BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF THE APPLICATION	)	
OF DELMARVA POWER & LIGHT COMPANY	)	PSC DOCKET NO. 14-41
FOR APPROVAL OF THE 2014 PROGRAM	)	
FOR THE PROCUREMENT OF SOLAR	)	
RENEWABLE ENERGY CREDITS	)	
(FILED JANUARY 27, 2014)	)	

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COMMENTS OF THE PUBLIC ADVOCATE
ON THE APPLICATION OF DELMARVA POWER & LIGHT COMPANY
FOR APPROVAL OF THE 2014 PROGRAM
FOR THE PROCUREMENT OF SOLAR RENEWABLE ENERGY CREDITS

The Public Advocate finds the proposed plan of Delmarva Power & Light Company (Delmarva) for the 2014 Procurement Program for Solar Renewable Energy Credits (SRECs) to be consistent with the Renewable Energy Portfolio Act, 26 *Del. C.* §§351-364 (REPSA), with one exception discussed below.

The proposed plan, prepared in consultation with the Renewable Energy Task Force established in 2010 by 26 *Del. C.* § 360(d) (RETF), meets the charges to the RETF, including:

a. Establishing a balanced market mechanism for Renewable Energy Credit (REC) and SREC trading;

b. Establishing REC and SREC aggregation mechanisms and other devices to encourage the deployment of solar energy technologies in Delaware with the least impact on retail electricity suppliers, municipal electric companies and ruralelectric cooperatives;

c. Minimizing the cost for complying with REPSA;

d. Establishing revenue certainty for appropriate investment in solar renewable energy technologies, including consideration of long-term contracts and auction mechanisms;

e. Establishing mechanisms to maximize in-state solar renewable energy generation and local manufacturing; and

f. Ensuring that residential, commercial and utility scale photovoltaic and solar photovoltaic (PV) systems of various sizes are financially viable and cost-effective instruments in Delaware.

The 2012 and 2013 Procurement Programs demonstrated that the auction process: (1) is a functional, balanced mechanism with minimal impact on retail electric suppliers; (2) ensures that systems of various sizes are financially viable; and (3) maximizes local manufacturing and installation content. Iterative changes in the 2013 auction process led to progress in minimizing the cost to ratepayers for complying with REPSA. Those changes included:

a. Reduction of the administratively set prices for systems between zero and two hundred fifty kilowatts (KW) capacity;

b. Creation of two tiers to allow systems built before the auction process to bid for long term contracts;

c. Reduction of the four tiers for new systems to three(N1 at 0-30 KW, N2 at >30-200 KW, and N3 at >200-2000 KW);

d. Establishment of a set price of $50/SREC for years eight to twenty instead of years eleven to twenty;

e. Reduction of the number of SRECs to be procured in the auction from 11,472 to 8000, with 1000 procured on the spot market; and

f. Use of Delaware manufacturing and installation content as a tie breaker instead of first priority for approving a system.

The net impact of the changes from 2012 to 2013, along with reductions in system cost that may have led to lower bids, reduced the total auction Net Present Value (NPV) cost to $5,775,841 from $22,919,016, or 75% less. See Exhibit "A," "Consultants SREC Program Evaluation" for details on this and other calculations.

The 2014 auction proposal also includes changes to minimize ratepayer cost while meeting all other requirements:

a. Tiers E1, E2, and N1 will be combined into a single tier with a purchase target of 3800 SRECs; and

b. The administratively set price for years eight to twenty will be decreased to $35/SREC from $50.

Assuming the same degree of Delaware content, and the same weighted average winning bid price, the total NPV cost of the 2014 Procurement Program would be $4,811,622. The cost to ratepayers would drop another 4% compared to 2012. There may be potential savings of another $2.1 million (NPV) in the 2015 Procurement Program if the ideas suggested in these comments are implemented. That would reduce Procurement Program cost by another 9% compared to 2012, for a total cost reduction to ratepayers of 88%.

The Risk of High Competitive Bids for E1/E2/N1 Tier in 2014

The assumption that owners of existing systems will continue to make very low bids to ensure they win a contract may seriously underestimate the weighted average winning bid price this year. While there may be 18,000 SRECs from existing systems with no SREC contract, many of these owners seem either uninterested in bidding or are uninformed. There were only about 5000 SRECs in losing bids last year and most were offered at a significantly higher price than the winning bids.

The Consultants' Report filed with the Delmarva Application shows supply curves for the 2013 auction for tiers N1 (page 8), E1 (page 10), and E2 (page 11). Each shows a steep slope toward higher prices (from $250 to $400/SREC) at about 1.5 times the winning bid volume. This suggests that owners of existing systems are stuck on obtaining the kind of high SREC prices seen several years ago. There may be a belief that every existing PV system will eventually receive a long term contract and the last holdout will get whatever price s/he wants.

The RETF forecasts that about 1000 SRECs will be bid from new systems built since the last auction, but the actual number is unknown. If the bids primarily come from bidders who lost in 2013, and they continue to bid high prices, we may see extremely high average bids in this tier.

