified the following main findings.

- In all scenarios, Maryland becomes a power exporter, substantial amounts of renewables are added, and the levels of most individual air pollutants decline rapidly but increase toward the end of the forecast period (though not to the levels present at the beginning of the forecast period).

- There was little difference in capacity and generation in Maryland between the BAU scenario and a 100% RPS without Calvert Cliffs scenario.

- Keeping Calvert Cliffs online would result in slightly less natural gas capacity in Maryland but a more significant reduction of natural gas capacity in PJM.

- The 100% clean energy scenario results in additional advanced nuclear and carbon capture storage capacity and generation.

Overall, PPRP stated that the "results point to a need for "clean firm" capacity, especially in the latter half of the forecast period, to meet Maryland GHG emission reduction goals." Thus, according to PPRP, the State will likely need to consider utilizing non-weather-dependent, always-available, zero-emissions energy, or "clean firm" energy, to meet the State's GHG emissions reduction goals.[14]

Maryland's Climate Pollution Reduction Plan

In 2022, the Maryland General Assembly passed the Climate Solutions Now Act (CSNA)[15] that, among other things, requires the State to (1) reduce statewide GHG emissions by 60% from 2006 levels by 2031 and (2) achieve net-zero GHG emissions by 2045. The CSNA also required the Maryland Department of the Environment (MDE) to develop a strategy to achieve the 2031

[13] *See* Senate Bill 265/House Bill 363 of 2020 and House Bill 1362 of 2021.

[14] Examples of "clean firm" energy include geothermal, hydrogen combustion, nuclear, and natural gas with carbon capture and sequestration.

[15] *See* Chapter 38 of 2022.

requirement and set the State on a path toward achieving the 2045 requirement. In December 2023 MDE published the strategy, entitled *Maryland's Climate Pollution Reduction Plan* (Plan). The Plan details current and new policies that, when taken together, are anticipated to achieve the 2031 GHG emissions reduction requirement. Notable new policy proposals include:

- creating a clean economy standard to direct the State to provide incentives, set sectoral standards, and set economywide standards to reduce GHG emissions;

- creating a clean power standard to require 100% of the electricity consumed in the State to be generated by clean and renewable sources of energy by 2035;

- modifying the definition of "Tier 1 renewable source" for purposes of the RPS to align with definitions in the proposed clean power standard, including eliminating the inclusion of waste-to-energy as a Tier 1 renewable source;

- creating a zero-emission heating equipment standard to require new space and water heating systems to produce zero direct emissions; and

- creating a clean heat standard to require that clean heat measures be deployed in buildings at the pace required to achieve the State's GHG reduction requirements.[16]

Executive Order on Implementing Maryland's Climate Pollution Reduction Plan

To help facilitate implementation of the Plan, in June 2024 Governor Wes Moore issued Executive Order (EO) 01.01.2024.19. Among other things, the EO requires:

- MDE to propose a zero-emission heating equipment standard regulation to phase-in zero-emissions standards for heating equipment and a clean heat standard regulation to expand the RPS to thermal energy systems;[17] and

