US Electric Utilities & IPPs
Is Coal in Maryland's Future?

Equities

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Looking at forthcoming regulations, we expect a substantial scaling back in MD
Digging deeper into Phase II implementation of the state's Healthy Air Act, we expect the bulk of the state's coal assets to opt to retire rather than retrofit with costly SCRs to meet more stringent NO_x emission thresholds. We look for the latest phase of regulations to be finalized later this year (prior to mid-Jan end of the current Governor's term), likely re-triggering a conversion to gas for NRG's Dickerson units (or at least just as well as part of Chalk Point, as well as potentially for Talen's Crane and at least Wagner Unit 2. When including the retirement of Potomac River, the rules would result in the closure of up to five of the state's eight coal plants. We emphasize that the final acceptable portfolio NO_x emission averages are still pending settlement, as well as timeline (2018-2020), but emphasize an overall target range of 0.07lb/MMBtu would leave little room for plants opting not to install any further retrofits (as is the intention of the program). We look for meaningful updates next Monday, 10/6, with finalization of rules by year end.

What does this mean? GenOn creditors already expecting, PPL not so much
While GenOn bondholders have been prepped for the announcement following discussion of an accelerated retirement earlier this year, we continue to see some risk to expectations around PPL. We include potential compliance scenarios to meet these threshold limitations, seeing potential to limit dispatch on the non-compliant units as a particular approach. The further question remains to what extent units can be repowered to gas units, on the cheap, using existing steam generators? Talen further suggests it continues to evaluate 'low cost' alternatives to comply with prospective Phase II regs (although details are scant). We suspect NRG would pursue the same playbook it has already used elsewhere, emphasizing both sites already have CTs with gas pipeline access, leaving the Raven assets a bit less clear in this regard. Lack of clarity on rules could further impede the 'sale-ability' of Crane through any contemplated divestment process as part of the deal. We estimate the GenOn units at risk generate ~$30-40 Mn/yr in EBITDA in '16/'17, with the two Talen units generating ~$20 Mn/yr in the same years. We estimate that any units converted to gas would contribute a nominal level of EBITDA given exceptionally limited energy dispatch.

We expect a significant shift in fuel source, as gas becomes the focus
With no CCGT capacity today, we emphasize meaningful expected additions of new gas plants through the decade as the state transitions away from coal, seeing multiple new merchant plants as having cleared in recent auctions (CPV's St Charles CCGT appears to be moving forward as a merchant build, following the rejection of its contract with the state earlier). In total, we estimate ~3.3GW of new merchant and we also emphasize new gas plants in adjacent Virginia (VEPCo) will likely assuage any resource constraints in the region, particularly as new pipeline capacity crosses the hit state from PA. Timing of any coal shutdowns – particularly if grouped – could yet drive the region to breakout separately (particularly seeing it as 'tested' as a separate region already). We also see new gas sources from the Marcellus heading southwards as further enabling cheaply-sourced gas as the basis for new merchant projects in MD.

We suspect NO_x regulations could yet impact other states too
While much of the Eastern coal portfolio is already in compliance with SO_2 regulations, both implicitly and explicitly required by EPA's MATS rules, we see risk around NO_x regulations across the eastern Appalachian coal portfolio. Plants without SCRs (having opted for cheaper SNCRs previously) could yet face pressures as subsequent iterations of rules are implemented. Comparably, it is NO_x emissions which have driven bulk of Western PRB capex for compliance with 'Regional Haze' rules, rather than SO_2 targets.

This version clarifies that AES' Warrior Run plant is not contemplating closure.

Is Coal in Maryland's Future?

Ability to meet the portfolio average standard will be critical for plants on the margin.

