Synapse
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Evaluation of Delmarva Power 2010 Integrated Resource Plan

Comments and Discussion of Key Issues

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Prepared by Synapse Energy Economics

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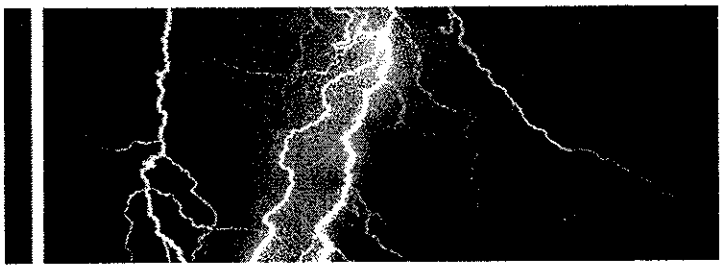

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Introduction and Summary

Delmarva Power and Light Company ("Delmarva") filed its 2010 Integrated Resource Plan ("IRP") on December 1, 2010. The plan contains summary and detailed information on Delmarva's power procurement approach for its standard offer service ("SOS") customers. The plan contains information on Delmarva's load forecast, demand-side management resources, transmission, supply resources including renewable resources, and environmental externalities. It includes ten technical appendices. The IRP is offered in fulfillment of Delaware's regulations on Integrated Resource Planning, finalized on January 1, 2010.[1]

These comments and discussion of key issues are provided to assist the Delaware Public Service Commission ("Commission") in assessing the substantive content of Delmarva's filing, and the extent to which it complies with the IRP regulations. They have been prepared by Synapse Energy Economics ("Synapse") on behalf of the Staff of the Public Service Commission. Synapse developed detailed comments in our review of Delmarva's 2006 and 2008 IRP filings, documented in an April, 2009 report filed with the Commission.[2] These comments serve as a follow-up to the April, 2009 Synapse report and as comments on the 2010 IRP. They focus on the following key areas of interest:

- Compliance with the 1/1/2010 IRP regulations;
- The role of demand-side resources in meeting SOS needs, including energy efficiency and demand response provided or proposed to be provided by Delmarva and through the Sustainable Energy Utility (SEU) programs;
- The choice of resource portfolio used to meet standard offer service needs; and
- The options for development of gas-fired generation and on-shore wind generation to meet a portion of SOS supply requirements.

Compliance with the 1/1/2010 IRP Regulations

In most areas of Delaware's Integrated Resource Planning regulation, Delmarva's 2010 IRP filing meets the requirement of the section without the need for further comment. Below is a set of five areas, however, which we have found to warrant further discussion at this time. These should be considered for further development in Delmarva's next IRP.[3] In general, these areas address issues of i) Delmarva involvement in considering the direct purchase of additional energy efficiency resources, ii) use of FSA contracts as the sole means to procure all non-renewable forms of energy, and iii) considerations of alternative resource options when determining the SOS procurement portfolio. Subsequent sections of this report address these issues.

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[1] 26 *Del. Admin. Code* §3010, Integrated Resource Planning for the Provision of Standard Offer Service by Delmarva Power and Light.

[2] Synapse Energy Economics, "Review of Delmarva Power & Light Company's Integrated Resource Plan," April 2, 2009.

[3] To a limited extent, some of the issues discussed in this report could be incorporated into Delmarva's framework for SOS procurement in the 2011-2012 cycle.

Table 1. IRP Regulation Requirements in Selected Areas – Potential Deficiencies in Delmarva 2010 IRP Filing

