Department of Legislative Services

Maryland General Assembly
2015 Session

FISCAL AND POLICY NOTE

Senate Bill 154 (Senator Middleton)
Finance

Renewable Energy Portfolio Standard - Thermal Energy

This bill establishes a thermal tier and an alternative compliance payment (ACP) schedule in the State's Renewable Energy Portfolio Standard (RPS), establishes and defines thermal renewable energy credits (TRECs), moves specified Tier 1 eligible technologies to the thermal tier, adds "woody biomass" as an eligible thermal energy source, and makes various conforming changes to incorporate the thermal tier and associated TRECs into the existing RPS. The overall RPS percentage requirements are increased from 20% by 2022 to 22% by 2025. The Public Service Commission (PSC) must adopt implementing regulations by March 1, 2016.

Fiscal Summary

State Effect: PSC can implement the bill with existing budgeted resources. State expenditures (all funds) increase minimally beginning in FY 2016 due to higher electricity prices. ACPs established under the bill are not anticipated to materially affect special fund revenues for the Strategic Energy Investment Fund.

Local Effect: Minimal.

Small Business Effect: Meaningful.

Analysis

Bill Summary: The State RPS is modified by consolidating thermal energy sources and separating them from electric energy sources. A thermal tier structure is created, which is analogous to the current Tier 1 and Tier 2 (predominantly electric) structure. Thermal energy produced from geothermal heating and cooling systems and from animal manure

sources is moved from Tier 1 to the thermal tier, and "woody biomass" is added as an eligible thermal energy source.

Generally, to qualify for the thermal RPS, the thermal energy must be (1) generated at a system or facility that did not exist as of January 1, 2015 and (2) delivered through direct heat, steam, hot water, or other thermal form to an end-user in Maryland for a useful thermal application. However, the owner of a geothermal heating and cooling system or an animal manure biomass system that was registered with PSC to receive RECs eligible for inclusion in RPS as a Tier 1 source before October 1, 2015, may choose to either remain registered as a Tier 1 source or reregister as a thermal tier source.

Percentage requirements are established for the thermal tier beginning in 2016. The percentage requirement increases from 0.1% of qualifying electricity sales in 2016 to 2.0% in 2025 and later. **Exhibit 1** summarizes the RPS percentage requirements and ACPs under the bill. No changes are made to the existing Tier 1 and Tier 2 percentage requirements or ACPs.

Exhibit 1
Thermal Energy Requirements – Annual Specifications Under the Bill

Compliance Year	Percentage of Retail Sales	Alternative Compliance Payments
2016	0.10%	$30.00
2017	0.25%	27.50
2018	0.38%	25.00
2019	0.50%	22.50
2020	0.75%	20.00
2021	1.00%	20.00
2022	1.20%	20.00
2023	1.40%	20.00
2024	1.70%	20.00
2025+	2.00%	20.00

Note: ACPs are expressed in $/TREC equivalents.

New Technology Added

Thermal energy produced from "woody biomass" (separately defined from qualified biomass) is also added to the thermal tier, and must be used in a system that (1) achieves specified net efficiencies (depending on the moisture content of the fuel) and (2) is in compliance with relevant State and federal laws and regulations. The system receives TRECs only for the portion of the thermal energy generated by woody biomass.

"Woody biomass" means (1) clean and untreated wood such as brush, stumps, lumber ends or trimmings, wood pallets, bark, wood chips or pellets, shavings, sawdust, or slash; (2) an agricultural crop; (3) biogas produced from clean and untreated wood or agricultural crops; or (4) liquid biofuel produced from clean and untreated wood or agricultural crops. It does not include (1) materials derived wholly or partly from construction and demolition debris or (2) liquids derived from mill residue.

PSC must adopt regulations for the metering, verification, and reporting of the output of woody biomass systems, subject to specified conditions.

Incorporation of TRECs in Trading System by PSC

As it must under current law for RECs, PSC must establish and maintain a market-based renewable energy trading system to facilitate the transfer and creation of TRECs. The system must include a registry of pertinent information regarding all available TRECs and TREC transactions among electricity suppliers in the State, including the creation, application, number, and price paid for the sale or transfer of TRECs. The registry must provide current information to electricity suppliers and the public on the status of TRECs created, sold, or transferred in the State.