The proposed 2014 auction prohibits lower bids from tier N2 and N3 from replacing higher bids in the combined N1/E1/E2 tier to protect new projects in the N1 tier. This may be a very costly mistake. **We recommend allowing lower bids from the N2 and N3 tiers to replace higher bids from E1 and E2 bidders so as to ensure that ratepayers are not paying more for SRECs than necessary.**

Considerations for the 2015 Procurement Program

The Commission's Order No. 8231 accepting the 2013 auction noted specific concerns of PSC Staff and recommended the RETF focus on those concerns in preparing the 2014 Procurement Program. A similar review will likely be needed after the 2014 Auction results are known. Our recommendations for RETF review are highlighted in bold type.

The Consultants' Report filed with the Delmarva Application highlighted concerns with the continuing Administrative Expense to manage SRECs over the twenty year term of the contracts. The Consultants calculated the combined ongoing cost from SRECTrade and the Sustainable Energy Utility (SEU) to be $17.43/SREC ($8.60 in NPV), with a total cost of $2.3 million ($1.2 million in NPV). The Consultants also commented that "under Commission Order 8231, Delmarva Power has the burden of proof of showing that these costs are not higher than what Delmarva would have paid if it had administered the contracts itself and not used the SEU as a contractual intermediary."(Consultants' Report at 41). **Delmarva should provide proof to the Commission and to the Public Advocate that the SEU's involvement in the process does not result in greater expense than if Delmarva had administered the contracts in-house.**

Using NPV calculations, Administrative Expense was 10% of the 2012 auction but grew to 25% in 2013, and could be as high as 28% for the 2014 auction. There may be several ways to address the Administrative Expense issue.

Electric meter technology exists to allow tracking of the electricity produced by each PV system. An SREC is created for each one million watt-hours. Instead of registering SRECs with the Generation Attribute Trading System, as is now required, Delmarva could simply use the meter reading to bypass the SEU and SREC Trade fees.

The meters are costly for small systems and could discourage installations. For those systems, SREC production could be "inferred" by taking the energy production in year seven and reducing it by one-half percent a year (an industry standard) for the balance of the contract. **We support legislation to provide authority to use the "metered" and "inferred" SRECs. If passed, Delmarva should adopt the use of these strategies.**

The combination of "metered" SRECs and "inferred" SRECs would also allow Delmarva to end the fixed SREC price in years eight to twenty. PV system costs continue to drop. Installed Tier N1 cost is now low enough that owners can make a 10% return and have less than a seven year payback period with just the Federal Tax subsidy and the Green Energy Fund grant. Delmarva can pre-buy all twenty years worth of SRECs and eliminate the out years of the Administrative Expense. **Delmarva should end fixed rates for SRECs in years eight to twenty.**

A secondary concern surrounding fixed prices in the outer years of the contract is that system owners might not maintain a system without a continuing SREC value. The required mid-life replacement inverter cost was high in the past. In today's dollars, an average system will produce a megawatt-hour a month of electricity worth about $135. That same megawatt-hour will produce one SREC worth $35 as proposed in this docket. Inverter cost is dropping about 10% a year, and a decade from now the payback on the inverter cost will be less than two years from the avoided cost of buying electricity alone. Given this, it is unlikely a system owner will fail to maintain the installation and give up the $135.

The Procurement Program is influenced by policy decisions being made elsewhere. The SEU has created an Enhanced Green Energy Fund. Under this program, the SEU pre-buys SRECs with upfront cash and uses its banking rights to keep them off the market. The funds come from un-spent auction revenue from the Regional Greenhouse Gas Imitative, so there is no added cost to ratepayers. The SEU will buy the equivalent of about 9300 N1 SRECs a year for two years. It is likely that the SEU will continue this program, as it can trade one SREC for three standard RECs currently worth about $50 on the spot market. Selling as RECs would not influence the SREC trading market, could stabilize rising REC prices, and would repay the SEU's $3 million investment in about seven years. The ability to trade SRECs for RECs expires at the end of 2014. **We support legislation to extend the SREC/REC trading right. We further support giving the Secretary of the Department of Natural Resources and Environmental Control the authority to annually alter the SREC/REC trading ratio to maintain rough spot market price parity in the face of changing market conditions.**

There were only forty bidders and nineteen contracts in the N2 and N3 tiers in 2013. **Delmarva should consider a pre-buy program similar to the SEU's with its own Green Energy Fund money for N1 systems, and should consider concentrating auctions on N2 and N3 projects. Delmarva could easily take the bidding in-house at a low cost with so few contracts to consider.**

Conclusion

In conclusion, the Public Advocate supports the proposed Delmarva Power 2014 SREC Procurement Program if modified in the way we have suggested to provide ratepayer price protection in the combined E1/E2/N1 tier. Otherwise, the Procurement Program is a just and reasonable balance between ratepayer protection and meeting the terms of the REPSA, and we recommend that the Commission approve the Application. We further respectfully ask the Commission to outline our highlighted concerns to be addressed by the RETF and Delmarva in preparing the 2015 Procurement Program.