Regulation Section	Regulation Text	Comment
Resource Portfolio Options 5.1	DPL shall include a description of the overall process and the analytical techniques it used to identify its proposed option. The Company shall not rely exclusively on any particular resource or purchase or procurement policy.	Heavy reliance on FSA, coupled only with renewable purchases.
Resource Portfolio Options 5.2	DPL shall identify and evaluate all resource options including generation and transmission service, supply contracts, both short- and long-term procurement DSM, DR and customer-sited generation, even if a particular strategy is ultimately not recommended by the Company. The IRP must show an investigation of all reasonable opportunities for a more diverse supply at the lowest reasonable cost, including consideration of environmental benefits and externalities. The Company shall also provide any hedging guidelines and shall identify any changes from any existing hedging policy. Cost evaluations shall contain a description of each option and an evaluation that considers the economic and environmental value of the following: ...	No analysis of purchase of energy efficiency resources other than savings arising from non-EE utility programs. No analysis of alternative (to FSA) supply contracts.
Resource Portfolio Options 5.6	The Company shall include a detailed description of its energy efficiency activities in accordance with 26 Del. C. S352. The Company shall first consider electricity DR and DSM strategies for meeting base load and load growth needs and cost-effective renewable energy resources before considering traditional fossil fuel-based electric supply services to meet their retail electricity supplier obligations as defined in 26 Del. C. S352.	Because the SEU is the entity responsible for energy efficiency in the state, Delmarva's consideration of energy efficiency DSM strategies is limited to reference to SEU's programs.
Plan Development 6.1.3	DPL shall evaluate the cost-effectiveness of the options from the perspectives of the utility and the different classes of ratepayers based on real prices (may also provide nominal prices).	Given the role of the SEU, no analysis of cost-effectiveness of direct procurement of more energy efficiency resources.
Plan Development 6.1.5	The IRP shall not include any assumptions that externalities are adequately addressed by either the fact that the IRP meets the RPS, satisfies the Energy Efficiency Resource Standards or that the generating units to be utilized comply with existing environmental regulations. This rule does not, however, preclude a potential conclusion that the Renewable Energy Portfolio Standards or Energy Efficiency Resources Standards in effect at the time adequately address externalities.	The IRP contains a separate externalities analysis, but no direct resource procurement option analysis based in part on incorporating the effect of externalities.

Demand Side Resources

Overview and Summary of Key Information from the 2010 IRP

The Energy Conservation and Efficiency Act of 2009[4] ("Act") requires "Affected Electric Energy Providers"[5] to meet Energy Efficiency Resource Standards ("EERS") targets of 2% of both the 2007 electricity consumption and the 2007 coincident peak electrical demand by 2011; and 15% of consumption and coincident peak demand by 2015.[6] Delmarva is an "Affected Electric Energy Provider"

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[4] 26 *Del. C.* §§1500-1507.

[5] An "Affected Electric Energy Provider" is a distribution utility, cooperative, or municipal electricity provider.
[6] Ibid., Section 1502.

as defined in the legislation and is subject to these standards. To meet these targets, Delmarva states it is responsible for implementing demand response and "utility provided energy efficiency programs,"[7] such as combined heat and power, and street lighting and transmission improvements; and Delmarva will coordinate with the Sustainable Energy Utility (SEU) on other energy efficiency programs. SEU was created by the Delaware Legislature in 2007 to be responsible for energy efficiency and conservation efforts in Delaware.

Delmarva computes EERS targets and presents them in Tables B.1 and B.2 in the IRP, assuming a linear savings ramp between 2011 and 2015. Their near-term energy reduction and demand savings goals are summarized in Table 2 below. The Act does not specify targets beyond 2015; Delmarva has chosen to hold the goal constant at 15% of 2007 consumption and demand for each subsequent year in the planning period (through 2020).

Table 2: Delmarva DE Energy and Coincident Peak Demand Reduction Goals

Year	Percentage	Peak Demand Reduction (MW)	Consumption Reduction (MWh)
2011	2%	37	174,542
2012	5%	84	465,030
2013	7%	132	751,281
2014	11%	198	1,037,045
2015	15%	275	1,309,067

Source: 2010 IRP, pages 54-55.

In tables B.3 and B.4 Delmarva lists reference case energy (MWh) and demand (MW) savings, by "DSM Initiative", and includes both Delmarva programs, and SEU programs. Table 3 and 4 below summarize Delmarva's presentation of the source of energy and demand savings by program category. Table 3 illustrates that Delmarva anticipates roughly two-thirds of the 2015 EERS target for energy savings (MWH) coming from SEU programs; and that combined heat and power ("CHP") and improved codes and standards will make up most of the rest of the energy savings target. Delmarva describes a CHP evaluation conducted on its behalf by ICF. That study illustrated that the target level for CHP could be obtained (roughly) under a 20% capital cost incentive program.[8] Delmarva makes no specific recommendation for how to achieve these savings.[9] Codes and standards savings are further described to include increases in air conditioning equipment efficiencies. Utility-specific programs and weatherization programs comprise a total of just 5.9% of the 2015 EERS target for energy savings.