By March 1 of each year, PSC must publish on its website (1) whether sufficient TRECs are available on the electronic system to fulfill the annual percentage obligation and (2) if insufficient TRECS are available, a reduced obligation that adjusts that year's percentage obligation proportionally based on the number of TRECs available on the electronic system compared to the number of TRECs electricity suppliers would have been required to purchase under the full obligation, rounded down to the closest whole number.

Alternative Compliance Payments

Generally, by April 1 of each year, if there are sufficient TRECs available to meet the entire thermal obligation, electricity suppliers must retire sufficient TRECs or pay an ACP for any shortfall. However, as discussed above, if insufficient TRECs are generated and available for purchase to meet the entire thermal obligation, PSC must adjust each supplier's TREC obligation based on the proportion of TRECs that have been generated.

Each supplier must then purchase TRECs or pay an ACP up to this adjusted RPS obligation. An electricity supplier is not required to comply with the TREC obligation if there are no TRECs available on March 1 through the electronic system.

Current Law: Maryland's RPS requires that renewable sources generate specified percentages of Maryland's electricity supply each year, increasing to 20% by 2022, including 2% from solar energy. Each electricity supplier must submit renewable energy credits (RECs) equal to a percentage specified in statute each year or pay an ACP equivalent to the supplier's shortfall. **Exhibit 2** details the requirements and associated ACPs.

Exhibit 2
Maryland's Renewable Energy Portfolio Standard – Annual Specifications
Current Law

	Percentage of Retail Sales				Alternative Compliance Payments		
Compliance Year	Tier 1 Total*	Tier 1 Solar*	Tier 1 Offshore Wind*	Tier 2	Tier 1	Tier 1 Solar	Tier 2
2010	3.025%	0.025%		2.50%	$20	$400	$15
2011	5.00%	0.05%		2.50%	40	400	15
2012	6.50%	0.10%		2.50%	40	400	15
2013	8.20%	0.25%		2.50%	40	400	15
2014	10.30%	0.35%		2.50%	40	400	15
2015	10.50%	0.50%		2.50%	40	350	15
2016	12.70%	0.70%		2.50%	40	350	15
2017	13.10%	0.95%	≤2.50%	2.50%	40	200	15
2018	15.80%	1.40%	≤2.50%	2.50%	40	200	15
2019	17.40%	1.75%	≤2.50%	-	40	150	-
2020	18.00%	2.00%	≤2.50%	-	40	150	-
2021	18.70%	2.00%	≤2.50%	-	40	100	-
2022	20.00%	2.00%	≤2.50%	-	40	100	-
2023+	20.00%	2.00%	≤2.50%	-	40	50	-

*Note: Tier 1 Solar and Offshore Wind requirements are part of the Tier 1 Total percentage requirement. ACPs are expressed as $/megawatt-hour, or $/REC, equivalents.

Source: Department of Legislative Services

For additional information on Maryland's RPS, see the **Appendix – Maryland's Renewable Energy Portfolio Standard**.

Background: The Department of Legislative Services (DLS) notes that this bill is not a "carve-out" for thermal energy like the existing carve-outs for solar and offshore wind. Both solar and offshore wind carve-outs require a portion *of the existing Tier 1* percentage requirement to be from solar or offshore wind energy. The bill establishes a new tier for thermal energy, while leaving the existing Tier 1 and Tier 2 percentage requirements unchanged. As a result, the bill increases the total percentage requirements for RPS compliance in each year beginning in 2016.

Recent legislation has incorporated solar water heating, geothermal, and thermal biomass technologies into RPS. The issue, however, is that thermal technologies were incorporated into an RPS designed for electricity technologies. To address this issue, Chapters 322 and 323 of 2013 established the Maryland Thermal Renewable Energy Credit Task Force to study and make recommendations on the incorporation of thermal energy into the State's RPS.

The task force was required to report its findings and recommendations to the Governor and the General Assembly by December 31, 2013. The bill generally incorporates the recommendations of the task force (as did Senate Bill 530/House Bill 931 of 2014 – both failed). However, the bill creates only one thermal tier, whereas the task force recommended two thermal tiers. A copy of the full report can be found at: http://dlslibrary.state.md.us/publications/exec/mea/sb797ch322hb1084ch323_2013.pdf.

