

Department of Legislative Services
 Maryland General Assembly
 2014 Session

FISCAL AND POLICY NOTE

House Bill 931 (Delegate Stein, *et al.*)
 Economic Matters

Renewable Energy Portfolio Standard - Thermal Energy

This bill establishes two thermal tiers in the State’s Renewable Energy Portfolio Standard (RPS) and an alternative compliance payment (ACP) schedule for each thermal tier, establishes and defines thermal renewable energy credits (TREC)s, moves specified Tier 1 and Tier 2 eligible technologies to the thermal tiers, adds “woody biomass” as an eligible thermal energy source, and makes various conforming changes to incorporate the thermal tiers and associated TREC)s into the existing RPS.

Fiscal Summary

State Effect: Special fund expenditures from the Public Utility Regulation Fund increase by \$32,100 in FY 2015 for a *half-time* regulatory economist for the Public Service Commission (PSC) to implement the bill. Future year expenditures reflect annualization and the elimination of one-time costs. Special fund revenues increase correspondingly from assessments imposed on public service companies. State expenditures (all funds) increase minimally beginning in FY 2015 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 (SEIF).

(in dollars)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
SF Revenue	\$32,100	\$38,000	\$39,700	\$41,500	\$43,300
SF Expenditure	\$32,100	\$38,000	\$39,700	\$41,500	\$43,300
GF/SF/FF Exp.	-	-	-	-	-
Net Effect	\$0	\$0	\$0	\$0	\$0

Note:() = decrease; GF = general funds; FF = federal funds; SF = special funds; - = indeterminate effect

Local Effect: Local expenditures increase minimally beginning in FY 2015 as electricity suppliers pass on the cost of assessments to all customer classes. Revenues are not materially affected.

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 1 and Thermal Tier 2 structure is created, which is analogous to the current Tier 1 and Tier 2 (predominantly electric) structure. Thermal energy must be delivered to an end-user in Maryland to qualify for the thermal RPS, and Thermal Tier 1 resources must be placed into service after January 1, 2015. “Tier 1 thermal renewable source” means one or more of the following energy systems used for the generation of thermal energy: (1) geothermal heating and cooling systems; (2) animal manure biomass systems; and (3) woody biomass systems. “Tier 2 thermal renewable source” means a system that generates thermal energy using qualified biomass. Eligible woody biomass and qualified biomass systems must receive TRECs only for the portion of the thermal energy generated by the woody biomass or qualified biomass.

Percentage obligations are established for Thermal Tier 1 and Thermal Tier 2 beginning in 2015. For Thermal Tier 1, the obligation increases from 0.10% of qualifying electricity sales in 2015 to 2.0% in 2024 and later. For Thermal Tier 2, the obligation is set at 3.0% of qualifying electricity sales from 2015 to 2019. **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	<u>Percentage of Retail Sales</u>		<u>Alternative Compliance Payments</u>	
	<u>Tier 1 Thermal</u>	<u>Tier 2 Thermal</u>	<u>Tier 1 Thermal</u>	<u>Tier 2 Thermal</u>
2015	0.10%	3.0%	\$30.00	\$2.50
2016	0.25%	3.0%	27.50	2.00
2017	0.38%	3.0%	25.00	1.50
2018	0.50%	3.0%	22.50	1.00
2019	0.75%	3.0%	20.00	0.50
2020	1.00%	-	20.00	-
2021	1.20%	-	20.00	-
2022	1.40%	-	20.00	-
2023	1.70%	-	20.00	-
2024+	2.00%	-	20.00	-

Note: ACPs are expressed in \$/MWh, or \$/TREC, equivalents.

Energy Sources Transferred Between RPS Tiers

Thermal Tier 1 and Thermal Tier 2 sources are defined above; however, some of those energy sources are transferred from the current Tier 1 and Tier 2. The energy sources transferred between RPS tiers are as follows:

- Thermal energy produced from geothermal sources and from animal manure sources is moved from Tier 1 to Thermal Tier 1.
- Thermal energy produced from existing qualified biomass facilities is moved to Thermal Tier 2.
- Electricity produced from “qualifying biomass” is removed from Tier 1; however, electricity produced from gas from anaerobic decomposition of animal waste or poultry waste is maintained as a Tier 1 source (previously this was part of the “qualified biomass” category).

The owner of a geothermal or 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, 2014, may choose to either remain registered as a Tier 1 source or reregister as a Thermal Tier 1 source.

New Technology Added

Thermal energy produced from “woody biomass” (separately defined from qualified biomass) is also added to Thermal Tier 1, and must be used in a system that achieves a net efficiency of 65% or higher (on an annual basis) as well as being in compliance with relevant State and federal laws and regulations. “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. A “woody biomass system” means a system that generates thermal energy using woody biomass.

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.

On or before 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.

The system currently used for trading RECs is the Generation Attributes Tracking System (GATS), which is a trading platform designed and operated by PJM Environmental Information Services, Inc, which tracks the ownership and trading of RECs.

Alternative Compliance Payments

In any year in which a TREC obligation exists, 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. The 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. Maryland's RPS operates on a two-tiered system with carve-outs for solar energy and offshore wind energy and corresponding RECs for each tier. Electricity suppliers must submit RECs equal to the percentage specified in statute each year or pay an ACP equivalent to the supplier's shortfall. Any ACPs made are paid into SEIF and used by the Maryland Energy Administration (MEA) to support new renewable energy sources. **Exhibit 2** details the requirements and associated ACPs.

Exhibit 2
Marland’s Renewable Energy Portfolio Standard – Annual Specifications

Compliance Year	Percentage of Retail Sales			Alternative Compliance Payments			
	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 \$/MWh, 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 two additional tiers 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 2015.