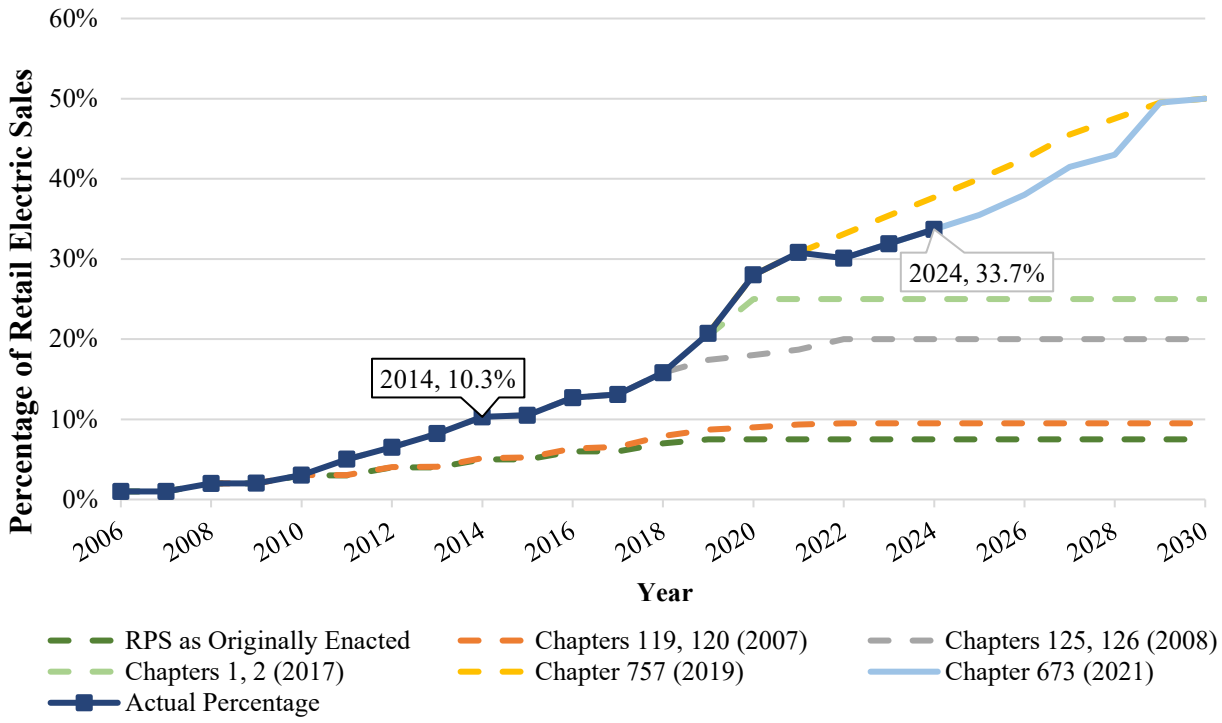
- the Maryland Energy Administration to establish a framework for a clean energy standard to achieve 100% clean electricity in Maryland by 2035.

[16] *See Maryland's Climate Pollution Reduction Plan* for a more detailed and thorough summary of the proposed policy changes.

[17] While the current RPS is primarily structured for *electricity* producing technologies, several thermal technologies are incorporated through a conversion factor: geothermal, thermal biomass systems, wastewater heating and cooling systems, and solar water heating systems. Accordingly, energy generated from these sources is eligible for inclusion in the RPS if the requirements in § 7-704 of the Public Utilities Article are met.

Appendix 1

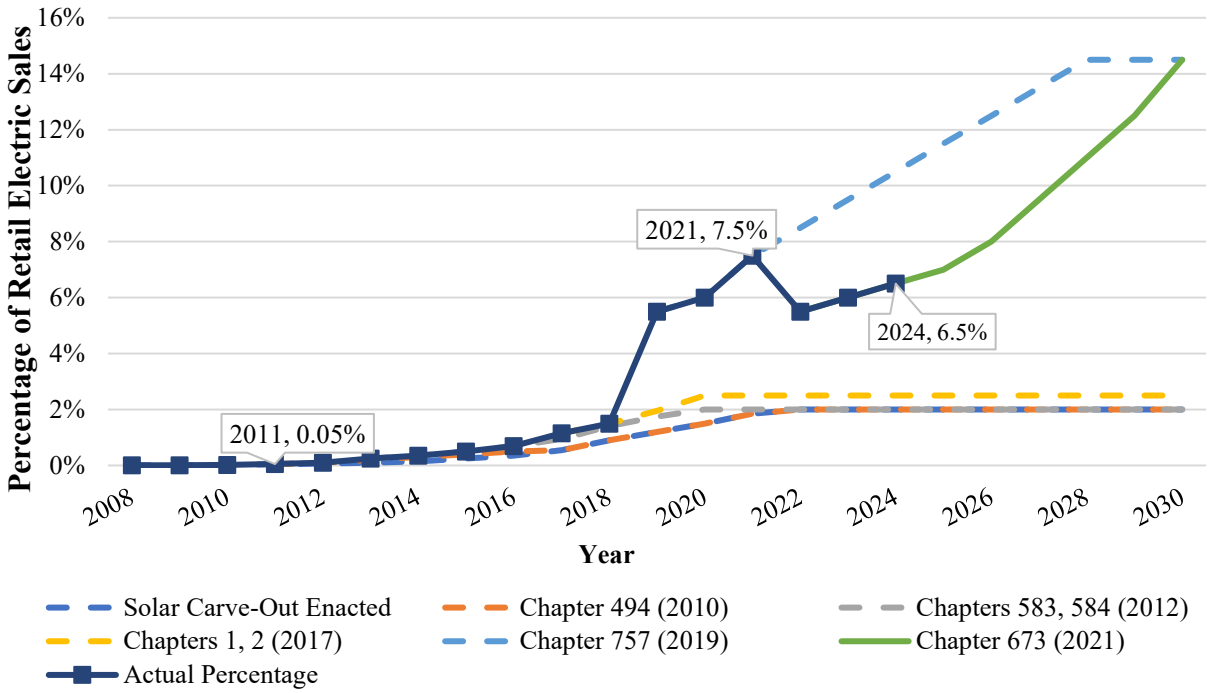
Exhibit 1
Statutory Changes in Tier 1 Source Requirement Under the RPS Compared to Actual Tier 1 Source Requirement by Year