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Dated: February 11, 2014

Exhibit "A"
Evaluation of the Proposed
2014 Delaware SREC Procurement Program

Prepared for: The Office of the Delaware Public Advocate

Prepared by: Alternative Strategies Consulting, LLC
David T. Stevenson

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Executive Summary

Delmarva Power & Light Company has made Application to the Delaware Public Service Commission in PSC Docket 14 – 41 for approval of its proposed 2014 SREC Procurement Program. The current program is a follow on to the 2012 Pilot Procurement Program and 2013 Procurement Program approved by the Commission.

We conclude that the 2014 Procurement Program for Solar Renewable Energy Credits (SREC) is consistent with Renewable Energy Portfolio Act, 26 *Del. C.* §§351-364 (REPSA), with one exception. The proposed 2014 auction prohibits lower bids from tier N2 and N3 from replacing higher bids in the combined N1/E1/E2 tier. This may be a very costly mistake. We recommend allowing lower bids from the N2 and N3 tiers to replace higher bids from E1 and E2 bidders.

We further conclude the proposed plan, prepared in consultation with the Renewable Energy Task Force established in 2010, 26 *Del. C.* § 360(d) (RETF), meets the charges to the RETF. Previous Procurement Programs demonstrated the auction process is a functional, balanced mechanism with minimal impact on retail electric suppliers, ensures systems of various sizes are financially viable, and maximizes local manufacturing and installation content. Iterative changes to the program resulted in cost savings to ratepayers of 75% from the 2012 program to the 2013 program. Potentially, the 2014 program may save ratepayers an additional 4% compared to 2012. We see potential savings of another $2.1 million (NPV) with ideas suggested in this document. That would lower Procurement Program cost another 9% compared to 2012, for a total cost reduction to ratepayers of 88%.

The Administrative Expense of the continuing servicing of SRECs delivered under contract for a twenty year period is of increasing concern. New Energy Opportunities, Inc., consulting for the Commission, estimated the Administrative Expense of the 2013 contracts will cost ratepayers $2.3 million. The Administrative Expense equaled 10% of the cost of the 2012 program. The cost rose to 25% for the 2013 program, and could rise to 28% in the 2014 program. We note Delmarva Power has the burden of proof to show using contractors for SREC administration is less expensive than servicing the contracts in house.

Several options exist to reduce Administrative Expense. Currently, SRECs must be tracked and registered with the Generation Attribute Trading System (GATS). Delmarva could simply use meter readings for utility scale PV systems and "inferred" SREC production for small systems to bypass the SEU and SREC Trade fees involved in tracking and registration. Legislation may be required to use "metered" or "inferred" SRECs.

The 2014 auction will solicit competitive bids from system owners for SRECs for the first seven years of a twenty-year contract. In the last thirteen years system owners will be paid a fixed price for each SREC. This follows a similar system used for the 2013 auction but drops the price from $50/SREC to $35. Discussions continue on the long-term use of fixed prices for the out years of contracts. We conclude that in order to minimize Administrative Expense and to reduce total SREC costs to ratepayers by more than $1 million per auction, there should be no out year payments. In fact, PV system costs have dropped so far that federal tax credits and state

Green Energy Fund (GEF) grants alone allow small PV system owners to realize targeted returns of 10% and the desired seven year payback of system cost. Delmarva should consider having no SREC auction for PV systems up to thirty kilowatts in capacity beyond 2014 but, rather, should pre-buy SRECs with GEF grants. In the 2013 auction only forty bids were made for utility scale PV systems with nineteen winning bids. Delmarva Power could easily handle that bidding volume in-house, providing further ratepayer's savings.

The balance of the report reviews selected policy issues in more detail.

Procurement Program Requirements

We conclude the 2014 Procurement Program for Solar Renewable Energy Credits (SRECs) to be consistent with the Renewable Energy Portfolio Act, 26 *Del. C.* §§351-364(REPSA),with one exception discussed below. The proposed plan, prepared in consultation with the RETF , 26 *Del. C.* § 360(d), meets the charges to the RETF, including:

1) Establishing a balanced market mechanism for Renewable Energy Credit (REC) and SREC trading;
2) Establishing REC and SREC aggregation mechanisms and other devices to encourage the deployment of solar energy technologies in Delaware with the least impact on retail electricity suppliers, municipal electric companies and rural electric cooperatives;
3) Minimizing the cost for complying with REPSA;
4) Establishing revenue certainty for appropriate investment in solar renewable energy technologies, including consideration of long-term contracts and auction mechanisms;
5) Establishing mechanisms to maximize in-state solar renewable energy generation and local manufacturing; and
6) Ensuring that residential, commercial and utility scale photovoltaic and solar photovoltaic systems of various sizes are financially viable and cost-effective instruments in Delaware.