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 a Maryland Thermal Renewable Energy 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. A copy of the full report can be found on MEA's website at: <http://energy.maryland.gov/documents/TRECTaskForceReport-Filed-.pdf>.

State Fiscal Effect: PSC special fund expenditures increase by \$32,110 in fiscal 2015, which accounts for the bill's October 1, 2014 effective date. This estimate reflects the cost of hiring one regulatory economist *half-time* to implement the requirements of the bill. It includes a salary, fringe benefits, one-time start-up costs, and ongoing operating expenses.

Position	0.5
Salary and Fringe Benefits	\$25,872
Other Operating Expenses	<u>6,238</u>
Total FY 2015 PSC Expenditures	\$32,110

Future year expenditures reflect a full salary with annual increases and employee turnover as well as annual increases in ongoing operating expenses. Special fund revenues increase correspondingly from assessments imposed on public service companies.

The incremental cost associated with the bill will be 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 2015 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 Tier 2 and moves them to thermal tiers. The effect of this is two-fold: (1) new Tier 1 and Tier 2 RECs are required to fill the production void left by the technologies moved to the thermal tiers; and (2) new TRECs are required to meet the thermal tier requirements.

First, the cost of replacing the RECs created by Tier 1 sources moving to the thermal tiers 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 but cannot be reliably estimated at this time and is not included in the costs below.

The second cost of the bill is that of purchasing TRECs. The fiscal impact depends on the quantity and price of TRECs produced. For example, MEA projects that approximately 161,600 Tier 1 TRECs and 1.68 million Tier 2 TRECs are required for 2016 compliance. The highest possible financial impact occurs if exactly 161,600 Tier 1 TRECs and 1.68 million Tier 2 TRECs are produced and traded at their respective ACPs of \$27.50/TREC and \$0.20/TREC.

Under these assumptions, the total cost of TRECs is \$4.78 million in 2016. When averaged out over anticipated State energy sales in 2016 of approximately 64.6 million MWh, this equates to an increase of \$0.074/MWh. Currently, delivered energy prices in the State average approximately \$120/MWh, so this represents an increase of approximately 0.06%.

These results are summarized for compliance years 2015 through 2019 in **Exhibit 3**. DLS notes that this assumes no replacement cost for Tier 1 RECs and that TREC prices are equal to ACPs. Further, as suppliers are not obligated to pay ACPs for TREC shortfalls, if fewer TRECs are produced, or prices fall below ACP, the compliance cost will be less.

**Exhibit 3
Compliance Cost
Calendar 2015-2019**

	<u>Unit</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Forecasted Sales	MWh	64,036,511	64,637,209	65,064,804	65,885,180	66,453,309
Thermal Tier 1		0.100%	0.250%	0.375%	0.500%	0.750%
Thermal 1 Demand	TREC	64,000	161,600	244,000	329,400	498,400
Thermal 1 ACP	\$/TREC	\$30.00	\$27.50	\$25.00	\$22.50	\$20.00
Thermal 1 Cost	\$	\$1,921,095	\$4,443,808	\$6,099,825	\$7,412,083	\$9,967,996
<i>Thermal 1 Impact</i>	<i>\$/MWh</i>	<i>\$0.030</i>	<i>\$0.069</i>	<i>\$0.094</i>	<i>\$0.113</i>	<i>\$0.150</i>
Thermal Tier 2		3.0%	3.0%	3.0%	3.0%	3.0%
Thermal 2 Demand	TREC	1,681,800	1,681,800	1,681,800	1,681,800	1,681,800
Thermal 2 ACP	\$/TREC	\$0.25	\$0.20	\$0.15	\$0.10	\$0.05
Thermal 2 Cost	\$	\$420,451	\$336,361	\$252,271	\$168,180	\$84,090
<i>Thermal 2 Impact</i>	<i>\$/MWh</i>	<i>\$0.007</i>	<i>\$0.005</i>	<i>\$0.004</i>	<i>\$0.003</i>	<i>\$0.001</i>
Total Thermal Tier Cost	\$	\$2,341,547	\$4,780,169	\$6,352,096	\$7,580,263	\$10,052,087
<i>Total Thermal Tier Impact</i>	<i>\$/MWh</i>	<i>\$0.037</i>	<i>\$0.074</i>	<i>\$0.098</i>	<i>\$0.115</i>	<i>\$0.151</i>

MWh = Megawatt-hour

ACP = Alternative Compliance Payment

TREC = Thermal Renewable Energy Credit

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

Source: Maryland Energy Administration

ACPs established under the bill are not anticipated to materially affect SEIF revenues.

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. Small businesses in this industry benefit from increased demand to design, build, and install thermal energy systems under the bill.

Additional Information

Prior Introductions: None.

Cross File: Although SB 530 (Senator Middleton – Finance) is listed as a cross file, it is different.

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

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ncs/lgc

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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. It requires that Tier 1 renewable sources generate specified percentages of the State’s electricity supply each year, gradually increasing 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 2014, RPS requirements are 10.3% for Tier 1 renewable sources, including at least 0.35% from solar energy, and 2.5% from Tier 2 renewable sources. Electric companies (utilities) and other electricity suppliers must submit RECs equal to the percentage specified in statute each year or pay an alternative compliance payment (ACP) equivalent to their shortfall. The Maryland Energy Administration must use ACPs to support new renewable energy 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 a Tier 1 renewable source; 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. Tier 2 now includes only large hydroelectric power plants.

RPS Compliance

For the 2012 compliance year, electricity suppliers retired approximately 5.5 million RECs at a cost of \$24.4 million, with ACPs accounting for only \$5,450 of the total. In general, electricity suppliers have been able to meet all of their Tier 1 nonsolar and Tier 2 REC requirements. The predominant source of ACPs (when required) has been from the Tier 1 Solar requirement.