RPS: renewable energy portfolio standard

Source: Department of Legislative Services

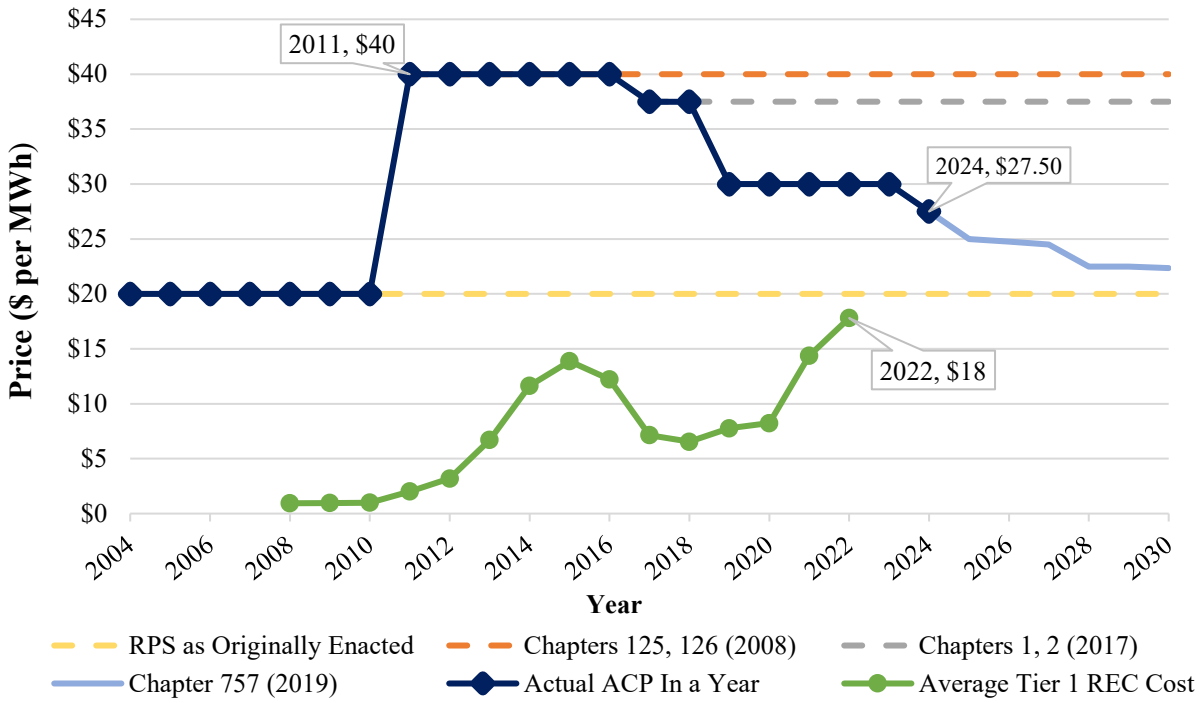
Exhibit 2
Statutory Changes in Solar Carve-Out Requirement Under the RPS Compared to Actual Solar Energy Requirement by Year