Meeting the Requirements

Procurement Programs executed in 2012 and 2013 demonstrated the auction process is functional and leads to bids that ensure financial viability of the PV systems. Survey results shown at page 19 of the Consultants' Report attached to the Application show that auction participants are generally satisfied with the auction process. Since contractors are being used to execute the auction, to register SRECs in the GATS system, and to manage SRECs, there is minimal impact on retail electric suppliers. Table 1 shows that the balance between system sizes and between new and existing systems has been maintained. Table 2 demonstrates that Delaware labor and equipment content is being encouraged with 58% of 2013 winning systems having both, and 34% having either labor or equipment. PV system owners receive a 10% SREC bonus for using Delaware equipment and 10% for using Delaware labor. Table 3 shows the impact of the bonus on actual expected SREC delivery.

Also note, in 2013 and 2014, 1000 SRECs are being purchased on the spot market to provide an opportunity for existing systems without a contract to have a market for their SRECs. There was also a one-time spot auction in 2013 for 2978 SRECs from existing systems with no contracts that were acquired for an average weighted price of $33.94. System owners offered 5394 SRECs in the auction compared to up to 6000 solicited.

Table 1: Year to Year Comparison of Procurement Programs

2012				
Tier	Size – KW	SREC Allocation	1st 10 Year $	2nd 10 Year $
1	0-50	2972	260*	50*
2A	>50-250	2000	240*	50*
2B	>250-500	2000	130.92	50*
3	>500-2000	4500	154.45	50*
Total		11472		
2013			1st 7 Year $	Next 13 Year $
N1	0-30	1200	46.48	50*
N2	>30-200	1400	86.60	50*
N3	>200-2000	1400	51.13	50*
E1	0-30	1500	34.59	50*
E2	>30-2000	1500	39.29	50*
Total		7000		
2014			1st 7 Year $	Next 13 Year $
E1,E2, N1	0-30, >30-2000	3800	TBD	35*
N2	>30-200	1600	TBD	35*
N3	>200-2000	1600	TBD	35*
Total		7000		

Note * denotes administratively set price

Table 2: 2013 Auction Results for Delaware Equipment and Labor Content

Tier	SRECs Awarded	# Both	% Both	# Either	% Either	# None	% None	SRECs with Bonus
N1	1215	364	29.9	711	58.5	141	11.6	1359
N2	1406	342	24.3	803	57.1	261	18.6	1554
N3	1903	1903	100					2284
E1	1968	130	6.6	816	41	1022	51.9	2076
E2	1032	188	18.2	312	30.3	531	51.5	1101
Total	7524	2427	38.9	2642	35.1	1955	26.0	8374
Total E1/E2/N1	4215	682	16.1	1839	43.6	1694	40.2	4536
Total N1/N2/N3	4524	2609	57.7	1514	33.5	402	8.9	5197

Table 3: Impact of Delaware Equipment and Labor Bonus on SREC Delivery

2012 Auction			
Tier	SRECs Awarded	SRECs Awarded with Bonus	
1	2972	3566	
2A	2000	2400	
2B	2000	2400	
3	4500	5400	
Total	11472	13766	
2014 Auction			
Tier	SRECs Allocation	Bonus Adjustment Based on 2013	SRECs with Bonus
E1/E2/N1	3800	1.076	4089
N2	1600	1.105	1768
N3	1600	1.20	1920
Total	7000		7777

The Risk of High Competitive Bids for E1/E2/N1 Tier in 2014

The assumption that owners of existing systems will continue to make very low bids to ensure they win a contract may seriously underestimate the weighted average winning bid price in 2014. While there may be 18,000 SRECs from existing systems with no SREC contract, many seem either uninterested in bidding or are uninformed. There were only about 5000 SRECs in losing bids in 2013 and most were offered at a significantly higher price than the winning bids.

The Consultants' Report filed with the Delmarva Application, shows supply curves for the 2013 auction for tiers N1 (page 8), E1 (page 10), and E2 (page 11). Each shows a steep slope toward higher prices (to $250 to $400/SREC) at about 1.5 times the winning bid volume. There seems to be a lot of owners of existing systems that are stuck on obtaining contracts for the kind of high SREC prices seen several years ago. There may be a belief that every existing PV system will eventually receive a long term contract and the last holdout will get whatever price they want.

The RETF is forecasting about 1000 SRECs will be bid from new systems built since the last auction, but the actual number is unknown. If we primarily obtain bids from bidders who lost in 2013, and they continue to bid high prices, we may see extremely high average bids in this tier.

The proposed 2014 auction prohibits lower bids from tier N2 and N3 from replacing higher bids in the combined N1/E1/E2 tier to protect new projects in the N1 tier. This may be a very costly mistake. We recommend allowing lower bids from the N2 and N3 tiers to replace higher bids from E1 and E2 bidders so as to ensure that ratepayers are not paying more for SRECs than necessary.

Administrative Expense

The Consultants' Report filed by the company with this application highlighted concerns with the continuing Administrative Expense to manage SRECs over the twenty-year term of the contract. The Consultants calculated that the combined ongoing cost from SRECTrade and the Sustainable Energy Utility (SEU) to be $17.43/SREC ($8.60 in NPV), with a total cost of $2.3 million ($1.2 million in NPV). The Net Present Value (NPV) calculation is shown on Table 4 based on the New Energy Opportunities, Inc. data.