Looking towards finalization of Maryland's Phase II regulations later this year as part of its Healthy Air Act rules, the state could yet see a substantial reduction in its coal capacity as generators (both GenOn and Talen) opt not to retrofit its units with SCRs. Negotiations are likely to continue through mid-January at the latest, when Governor's O'Malley's term is over, with the key question being both the final portfolio-wide averages under the new regulations, as well as the *timeline* (2018-2020) for compliance; significant details are expected next Monday (10/6). We include a detailed breakdown of historic emissions from each of the plants, including existing portfolio wide averages.

We look for key details to be hashed out around the portfolio averaging

On paper today, proposed regulations would require a 0.07lb/MMbtu standard; however, additional latitude will likely be provided in any final regulations. We provide a breakdown of assets below – we believe all assets without SCRs could yet retire (all marked below). In the NO_x scenario to the right, we include a theoretical 'maximum' performance definition, and the weighted portfolio profile of the portfolio pro-forma for the retirements. We look for key details to be hashed out around the portfolio averaging (we don't see much latitude for NRG to use benefits from low emissions at Morgantown to the balance of the portfolio, with MD specifically seeking to cut out this loophole).

Figure 1: The Maryland Coal Portfolio – What will remain after the new regulations? Only the SCR units in our view.

			NOx Emissions (lbs/MMBtu)						
Plant unit	Capacity (MWs)		2013	2012	2011	2011-13 average	NOx Scenario	State	Owner
Brandon Shores 1	685	**SCR**	0.08	0.10	0.15	0.11	0.07	MD	Riverstone Holdings LLC
Brandon Shores 2	685	**SCR**	0.10	0.20	0.15	0.15	0.07	MD	Riverstone Holdings LLC
C.P. Crane 1	190	*SNCR*	0.41	0.40	0.43	0.41		MD	Riverstone Holdings LLC
C.P. Crane 2	209	*SNCR*	0.57	0.47	0.46	0.50		MD	Riverstone Holdings LLC
Herbert A Wagner 2	136	*SNCR*	0.45	0.56	0.41	0.47		MD	Riverstone Holdings LLC
Herbert A Wagner 3	359	**SCR**	0.09	0.11	0.11	0.10	0.09	MD	Riverstone Holdings LLC
Riverstone Portfolio average emissions			0.14	0.20	0.19	*0.18*	*0.07*		
Chalk Point 1 and 2 ST1	364	**SCR**	0.18	0.21	0.19	0.20	0.07	MD	NRG Energy, Inc.
Chalk Point 1 and 2 ST2	364	*SNCR*	0.26	0.28	0.26	0.27		MD	NRG Energy, Inc.
Dickerson 2	196	*SNCR*	0.27	0.22	0.27	0.25		MD	NRG Energy, Inc.
Dickerson 3	196	*SNCR*	0.26	0.24	0.26	0.26		MD	NRG Energy, Inc.
Dickerson ST1	196	*SNCR*	0.26	0.24	0.25	0.25		MD	NRG Energy, Inc.
Morgantown ST1	626	**SCR**	0.03	0.03	0.04	0.03	0.03	MD	NRG Energy, Inc.
Morgantown ST2	626	**SCR**	0.04	0.03	0.03	0.04	0.04	MD	NRG Energy, Inc.
NRG Portfolio average emissions			0.13	0.11	0.13	*0.12*	*0.04*		
Warrior Run Cogeneration GEN1	229		0.08	0.08	0.17	0.11		MD	AES Corporation
Maryland overall average						*0.51*			
Example of Plant Burning Low-NOx Indonesian Coal:									
Bridgeport Harbor 3 3	400		0.13	0.14	0.13	0.14		CT	Public Service Enterprise
PPL/Talen Assets in PA									
Montour 1	806		0.37	0.38	0.31	0.35		PA	PPL Corporation
Montour 2	819		0.37	0.38	0.26	0.33		PA	PPL Corporation
Brunner Island 1	363		0.37	0.37	0.35	0.36		PA	PPL Corporation
Brunner Island 2	405		0.35	0.38	0.35	0.36		PA	PPL Corporation
Brunner Island 3	790		0.36	0.37	0.38	0.37		PA	PPL Corporation
Pennsylvania overall average						*0.35*			

Source: SNL, company reports, and UBS estimates

What about Talen's portfolio? Some Risk in the Deal.