State Fiscal Effect: PSC can implement the bill with existing budgeted resources. The incremental cost associated with the bill is absorbed by all electric customers in the State. As an electric customer, State agencies and the University System of Maryland used approximately 1.56 million megawatt-hours (MWh) of electricity in 2012, at a cost of $138.5 million. An electric rate increase of a magnitude anticipated under the bill increases State expenditures (all funds) minimally beginning in fiscal 2016 due to higher electricity prices. The potential effect on electricity prices, borne by all customers, is discussed below.

Generally, the bill removes current technologies from Tier 1 and moves them to a thermal tier. The effect of this is two-fold: (1) new Tier 1 RECs are required to fill the production void left by the technologies moved to the thermal tier; and (2) new TRECs are required to meet the thermal tier obligation.

First, the cost of replacing RECs created by Tier 1 sources moving to the thermal tier is the difference in price between those RECs created by the affected technologies and the price of RECs purchased to replace them. This portion of the bill's cost is likely minimal

(and could potentially be negative) but cannot be reliably estimated at this time and is not included in the cost estimates below.

The second cost of the bill is that of purchasing TRECs. The total cost depends on the quantity and price of TRECs produced. For example, under one energy use assumption, 63,637 TRECs are required for 2016 compliance. The highest possible financial impact occurs if that exact number of TRECs is produced and traded at the 2016 ACP of $30/TREC.

Under these assumptions, the total cost of TRECs is $1.9 million in 2016. When averaged out over anticipated eligible State energy sales in 2016 of approximately 63.6 million MWh, this equates to an increase of $0.03/MWh. Currently, delivered energy prices in the State average approximately $120/MWh, so this represents an increase of approximately 0.025%.

These results are summarized for compliance years 2016 through 2025 for various TREC prices, expressed as a percent of ACP, in **Exhibit 3**. DLS notes that this assumes no replacement cost for Tier 1 RECs. Further, as suppliers are not obligated to pay ACPs for TREC shortfalls, if fewer TRECs are produced, the compliance cost is less.

Exhibit 3
Annual Compliance Cost, by TREC Prices as Percent of ACP
Calendar 2016-2025+

			TREC Price							
			25% of ACP		50% of ACP		75% of ACP		100% of ACP	
Year	Retail Electric Sales (MWh)	TRECs	Cost ($)	$/MWh	Cost ($)	$/MWh	Cost ($)	$/MWh	Cost ($)	$/MWh
2016	63,637,209	63,637	$477,279	**$0.01**	$954,558	**$0.02**	$1,431,837	**$0.02**	$1,909,116	**$0.03**
2017	64,064,804	160,162	1,101,114	**0.02**	2,202,228	**0.03**	3,303,341	**0.05**	4,404,455	**0.07**
2018	64,885,180	246,564	1,541,023	**0.02**	3,082,046	**0.05**	4,623,069	**0.07**	6,164,092	**0.10**
2019	65,453,309	327,267	1,840,874	**0.03**	3,681,749	**0.06**	5,522,623	**0.08**	7,363,497	**0.11**
2020	65,997,240	494,979	2,474,897	**0.04**	4,949,793	**0.08**	7,424,690	**0.11**	9,899,586	**0.15**
2021	66,519,872	665,199	3,325,994	**0.05**	6,651,987	**0.10**	9,977,981	**0.15**	13,303,974	**0.20**
2022	67,122,963	805,476	4,027,378	**0.06**	8,054,756	**0.12**	12,082,133	**0.18**	16,109,511	**0.24**
2023	67,829,337	949,611	4,748,054	**0.07**	9,496,107	**0.14**	14,244,161	**0.21**	18,992,214	**0.28**
2024	68,438,884	1,163,461	5,817,305	**0.09**	11,634,610	**0.17**	17,451,915	**0.26**	23,269,221	**0.34**
2025+	69,048,573	1,380,971	6,904,857	**0.10**	13,809,715	**0.20**	20,714,572	**0.30**	27,619,429	**0.40**

MWh = Megawatt-hour

Note: Numbers may not sum to total due to rounding.