Table 4: NPV Administrative Expense of 2013 Auction Over Twenty Years

Year	Admin. Expense $
2013	106,778
2014	109,196
2015	102,249
2016	193,495
2017	104,783
2018	106,119
2019	107,496
2020	108,294
2021	110,391
2022	111,919
2023	113,513
2024	115,148
2025	116,841
2026	118,590
2027	120,406
2028	122,281
2029	124,221
2030	126,229
2031	128,308
2032	130,459
2033	99,496
Total $	2,386,212
Cost/SREC $	17.43
Total Cost NPV $	1,204,408
Cost/SREC NPV $	8.60

NPV uses 7% Discount Rate

The Cost Impact of the Changing Auction Process

Iterative changes in the auction process for 2013 led to progress in minimizing the cost to ratepayers for complying with REPSA. Changes to the 2013 auction include:

a. Dropped administratively set prices for systems between zero and two hundred fifty kilowatts (KW) capacity;
b. Created two tiers to allow systems built before the auction process to bid for long term contracts;
c. Reduced the four tiers for new systems to three tiers, N1 at 0-30 KW, N2 at >30-200 KW, and N3 at >200-2000 KW;
d. Established an administratively set price of $50/SREC for years eight to twenty instead of years eleven to twenty;
e. Reduced the number of SRECs to be procured from 11,472 to 8000 with 1000 procured on the spot market; and
f. Using Delaware manufacturing and installation content as a tie breaker instead of giving first priority for approving a system.

The net impact of the changes from 2012 to 2013, along with reductions in system cost that may have led to lower bids, reduced the total auction Net Present Value (NPV) cost to $5,775,841 from $22,919,016 or 75% less. Tables 5 and 6 calculate the Net Present Value of the auction cost by tier. We used a 7% Discount Rate, as recommended by the United States Office of Management & Budget.

The 2014 auction proposal also includes changes to minimize ratepayer cost while meeting all other requirements:

a. Tiers E1, E2, and N1 will be combined in a single tier with a purchase target of 3800 SRECs; and
b. The administratively set price for years eight to twenty will be decreased to $35/SREC from $50

Assuming the same degree of Delaware content, and the same weighted average winning bid price, the total NPV cost of the 2014 Procurement Program would be $4,811,622. The cost to ratepayers would drop another 4%. Calculations are shown in Table 7.

Table 5: SREC Cost 2012 Auction, NPV by Tier, 7% Discount Rate[1]

	Tier 1		Tier 2A		Tier 2B		Tier 3	
Year	**SREC**	**$**	**SREC**	**$**	**SREC**	**$**	**SREC**	**$**
2013	3566	927,160	2400	576,000	2400	314,208	5400	834,030
2014	3548	922,524	2388	573,120	2388	312,637		829,860
2015	3530	917,912	2376	570,254	2376	311,074		825,711
2016	3513	913,322	2364	567,403	2364	309,518		821,582
2017	3495	908,755	2352	564,566	2352	307,971		817,474
2018	3478	904,212	2341	561,743	2341	306,431		813,387
2019	3460	899,691	2329	558,935	2329	304,899		809,320
2020	3443	895,192	2317	556,140	2317	303,374		805,273
2021	3426	890,716	2306	553,359	2306	301,857		801,427
2022	3409	886,263	2294	550,592	2294	300,348		797,241
2023	3392	169,583	2283	114,133	2283	114,133		256,800
2024	3375	168,735	2271	113,563	2271	113,563		255,516
2025	3358	167,891	2260	112,995	2260	112,995		254,238
2026	3341	167,052	2249	112,430	2249	112,430		252,967
2027	3324	166,217	2237	111,868	2237	111,868		251,702
2028	3308	165,386	2226	111,308	2226	111,308		250,444
2029	3291	164,559	2215	110,752	2215	110,752		249,191
2030	3275	163,736	2204	110,198	2204	110,198		247,945
2031	3258	162,917	2193	109,647	2193	109,647		246,706
2032	3242	162,103	2182	109,099	2182	109,099		245,472
Total $		10,723,924		6,748,105		4,188,309		10,666,105
NPV $		6,978,775		4,366,314		2,563,426		6,642,749
NPV/SREC $		1,957		1,819		1068		1,230

Cost/SREC @ NPV = $74.65
Administrative Cost/SREC @NPV[2] = $8.60
Total Cost/SREC @ NPV $83.25
Total Cost of auction = $37,125,270
Total NPV Cost of Auction = $22,919,016
Administrative Cost as % of SREC Price = 10%
Note 1: SREC Totals include bonus for Delaware content from Table 3
Note 2: Based on Table 4

Table 6: SREC Cost 2013 Auction, NPV by Tier, 7% Discount Rate[1]