RPS: renewable energy portfolio standard

Source: Department of Legislative Services

Exhibit 3
Statutory Changes in Tier 1 ACP Price Under the RPS Compared to Actual ACP Price by Year and Average Tier 1 REC Cost by Year



ACP: alternative compliance payment

REC: renewable energy credit

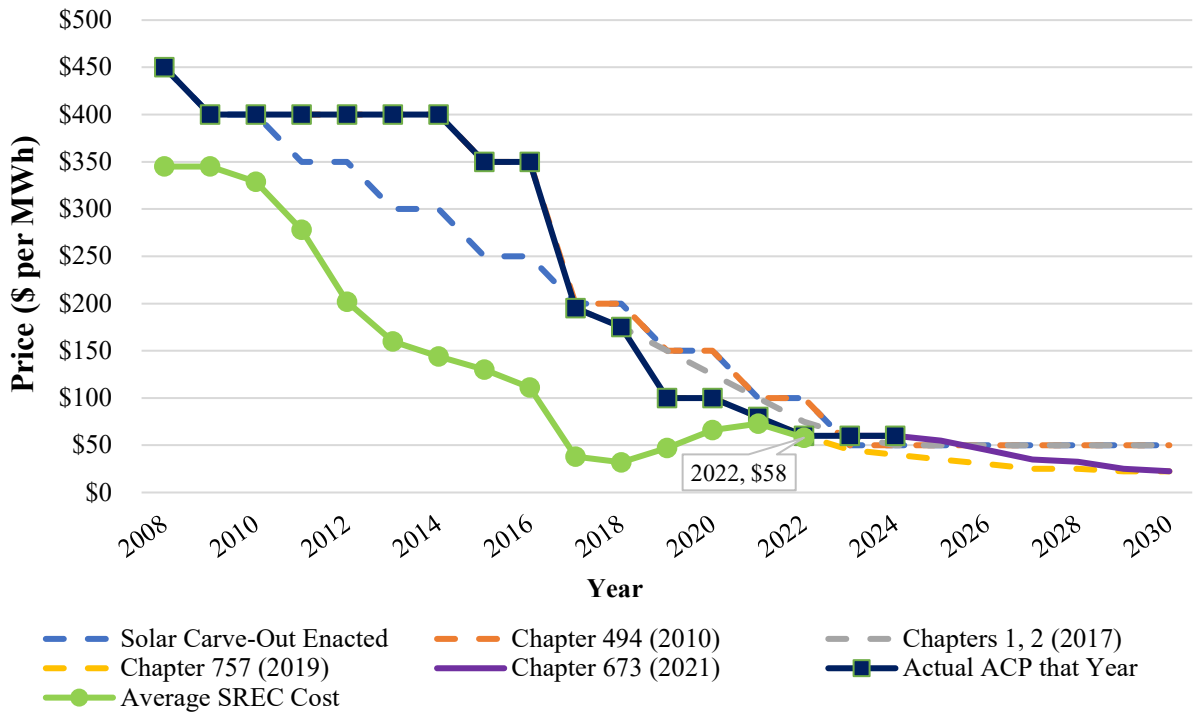
RPS: renewable energy portfolio standard

Note: Costs reflect the most recent publicly available data from the Public Service Commission.

Source: Public Service Commission; Department of Legislative Services

Exhibit 4

Statutory Changes in Solar Energy ACP Price Under the RPS Compared to Actual ACP Price by Year and Average SREC Cost by Year



ACP: alternative compliance payment

RPS: renewable energy portfolio standard

SREC: solar renewable energy credits

Note: Costs reflect the most recent publicly available data from the Public Service Commission.

Source: Public Service Commission; Department of Legislative Services