Table 4 below illustrates Delmarva's reliance on Advanced Metering Infrastructure ("AMI") and direct load control for 39% of the 2015 demand savings, SEU programs for 44% of 2015 demand savings, and the remaining ~16% coming from codes and standards, CHP, weatherization, and utility transmission, distribution and street lighting programs.

[7] 2010 IRP, page 33.
[8] Table B.7. in the IRP (page 72), the "20% Capital Cost Reduction" table, lists CHP production of 185,047MWh by 2015. The savings target for CHP as listed by Delmarva in Table B.3 is 196,831 MWh.
[9] IRP, page 34, states "Work with SEU to determine CHP program responsibility".

Table 3. Summary Demand-Side Energy Savings – MWh – By Delmarva and SEU Program Category

	Delmarva Projected Energy Impacts (MWh), Cumulative						Share by Program	
	2011	2012	2013	2014	2015	2020	2011%	2015%
AMI Dynamic Pricing	1,279	35,826	36,304	34,721	33,225	35,057	0.7%	2.5%
Utility Eff. Programs - T, D, Street Lighting	4,408	8,814	18,107	22,512	26,884	48,816	2.5%	2.1%
Utility Direct Load Control	3,546	6,284	9,636	11,475	12,851	18,412	2.0%	1.0%
Combined Heat and Power	61,503	95,335	129,167	162,999	196,831	468,633	35.2%	15.0%
Improved Codes and Standards	36,795	73,591	110,386	147,181	183,977	367,953	21.1%	14.1%
Weatherization Assistance Program	885	1,769	2,654	3,539	4,424	8,847	0.5%	0.3%
Approved SEU Programs	54,182	143,994	235,856	330,247	427,665	888,183	31.0%	32.7%
Prospective SEU Programs	11,944	99,417	209,170	324,372	423,211	423,211	6.8%	32.3%
Total	174,542	465,030	751,281	1,037,045	1,309,067	2,259,112	100%	100%

Table 4. Summary Demand Savings – MW – By Delmarva and SEU Program Category

	Delmarva Projected Demand Impacts (MW), Cumulative						Share by Program	
	2011	2012	2013	2014	2015	2020	2011%	2015%
AMI Dynamic Pricing	2.89	81.55	122.41	120.51	118.33	126.41	4.5%	24.0%
Utility Eff. Programs - T, D, Street Lighting	0.54	1.08	3.04	3.59	4.13	6.86	0.8%	0.8%
Utility Direct Load Control	25.41	33.97	55.33	69.39	73.83	75.77	39.6%	15.0%
Combined Heat and Power	8.78	13.63	18.47	23.32	28.16	67.65	13.7%	5.7%
Improved Codes and Standards	9.63	19.25	28.88	38.51	48.14	96.27	15.0%	9.8%
Weatherization Assistance Program	0.24	0.47	0.71	0.95	1.19	2.37	0.4%	0.2%
Approved SEU Programs	13.38	35.65	58.34	81.59	105.50	216.89	20.9%	21.4%
Prospective SEU Programs	3.21	26.69	56.15	87.07	113.60	113.60	5.0%	23.0%
Total	64.1	212.3	343.3	424.9	492.9	705.8	100%	100%

Delmarva has stated that it is cooperating with the SEU in order to reach the EERS goal. The SEU and Delmarva are meeting quarterly to discuss the status of savings. Because of the statutory responsibilities of the SEU, Delmarva is not currently developing in-house utility efficiency programs

SEU Programs

Synapse received information from the SEU which detailed the progress made so far towards meeting EERS goals. In short, the success of the programs' efforts in achieving EERS targets for MWH savings for 2011 is doubtful, and success for 2015 goals will depend on the nature of ongoing development and

maturation of programs, funding availability, and participation rates. Based on the limited information received, it appears that approved SEU program savings will be less than half of the savings anticipated by Delmarva for 2011 (as shown in Table 2 above), and no "prospective SEU program" savings are foreseen for 2011. While the programs are still undergoing development, and continuing to mature, there is yet another barrier that will be erected in 2012 that will slow such development and maturation. A number of the programs rely upon financing made available through the federal American Recovery and Reinvestment Act ("ARRA"). That financing expires in early 2012.