	N1		N2		N3		E1		E2	
Year	**SREC**	**$**	**SREC**	**$**	**SREC**	**$**	**SREC**	**$**	**SREC**	**$**
2014	1359	63,166	1554	134,576	2284	116,781	2076	71,809	1101	43,258
2015	1352	62,850	1546	133,904	2273	116,197	2066	71,450	1095	43,042
2016	1345	62,536	1538	133,234	2261	115,616	2055	71,093	1090	42,827
2017	1339	62,224	1531	132,568	2250	115,038	2045	70,737	1085	42,613
2018	1332	61,912	1523	131,905	2239	114,463	2035	70,383	1079	42,400
2019	1325	61,603	1516	131,245	2227	113,890	2025	70,031	1074	42,188
2020	1319	61,295	1508	130,589	2216	113,321	2014	69,681	1068	41,977
2021	1312	65,607	1500	75,021	2205	110,262	2004	100,221	1063	53,152
2022	1306	65,279	1493	74,646	2194	109,711	1994	99,720	1058	52,886
2023	1299	64,953	1485	74,273	2183	109,163	1984	99,221	1052	52,622
2024	1293	64,628	1478	73,901	2172	108,617	1975	98,725	1047	52,359
2025	1286	64,305	1471	73,532	2161	108,074	1965	98,232	1042	52,097
2026	1280	63,983	1463	73,164	2151	107,533	1955	97,740	1037	51,836
2027	1273	63,663	1456	72,798	2140	106,996	1945	97,252	1032	51,577
2028	1267	63,345	1449	72,434	2129	106,461	1935	96,765	1026	51,319
2029	1261	63,028	1441	72,072	2119	105,928	1926	96,282	1021	51,063
2030	1254	62,713	1434	71,712	2108	105,399	1916	95,800	1016	50,807
2031	1248	62,400	1427	71,353	2097	104,872	1906	95,321	1011	50,553
2032	1242	62,088	1420	70,996	2087	104,347	1897	94,845	1006	50,301
2033	1236	61,777	1413	70,641	2077	103,826	1887	94,370	1001	50,049
Total $		1,263,356		1,874,565		2,196,494		1,759,680		968,925
Total NPV $		668,774		1,096,188		1,180,436		890,390		499.726
NPV/ SREC $		492		705		517		429		454

Cost/SREC @ NPV = $25.89
Administrative Cost/SREC @NPV[2] = $8.60
Total Cost/SREC @ NPV $34.49
Total Cost of auction = $10,982,196
Total NPV Cost of Auction = $5,775,841
Administrative Cost as % of SREC Price = 25%
Note 1: SREC Totals include bonus for Delaware content from Table 2
Note 2: Based on Table 4

Table 7: SREC Cost 2014 Auction, NPV by Tier, 7% Discount Rate[1]

	N1/E1/E2		N2		N3	
Year	**SRECs**	**$**	**SRECs**	**$**	**SRECs**	**$**
2015	4089	151,293	1768	153,109	1920	98,170
2016	4069	159,537	1759	152,343	1910	97,679
2017	4048	149,784	1750	151,582	1901	97,190
2018	4028	149,035	1742	150,824	1891	96,704
2019	4008	148,290	1733	150,070	1882	96,221
2020	3988	147,548	1724	149,319	1872	95,740
2021	3968	146,811	1716	148,573	1863	95,261
2022	3948	138,180	1707	59,746	1854	64,883
2023	3928	137,490	1699	59,448	1845	64,559
2024	3909	136,802	1690	59,150	1835	64,236
2025	3889	136,118	1682	58,855	1826	63,915
2026	3870	135,438	1673	58,560	1817	63,595
2027	3850	134,760	1665	58,268	1808	63,277
2028	3831	134,087	1656	57,976	1799	62,961
2029	3812	133,416	1648	57,686	1790	62,646
2030	3793	132,749	1640	57,398	1781	62,333
2031	3774	132,085	1632	57,111	1772	62,021
2032	3755	131,425	1624	56,825	1763	61,711
2033	3736	130,768	1615	56,541	1754	61,402
2034	3718	130,114	1607	56,259	1746	61,095
Total $		2,786,729		1,809,643		1,495,598
Total NPV $		1,505,600		1,117,191		851,187
NPV/REC $		368		632		443

Cost/SREC @ NPV = $22.33

Administrative Cost/SREC @NPV[2] = $8.60

Total Cost/SREC @ NPV $30.93

Total Cost of auction = $8,803,031

Total NPV Cost of Auction = $4,811,622

Administrative Cost as % of SREC Price = 28%

Note 1: SREC Totals include bonus for Delaware content from Table 3

Note 2: Based on Table 4

Minimizing Administrative Expense

Using NPV calculations, the Administrative Expense was 10% of the 2012 auction; it grew to 25% in 2013, and could be as high as 28% for the 2014 auction. There may be several ways to address the estimated $2.3 million Administrative Expense for the 2013 Procurement Program.

Electric meter technology exists to allow tracking the electricity produced by each photovoltaic system. An SREC is created for each one million watt-hours. Instead of registering SRECs with the Generation Attribute Trading System, as is now required, Delmarva could simply use the meter reading to bypass the SEU and SREC Trade fees.