Is Indonesian the answer to NO_x? Unclear if it goes far enough.

We suspect Crane (both units) as well as Wagner-Unit 2 are at risk of retirement, seeing the units as having NO_x emissions today that are substantially higher than the portfolio targets contemplated. Notably, while Wagner-Unit 3 has an SCR, the question remains whether future 1-hour SO_2 regulations will allow the plant to continue to average its emissions with the adjacent Brandon Shores units. While management has maintained that using Adaro Indonesian coal it can be in compliance with air standards, we qualify that the low-Sulfur attributes of the coal do not fundamentally change the combustion temperatures meaningfully, particularly with sub-bituminious PRB coal already used at Crane (typically the lower the heat, the lower NO_x profile of the plant.)

Indonesian Coal: Looking at the PSEG Bridgeport Example

We include a table below showing the latest NO_x emissions from this unit over the last few years, seeing it as a good example of an existing US plant using low-NO_x Indonesian coal to reduce its emission levels to the 0.13lb/MMBtu context in its state of CT. While lower than what is otherwise reported today at Crane and Wagner under their existing coal burn composition, it remains unclear if an average of these lower levels (if even achievable), coupled with improved NO_x (yet lower than 0.08 disclosed last year), could hit prospective targets.

Figure 2: PSEG's Bridgeport Unit 3 Emissions

Emissions	2009	2010	2011	2012	2013
CO2 Emissions (tons)	1,169,174	1,381,071	553,087	156,454	765,428
CO2 Emissions Rate (lbs/MMBtu)	209.76	209.76	209.76	209.76	209.76
NOx Emissions (lbs)	1,676,363	1,868,130	744,658	212,013	993,515
NOx Emissions Rate (lbs/MMBtu)	0.1504	0.1419	0.1412	0.1421	0.1361
SO2 Emissions (lbs)	2,528,250	2,520,358	1,025,891	289,717	1,563,257
SO2 Emissions Rate (lbs/MMBtu)	0.2268	0.1914	0.1945	0.1942	0.2142

Source: SNL Energy

… and the Sale of Crane? Really selling it for remaining cash

Raven is 90% of RJS 2016 adjusted EBITDA and nearly 25% of Talen 2016 adjusted EBITDA.

We see the sale of this asset as the less likely of the two sale 'portfolio' options of the Talen portfolio making mitigation proposal. With a potentially limited remaining life, we see the asset as likely unsellable for an attractive valuation. Moreover, the portfolio averaging benefits amidst a broken-up portfolio could yet create additional complexity. We suspect Talen will continue to own both assets through any potential regulatory clarity at a minimum, if not clarity through retirement.

More than half of the segment's EBITDA is attributable to Brandon Shores by our estimate, however, emphasize the Raven piece is a key total contributor to Talen, as part of Riverstone's contribution of assets (90% of RJS Power and 23% of Talen adjust 2016 EBITDA).

We emphasize that initial concerns around market power by the IMM as part of the portfolio could yet be mitigated given asset risk to both Crane and Wagner