Delmarva does not currently plan to establish any efficiency programs that could contribute towards EERS savings goals currently expected to be met through the SEU programs.

Notably, the limited information available through the SEU does illustrate that energy efficiency costs are on average lower than the cost of SOS supply. Some programs (notably residential lighting, home performance with EnergyStar, and the appliance rebate program) exhibited levelized costs of saved electricity that were significantly lower than the costs to procure SOS supply. This indicates that there should be room in Delmarva's SOS procurement plans to ensure that this alternative to SOS supply-side resources is procured. Currently, the IRP does not call this out as an option other than as part of the SEU programs.[10]

Delmarva Demand Response Programs

Delmarva is implementing residential and small commercial air conditioner direct load control programs and AMI-enabled dynamic pricing[11] and expects to obtain a portion of the EERS demand reduction goal through those programs. Delmarva estimates energy savings (MWh) also arising from behavioral responses of customers on the dynamic pricing tariff. Tables 3 and 4 above list the estimated savings.

The air conditioning direct load control programs are opt-in programs that offer customers a choice of smart thermostats that interact with the AMI interface or outdoor switches. In 2011, Delmarva estimates that these air conditioning direct load control programs will lead to 25.4 MW of demand savings, almost 40% of the 2011 EERS demand savings goal. This share declines to 15% by 2015 (as the absolute level of savings ramps up to 73.8 MW). The company does not state how many customers they expect will participate in the program.

Delmarva has been installing its AMI system over the past few years, and in March 2011, it filed an application to employ AMI-enabled dynamic pricing rates. The company is proposing a dynamic pricing option: the Critical Peak Rebate (CPR). The filing proposes to default customers to a CPR pricing structure. Delmarva expects that some customers will return to the existing flat rate, and some

[10] It is our understanding that the Energy Efficiency Working Group is / will be considering a recommendation to the legislature that will allow for increased procurement of energy efficiency resources by Delmarva. Synapse understands that Staff is concerned that this proposal will be difficult to implement, costly to oversee, difficult to evaluate, and has potential jurisdictional conflicts.

[11] AMI-enabled dynamic pricing reflects a tariff rate structure that uses the ability of the meter to record consumption in hourly (or sub-hourly) increments and price kWh consumption differently for different time periods.

customers in the future, when the program is available, will leave for the Critical Peak Pricing (CPP) option. The expected participation percentages for each rate in 2025 are shown below in Table 5.

Table 5

1: Expected Dynamic Pricing Participation in 2025

SOS Residential Customers	CPR rate	55%
	CPP rate	20%
	Non-dynamic rate	25%
SOS Non-Residential Customers	CPR rate	65%
	CPP rate	10%
	Non-dynamic rate	25%

The expected energy and demand savings from AMI-enabled dynamic pricing is shown in Table 6, below.

Table 6: Energy and Demand Savings from AMI Enabled Dynamic Pricing

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Energy Impacts (MWh)	1,279	35,826	36,304	34,721	33,225	33,464	33,866	34,243	34,640	35,057
Demand Impacts (MW)	2.89	81.55	122.41	120.51	118.33	119.57	120.27	122.23	124.27	126.41

The impact of AMI-enabled dynamic pricing is projected to ramp quickly from 2011 to 2013, and holds relatively steady from 2013 through 2020. Delmarva stated in the IRP that it estimated that residential customers will reduce their energy consumption by 1.5% each year as a result of the detailed energy use information the company will provide.[12] The company stated in discovery that it will implement an extensive customer education campaign to inform customers about the dynamic rates in order to increase participation. Additionally, Delmarva will provide frequent feedback to customers about their reductions. Delmarva will monitor the reductions achieved through dynamic pricing, and if achievements are falling short of goals, it stated that it will revise the `customer education effort, the design of rates, or introduce new programs to achieve peak energy use reductions.[13]