The meters are costly for small systems and could discourage installations. For those systems, SREC production could be "inferred" by taking the energy production in year seven and reducing it one half percent a year (an industry standard) for the balance of the contract. These changes may require legislation to provide authority to use the "metered" and "inferred" SRECs. If passed, Delmarva should adopt the use of these strategies.

Using Green Energy Fund Grants Instead of SRECs for PV Systems up to 30KW Capacity

Delmarva can pre-buy all twenty years worth of SRECs and eliminate the out years of the Administrative Expense. Table 8 shows a financial analysis of a 7.5KW PV system with an installed price of $3.25/watt, which is typical of current installed cost. With a federal tax credit of 30%, a GEF grant of $.95/watt, and no SREC sales, the PV system owner would see a 10.3% IRR and a seven year payback of their investment. The GEF payment could be reduced as system cost comes down. Delmarva's current $1.2 million GEF fund would buy 1.26 megawatts of tier N1 capacity, which translates to about 1750 SRECs a year - a larger volume than the SREC allocations in 2013 2014 (1,200 and 1,000, respectively). Ratepayers would pay the same GEF fee but would have no SREC costs added to their electric bills. Since about one-third of SRECs in the first tier in the 2014 auction will come from new projects, we can see from Table 7 that NPV savings of $500,000 are possible. The NPV savings to ratepayers in Administrative Expenses over the twenty year contract period would be about $285,000 (1650 SRECs x $8.60/SREC x 20 years).

Ending Administratively Set SREC Prices in Final Thirteen Years of Contracts

The combination of "metered" SRECs and "inferred" SRECs would also allow Delmarva to end the fixed SREC price in years eight to twenty. A concern surrounding fixed prices in the out years of the contract is that system owners might not maintain a system without a continuing SREC value. The required mid-life replacement inverter cost was high in the past. In today's dollars, an average system will produce a megawatt-hour a month of electricity worth about $135. That same megawatt-hour will produce one SREC worth $35 as proposed in this docket. Inverter cost is dropping about 10% a year and a decade from now the payback on the inverter cost will be less than two years from the avoided cost of buying electricity alone. It is unlikely a system owner will fail to maintain the installation and give up the $135.

There may be higher competitive auction bids for the first seven years to adjust for the loss of the guaranteed out year payments for PV systems above 30KW. Table 9 shows a financial analysis for a 1700 KW system with no GEF grant, $60 SRECs for the first 7 years, and $35 SRECs for the last 13 years. The PV system owner would see a 10.3% internal rate of return (IRR), and a 6.8 year payback. Table 10 shows that the same system with no SREC value in the last 13 years would need $80/SREC to see the same 10.3% IRR. However, ratepayers would save $17.43/SREC in the final thirteen years of the contract or about $430,000 (1900 SRECs x $17.43/SREC x 13 years), and would pay about $628,000 less in total SREC payments for a $1.1 million total savings.

Table 8: Financial Analysis Enhanced GEF, No SREC Contract

Year	Utility Cost-$ no solar	Solar Watts/Yr	Utility Cost-$ With solar	Savings- $	SREC Value -$	Inverter Cost-$	Cash Flow - $	Cum. Cash Flow-$
1	1458	10500	41	1418			(9589)	(9589)
2	1458	19385	55	1403			1403	(8185)
3	1458	10291	69	1389			1389	(6796)
4	1458	10188	83	1375			1375	(5241)
5	1458	10086	96	1362			1362	(4059)
6	1458	9985	110	1348			1348	(2711)
7	1458	9886	123	1335			1335	(1377)
8	1458	9787	137	1321			1321	(55)
9	1458	9689	150	1308			1308	1253
10	1458	9592	163	1295			1295	2548
11	1458	9496	176	1282			1282	3830
12	1458	9401	189	1269			1269	5099
13	1458	9307	202	1256			1256	6355
14	1458	9214	214	1244			1244	7599
15	1458	9122	227	1231			1231	8830
16	1458	9031	239	1219		(2,000)	(781)	8050
17	1458	8940	251	1207			1207	9257
18	1458	8851	263	1195			1195	10451
19	1458	8762	275	1183			1183	11634
20	1458	8675	287	1171			1171	12805
21	1458	8588	299	1159			1159	13965
22	1458	8502	310	1148			1148	15113
23	1458	8417	322	1136			1136	16249
24	1458	8333	333	1125			1125	17374
25	1458	8250	344	1114			1114	18488
26	1458	8167	355	1103			1103	19590
Total		241,455		32,596			19,590	10.3% IRR

Payback = 7.0 years
System Size = 7500 watts
Installed Cost = $3.25/watt
System Cost = $24,375
Replacement Inverter Cost (year 15) = $2000 ($.265/watt)
First Year Watt Production = 10,500
Electricity Cost = $.135/KWh
GEF Grant = $.95/installed watt less 15% federal tax = $6,056
Federal Tax Credit = 30% of installed cost = $7,313
SREC Contract First Seven Years = $0
SREC Contract Next Thirteen Years = $0