Source: Public Service Commission; Department of Legislative Services

Small Business Effect: As discussed above, small businesses incur higher electricity prices under the bill. However, the bill also creates demand for thermal energy technology installations similar to the solar carve-out in the current RPS. The Maryland Energy Administration advises that many thermal systems are small-scale and therefore require more jobs per unit of installed capacity than large-scale, centralized systems. Small businesses in this industry benefit from increased demand to design, build, install, and maintain thermal energy systems under the bill. Other small businesses may benefit from processing the fuel needed for woody biomass systems.

Additional Information

Prior Introductions: SB 530 of 2014, a similar bill, received a hearing in the Senate Finance Committee, but no further action was taken. Its cross file, HB 931, received an unfavorable report from the House Economic Matters Committee.

Cross File: None.

Information Source(s): Public Service Commission, Maryland Energy Administration, Maryland Department of Agriculture, Office of People's Counsel, Department of Legislative Services

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Appendix – Maryland's Renewable Energy Portfolio Standard

Maryland's Renewable Energy Portfolio Standard (RPS) was enacted in 2004 to facilitate a gradual transition to renewable sources of energy. Maryland's RPS operates on a two-tiered system with carve-outs for solar energy and offshore wind energy and corresponding renewable energy credits (RECs) for each tier. Electric companies (utilities) and other electricity suppliers must submit RECs equal to a percentage specified in statute each year or else pay an alternative compliance payment (ACP) equivalent to their shortfall. Over the past few years, the requirements have been met almost entirely through RECs, with negligible reliance on ACPs. For example, the combined ACPs over 2012 and 2013 were less than $8,000 out of a total compliance cost of $81.3 million. The Maryland Energy Administration must use ACPs to support new renewable energy sources.

The percentage requirements gradually increase to a minimum of 20%, including 2% from solar sources, by 2022. The Tier 2 requirement remains constant at 2.5% each year until ending after 2018. In 2015, the requirements are 10.5% for Tier 1 renewable sources, including at least 0.5% from solar energy, and 2.5% from Tier 2 renewable sources.

Generally, a REC is a tradable commodity equal to one megawatt-hour of electricity generated or obtained from a renewable energy generation resource. In other words, a REC represents the "generation attributes" of renewable energy – the lack of carbon emissions, its renewable nature, etc. A REC has a three-year life during which it may be transferred, sold, or redeemed. RECs are classified as Tier 1 or Tier 2, depending on the energy source. Solar and offshore wind are accounted for separately but are considered part of Tier 1. REC generators and electricity suppliers are allowed to trade RECs using a Public Service Commission-approved system known as the Generation Attributes Tracking System, a trading platform designed and operated by PJM Environmental Information Services, Inc. that tracks the ownership and trading of RECs.

Tier 1 sources include wind (onshore and offshore); qualifying biomass; methane from anaerobic decomposition of organic materials in a landfill or wastewater treatment plant; geothermal; ocean, including energy from waves, tides, currents, and thermal differences; a fuel cell that produces electricity from specified Tier 1 renewable sources; a small hydroelectric plant of less than 30 megawatts; poultry litter-to-energy; waste-to-energy; refuse-derived fuel; and thermal energy from a thermal biomass system. Tier 1 Solar sources include photovoltaic cells and residential solar water heating systems commissioned in fiscal 2012 or later. Following the transfer of several sources to Tier 1, Tier 2 includes only large hydroelectric power plants.

RPS Compliance

For the 2013 compliance year, (the most recent for which data is available) electricity suppliers retired approximately 6.5 million RECs at a cost of $56.8 million. Of that amount, the Tier 1 Nonsolar cost was $32.7 million, the Tier 1 Solar cost was $21.4 million, and the Tier 2 cost was $2.8 million. The total cost of RPS compliance has increased steadily since 2009, as shown in **Exhibit 1**.

Exhibit 1
Cost of RECs for RPS Compliance
($ in Millions)

	2009	2010	2011	2012	2013
Tier 1 Nonsolar	$1.3	$1.9	$6.2	$12.5	$32.7
Tier 1 Solar	1.1	5.1	7.8	11.3	21.4
Tier 2	0.6	0.6	0.6	0.7	2.8
Total	**$3.1**	**$7.6**	**$14.7**	**$24.5**	**$56.8**

Note: Numbers may not sum to total due to rounding.

Source: Public Service Commission