Discussion and Recommendations – Demand Side Programs

Based on the low cost opportunities for energy efficiency resource procurement illustrated by the SEU, and the concern that the SEU programs will not (for 2011) and may not (for 2015) be able to reach EERS targets, Delmarva should continue to cooperate with the SEU in its energy efficiency and conservation efforts. The IRP[14] and responses to discovery[15] indicate that while Delmarva has a contingency plan, the SOS procurement approach selected does not contain any provisions for buying lower-cost energy efficiency resources. There are a number of ways this could be achieved, but generally the two primary vehicles are either direct program establishment by Delmarva, or buy-in to those SEU programs that might otherwise falter with the end of ARRA funding, and/or exhibit relatively low levelized costs of saved energy. Also, we note that while the Act limits the surcharge that may be imposed for collections

[12] IRP, page 79.
[13] Response to Discovery, Staff-15.
[14] IRP, pages 96-97.
[15] Response to Staff-05.

to support the Sustainable Energy Trust, the more general IRP guidelines support procurement of energy efficiency if it is less expensive than supply resources.

AMI-enabled demand response constitutes the lion's share of expected demand savings from Delmarva's DSM Initiatives (Table 4 above, and Table B.4 in the IRP). Based on Delmarva's response to Staff-03, it appears that Delmarva would prefer an option to have direct market-based, and time-based, pricing for SOS customers. Staff believes that before mandatory real-time pricing can be considered, there should be customer education and widespread availability of the tools necessary for customers to control their energy usage. The availability of interval metering throughout Delmarva's territory presents an opportunity to test the effect of directly using some form of time-based pricing.[16] However, Synapse does have concern with the overall magnitude of peak demand savings being ascribed to AMI-enabled pricing at this time, since the outcomes will vary depending on the final form of tariff option approved for the program and those outcomes have not yet been determined. We do note that direct load control demand response is estimated to provide 15% of the EERS target for peak demand savings in 2015, and represents a reasonable investment in relatively more certain (i.e., dispatchable) peak demand reduction.

As is discussed in the following section, there are SOS portfolio opportunities associated with some level of direct procurement of PJM spot market wholesale energy. A combination of factors – the existence of interval metering infrastructure (AMI), the presence of EERS peak demand targets, high PJM capacity prices in the Delmarva zone, and SOS procurement opportunities – leads us to believe that Delmarva should give more careful consideration in the future to procuring at least a portion of SOS energy supplies through direct PJM spot market purchases, and should then consider how such a price signal may best be utilized to ensure the highest levels of demand response for customers with AMI.[17]

Our initial recommendations are the following:

- Coordinate with the SEU in its energy efficiency and conservation efforts to promote effective procurement of energy efficiency and to help ensure SEU program development. Closer coordination with the SEU will also be required if an energy efficiency surcharge is implemented via the Energy Efficiency and Conservation Act (this form of surcharge would be capped at roughly 0.9 mills/kWh ($0.9/MWh).[18] We do note that such a charge would be much lower than energy efficiency charges in place for states with high-achieving efficiency programs.[19]
- Determine the best ways to maximize peak demand savings available from AMI customers and continually refine an AMI tariff to ensure such savings.

[16] The tariff options ultimately chosen for any AMI-enable demand response are critical to the program's success.
[17] We understand that Delmarva has filed for approval of AMI-enabled pricing structures.
[18] Synapse estimate based on the law's cap of $0.58/month and an average monthly usage of 650 kWh. If Delaware average consumption is different, the surcharge amount would also be different.
[19] Synapse notes that other states with high-performing energy efficiency programs use more direct forms of ratepayer-funded "system benefit charges" that are used to support energy efficiency installations. Delaware's SEU approach differs, somewhat fundamentally, from these other approaches.