Table 9: Financial Analysis Tier N3 $35 SREC for Final 13 Years

Year	Utility Cost-$ no solar	Solar Watts/Yr	Utility Cost-$ With solar	Savings-$	SREC Value -$	Inverter Cost-$	Cash Flow - $	Cum. Cash Flow-$
1	249900	2380000	-	249900	142800		(2582300)	(2582300)
2	249900	2356200	2499	247401	141372		388773	(2193527)
3	249900	2332638	4973	244927	139958		384885	(1808642)
4	249900	2309312	7422	242478	138559		381036	(1427605)
5	249900	2286219	9847	240053	137173		377226	(1050379)
6	249900	2263356	12248	237652	135801		373454	(676925)
7	249900	2240723	14624	235276	134443		369719	(307206)
8	249900	2218316	16977	232923	77641		310564	3358
9	249900	2196132	19306	230594	76865		307459	310816
10	249900	2174171	21612	228288	76096		304384	615200
11	249900	2152429	23895	226005	75335		301340	916541
12	249900	2130905	26155	223745	74582		298327	1213867
13	249900	2109596	28393	221508	73836		295343	1510211
14	249900	2088500	30607	219293	73098		292390	1802601
15	249900	2067615	32800	217100	72367		289466	2092067
16	249900	2046939	34971	214929	71643	(450,000)	(163429)	1928638
17	249900	2026469	37121	212779	70926		283706	2212344
18	249900	2006205	39248	210652	70217		280869	2493213
19	249900	1986143	41355	208545	69515		278060	2771273
20	249900	1966281	43440	206460	68820		275279	3046552
21	249900	1946619	45505	204395			204395	3250947
22	249900	1927152	47549	202351			202351	3453298
23	249900	1907881	49573	200327			200327	3653625
24	249900	1888802	51576	198324			198324	3851950
25	249900	1869914	53559	196341			196341	4048291
26	249900	1851215	55522	194378			194378	4242668
Total		54,729,731		5,746,622	1,921,046		4,242,668	9.4% IRR

Payback = 6.8 years
System Size = 1,700,000 watts
Installed Cost = $2.50/watt
System Cost = $4,250,000
Replacement Inverter Cost (year 15) = $450,000 ($.267/watt)
First Year Watt Production = 2,380,000
Electricity Cost = $.105/KWh
GEF Grant = $0
Federal Tax Credit = 30% of installed cost = $1,275,000
SREC Contract First Seven Years = $60
SREC Contract Next Thirteen Years = $35

Table 10: Financial Analysis Tier N3 $0 SREC for Final 13 Years

Year	Utility Cost-$ no solar	Solar Watts/Yr	Utility Cost-$ With solar	Savings-$	SREC Value -$	Inverter Cost-$	Cash Flow - $	Cum. Cash Flow-$
1	249900	2380000	-	249900	190400		(2534700)	(2534700)
2	249900	2356200	2499	247401	188496		435897	(2098803)
3	249900	2332638	4973	244927	186611		431538	(1667265)
4	249900	2309312	7422	242478	184645		427223	(1240042)
5	249900	2286219	9847	240053	182897		422950	(817092)
6	249900	2263356	12248	237652	181069		418721	(398371)
7	249900	2240723	14624	235276	179258		414534	16163
8	249900	2218316	16977	232923			232923	249086
9	249900	2196132	19306	230594			230594	479680
10	249900	2174171	21612	228288			228288	707968
11	249900	2152429	23895	226005			226005	933973
12	249900	2130905	26155	223745			223745	1157718
13	249900	2109596	28393	221508			221508	1378225
14	249900	2088500	30607	219293			219293	1598518
15	249900	2067615	32800	217100			217100	1815617
16	249900	2046939	34971	214929		(450,000)	(235071)	1580546
17	249900	2026469	37121	212779			212779	1793325
18	249900	2006205	39248	210652			210652	2003977
19	249900	1986143	41355	208545			208545	2212532
20	249900	1966281	43440	206460			206460	2418981
21	249900	1946619	45505	204395			204395	3623376
22	249900	1927152	47549	202351			202351	2825727
23	249900	1907881	49573	200327			200327	3026055
24	249900	1888802	51576	198324			198324	3224379
25	249900	1869914	53559	196341			196341	3420720
26	249900	1851215	55522	194378			194378	3615098
Total		54,729,731		5,746,622	1,293,476		3,615,098	9.4% IRR

Payback = 6.0 years
System Size = 1,700,000 watts
Installed Cost = $2.50/watt
System Cost = $4,250,000
Replacement Inverter Cost (year 15) = $450,000 ($.267/watt)
First Year Watt Production = 2,380,000
Electricity Cost = $.105/KWh
GEF Grant = $0
Federal Tax Credit = 30% of installed cost = $1,275,000
SREC Contract First Seven Years = $80
SREC Contract Next Thirteen Years = $0