- Maximize the procurement of dispatchable load control through the direct load control programs.

Standard Offer Service Procurement Portfolio

Overview of SOS Procurement Offered in the IRP

Delmarva provides a cost analysis between a reference supply portfolio ("reference case," or RC), and three alternative portfolios.[20] It also provides results for one planning year – 2020 - for sensitivity analysis using different input assumptions for carbon prices (a low and a high price sensitivity – the RC uses an intermediate value[21]) and gas prices (low gas price).[22]

The reference portfolio consists of the existing SOS Full Requirements Service Agreements (FSA), and modeled results for future FSA's of the same product definition: three-year fixed price contracts for the Residential and Small Commercial and Industrial ("RSCI") sector, based on purchasing one-third of RSCI requirements each year; and one-year fixed price contracts for large commercial ("LC") customers.

The alternative portfolios consist of the same FSA contract procurement strategy but with inclusion in the portfolio of the costs and benefits of i) a 135 MW gas-fired CC addition in Delmarva South, online in 2014, ii) a 150 MW on-shore (PJM western region) wind resource online in 2014, and iii) 150 MW offshore wind purchase online in 2016 (incremental to the existing Bluewater Wind contract).

The underlying, preferred baseline SOS procurement approach is the use of FSA contracts. These contracts essentially outsource the entirety of the portfolio management (excluding renewable requirements), as winning bidders provide all energy, capacity, and ancillary services requirements for SOS load. While the three alternatives analyzed do address three specific supply source alternatives that affect the financial performance of the supply portfolio, these three "one-off" analyses essentially represent a set of incremental changes to the core FSA approach. The 2010 IRP does not attempt to assess procurement of alternative product types other than the full-service arrangements, such as some combination of standard fixed volume block energy purchases, long-term contracts for new or existing resources, and/or direct use of the PJM wholesale spot markets for energy, capacity and ancillary services.

Delmarva's implicit assumption in its approach is that the FSA arrangements represent a reasonable cost, market-based purchase that will outperform (e.g., be less costly, and/or more price stabilizing, and/or more reliable) any alternative purchasing arrangements. While the 2008 IRP did analyze other arrangements besides the FSA approach[23], the 2010 IRP does not attempt to either replicate the earlier analyses using updated market information, or conduct an alternative assessment of procurement using other product types or durations. Thus its conclusion that the FSA approach is aligned with the goals of

[20] 2010 IRP, pages 8-11, and Appendix 5, Portfolio Model Technical Appendix.
[21] RC carbon pricing begins in 2018, and reach $30/ton (nominal) by 2020. IRP Appendix 5, page 54.
[22] Appendix 5, pages 26-31.
[23] See "Delmarva Revised Update to IRP," November 3, 2008.

the IRP Regulations is not supported by any analytical evidence of the costs of alternative procurement approaches.

In support of continuing the use of the FSA contracting approach to meet SOS requirements, Delmarva states:

> "As measured by reliability, reasonable cost and price stability, Delmarva Power and Light Company (Delmarva, DPL) believes that the SOS procurement strategy it has pursued since the last IRP has been successful."[24]

Discussion and Recommendations

There is no current documentation in the IRP of the comparative effects on reliability, cost or price stability of anything other than the FSAs and the incremental unit supply options examined. There are other portfolio arrangements that could have been analyzed, and would have served as an important comparison point to the FSA contracts Delmarva relies upon. There is no provision of a benchmark value using the PJM wholesale spot markets (energy, capacity, and ancillary services) as a source of full-service supply for SOS load. There is no provision of portfolio effects using even the simplest combination of fixed volume, block purchases and reliance on the PJM spot markets to balance load. While a myriad of combinations (i.e., hedging options) is possible, and we would not expect an exhaustive analysis of the effects of all or even many combinations, the lack of at least a few alternatives using current market projections makes it difficult to assess the reasonableness of the preferred approach.

Delmarva suggests, in response to Staff-03, that "establishment of an SOS customer charge to reflect capacity costs" could be warranted. Current FSA arrangements include capacity costs. The FSA approach has already undergone one significant change – removal of the RPS obligation from FSA suppliers. Removal of the capacity obligation,[25] as referenced in the discovery response, would be a second major change. At some point, if market-based risks (such as REC costs, or capacity costs) are considered for removal from the FSA approach, it is reasonable to ask if the product type itself should be changed and reconsideration of the underlying reasons for having a full requirements product in the first place should be undertaken.

In that vein, we suggest that Delmarva consider the implications of moving toward direct physical purchase of energy through the PJM spot market for SOS load, and more considered analysis of the effect of different types of hedging strategies to minimize price volatility that might be of concern with such a strategy. The current FSA approach is one hedging strategy, essentially at one end of the continuum of options for addressing price and volume risk for SOS load. Another strategy would be for Delmarva itself to secure minimal forward pricing hedges (using the 12-18 month forward futures

[24] 2010 IRP, Executive Summary, page 1.

[25] A change in rate design to allow a customer charge for capacity (presumably, a direct pass-through of PJM RPM capacity construct charges) effectively removes this obligation from SOS providers currently providing it as part of the FSA contract.

available in PJM, as noted by Brattle[26]) based on the underlying load profiles of the SOS sectors. A third strategy would be to use solely a spot-price pass through for SOS load, but fix the price on a quarterly, seasonal, 6-month, or annual basis and true up imbalances in some periodic fashion. To meet the minimum requirements of Section 5.4 of the IRP regulations, Delmarva could fix the volume of SOS load (either physical load, or financial hedging products) procured in annual auctions at 30% of its expected energy requirement. For any of these alternatives, different combinations of longer-term hedging or physical energy products (such as long-term contracted wind plant output) can complement the shorter term purchases.

While we are not suggesting any particular procurement approach, it is our recommendation that Delmarva more carefully analyze these options with the aim of minimizing costs for SOS load. Current SOS costs include a premium[27] associated with fixing the price for three years, and there is no direct analytical evidence provided by Delmarva in its IRP submittal that this approach is most likely to result in minimal costs for SOS customers. Depending on tariff design particulars under a "spot price pass-through" approach, and also depending on mechanisms in place for customers to better control temporal usage patterns or overall use,[28] other options might provide lower overall costs to SOS load while still maintaining some degree of price stability.[29]

Staff suggests that Delmarva conduct an analysis of the effect on SOS rates of switching to procuring SOS energy in the PJM day-ahead energy market, SOS capacity in the PJM RPM market, and SOS ancillary service obligations in the respective PJM ancillary service markets. The analysis should be based on two historic periods—one period of rising energy prices and one period of declining energy prices. This additional information will assist in determining whether there is sufficient benefit in deviating from the current three-year rolling average SOS procurement process.[30]

Ongoing developments, including i) the availability of interval metering for SOS customers, ii) the potential for covering a part of capacity obligations through direct investment in a gas-fired combined cycle unit (discussed in the following section), and iii) the ability to reduce peak load (and associated peak period prices) through increased use of direct load control and AMI-enabled demand reduction, represent opportunities to lower overall SOS costs, and there may be synergistic benefits if such developments are examined in tandem with SOS supply cost procurement alternatives.

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[26] Appendix 5, page 42.

[27] FSA suppliers include a premium to cover price and volume risks over the three-year period of the contract. This can be seen by analyzing the total costs to procure PJM capacity, energy and ancillary services in the Delmarva zone, and accounting for load shapes of SOS consumption.

[28] There are two possible savings mechanisms for SOS ratepayers associated with this issue: 1) average energy price savings associated with the form of contractual or purchasing arrangements, and 2) reduction of use (or shifting of use to other time periods) to take advantage of the hourly differences in wholesale spot market prices.

[29] We note that price stability, while an important aim and explicitly a part of the IRP regulations, can be at odds with the aim of minimizing costs. For example, changes in seasonal consumption patterns will lead to differences in customer bills even in the presence of price stability. There are numerous mechanisms available to facilitate bill stability that can be mutually supportive of minimal cost objectives.

[30] This analysis could be part of the SOS procurement improvement process or the next IRP.

Combined Cycle Unit and Increased Wind Alternatives

Overview / Information in IRP

Delmarva analyzed the financial effect of a 135 MW combined cycle unit on the Reference Case portfolio. While the results did not indicate a net benefit to the portfolio for the early year tested (2015), it does show benefit in 2020, and essentially breakeven in 2017.[31] Also, the analysis did not review the overall life-cycle benefits of a new CC unit,[32] and in general the portfolio analysis does not attempt to incorporate capacity price risk into the assessment.[33] Both of these unanalyzed factors could drive increased benefits associated with Delmarva addition of a CC unit. The sensitivity analyses (high carbon, low carbon, and low gas price) all indicate that in 2020, a portfolio with the CC unit is less costly than the reference case portfolio.[34] Lastly, Delmarva also conducted a 2020 sensitivity around other variables, and notably illustrated a significantly lower portfolio cost than the RC with a larger CC unit in the north of the DPL zone.[35]

Delmarva also analyzed the value of adding more wind resources to the SOS portfolio. On-shore wind resources are slightly more expensive than the CC unit additions in the early years, based on the modeling parameters used. However, as with CC unit alternatives, the 2020 year analysis indicates reduced costs relative to the reference portfolio, as is also the case in the sensitivity analyses for 2020. Off-shore wind addition raises modeled costs significantly higher than either the CC unit or on-shore wind options. However, these results are based on IPM model inputs for on-shore wind costs, which are relatively high compared to actual costs seen in the market for on-shore wind in recent years.[36] More empirical evidence of the costs of new on-shore wind in the PJM regional market would be valuable to help ascertain if increased on-shore wind in the SOS portfolio represents a likely net benefit for customers.

Discussion and Recommendations

Adding a CC unit to the SOS portfolio certainly has the potential to provide benefits to SOS customers and simultaneously provide risk protection against capacity prices, energy costs, and CO2 emission prices. Adding on-shore wind has the potential to help energy costs and CO2 emissions risk (though generally not capacity price risk). Delmarva's portfolio modeling is useful in setting the underlying framework for SOS purchase decisions in this regard, but it is our sense that additional analysis is required to determine just how beneficial these alternatives may be for SOS customers. Any procurement of such a resource or resources for the SOS portfolio should be conducted using a competitive process.

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[31] IRP Appendix 5, Tables 2 and 3, page 35s 35-36.
[32] IRP Appendix 5, page 32.
[33] IRP Appendix 5, page 51.
[34] IRP Appendix 5, Table 5, page 58.
[35] IRP Appendix 5, Table 6, page 58.
[36] IRP Appendix 4, Exhibit 2.4, page 10 (IPM wind costs); and see for example, Wiser and Bolinger, Lawrence Berkeley National Laboratory,"2009 Wind Technologies Market Report", wind cost sections at pages 44-48. Available at http://eetd.lbl.gov/ea/emp/reports/lbnl-3716e.pdf.

We recommend the following:

- Review alternatives for new CC unit procurement in the Delmarva zone, accounting for capacity price risk, scale issues (i.e., the potentially significant beneficial effect of a larger CC unit in the north), current CO2 price risks, the potential benefit associated with new gas unit contributions toward reducing health risks (by helping to minimize Delmarva reliance on existing coal-heavy PJM resources), and in combination with policies for core SOS procurement options. Include in this review any concerns associated with recent PJM tariff changes that modify the ability of states to self-supply load with resources of their own choice.[37]
- Review the current costs of on-shore wind alternatives, and compare to those used in the IPM model. To the extent that less expensive on-shore resources are available, analyze the impacts on the SOS portfolio and consider supplementing it with additional on-shore resources if this proves to be cost-effective.
- Delmarva has several programs in various stages of implementation that could have a significant impact on their SOS procurement process. These include AMI, dynamic pricing, customer choice, revenue decoupling, IRP, and compliance with energy efficiency and renewable state policies. Delmarva should coordinate these efforts with the SOS procurement process to ensure that they are working in harmony and will not have unintended consequences on the procurement results.

[37] FERC decision on PJM modification to offer price rules for PJM RPM capacity resources. EL11-20, April 11, 2011.