Figure 3: Raven Power EBITDA Profile – All Assets

Raven Power	2014	2015	2016	2017
Capacity (MW)	2,621	2,621	2,621	2,621
Blended Capacity Factor (%) SNL	37%	37%	37%	37%
PJM-West On-Peak ($/MWh)	45	47	47	46
Bias for Super-Peak ~10%	*50*	*52*	*51*	*51*
Blended Power Price ($/MWh)	47	49	48	48
Variable Cost ($/MWh)				
Coal	(24)	(24)	(24)	(24)
Transport	(14)	(14)	(14)	(14)
Total Variable Cost	(37)	(37)	(37)	(37)
Energy Margin ($MWh)	9	12	11	10
Generation (TWh)	8.4	8.4	8.4	8.4
Energy Margin ($Mn)	79	97	90	87
PJM MAAC Capacity Payment ($/MW-day)	174	155	139	120
Capacity Revenue ($Mn), EFOR Adjusted	141	126	113	97
Total Revenue	221	222	203	184
O&M ($/kW-yr), UBSe	45	45	45	45
O&M ($ Mn)	118	118	118	118
EBITDA	**103**	**104**	**85**	**67**
Maintenance Capex ($/kW-yr), UBSe	10	10	10	10
Maintenance Capex ($ Mn)	(26)	(26)	(26)	(26)
FCF	**77**	**78**	**59**	**40**

Source: SNL Energy, Platts, Company Filings, and UBS Estimates

And what about the specific Raven Assets?

We include Crane and Wagner below – both contribute relatively little to the portfolio at present still, making them relatively unlikely to see anything meaningful in retrofits put into them to comply with regulations.

Figure 4: Wager Estimated Financial Profile

Herbert A Wagner - 2016 Financial Snapshot	
963	Capacity (MW)
20%	Capacity Factor, UBSe
51	2016 PJM-West Peak ($/MWh), Bias for Super-Peak ~10%
(41)	Variable Cost (Coal & Dispatch) ($/MWh)
10	Energy Margin ($MWh)
1.69	Generation (TWh)
18	Energy Margin ($Mn)
139	PJM MAAC Capacity Payment ($/MW-day)
42	Capacity Revenue ($Mn)
45	O&M ($/kW-yr), UBSe
43	O&M ($ Mn)
16	**EBITDA**

Source: SNL Energy, Platts, Company Filings, and UBS Estimates

Figure 5: Crane Estimated Financial Profile

C.P. Crane - 2016 Financial Snapshot	
385	Capacity (MW)
27%	Capacity Factor, UBSe
51	2016 PJM-West Peak ($/MWh), Bias for Super-Peak ~10%
(49)	Variable Cost (Coal & Dispatch) ($/MWh)
2	Energy Margin ($MWh)
0.91	Generation (TWh)
2	Energy Margin ($Mn)
139	PJM MAAC Capacity Payment ($/MW-day)
17	Capacity Revenue ($Mn)
45	O&M ($/kW-yr), UBSe
17	O&M ($ Mn)
2	**EBITDA**

Source: SNL Energy, Platts, Company Filings, and UBS Estimates

Salvaging what it can of the NRG portfolio?

We suspect a conversion to gas, following its playbook elsewhere

We include a table below of the economics of NRG's GenOn coal portfolio in the state, emphasizing that its Morgantown facility is the clearest to survive, but Chalk Point could yet emerge under certain scenarios (specifically its Unit 1, with an existing SCR).

Figure 6: NRG GenOn Mid-Atlantic Assets

GenOn Mid-Atlantic			
Assets	MW	Market	Fuel
Chalk Point - Coal	667	PEPCO	Coal
Chalk Point - Gas	1,690	PEPCO	Gas
Dickerson - Coal	537	PEPCO	Coal
Dickerson - Gas	312	PEPCO	Gas
Morgantown - Coal	1,229	PEPCO	Coal
Morgantown - Oil	248	PEPCO	Oil
Total MW	4,683		
Present Value of Op. Leases	706		

Source: SNL Energy, Platts, Company Filings, and UBS Estimates

We expect Chalk Point and Dickerson to be converted to gas if regulations no longer enable the plant to burn coal, seeing existing CTs at both plants served with gas. We see the conversion costs as reasonable, with existing pipelines in place; we estimate the units once converted would contribute a nominal level of EBITDA.

We estimate the coal units today at Dickerson and Chalk Point units together produce ~$35 Mn in annual EBITDA, with the bulk at Chalk Point (~$25 Mn).

But what about attitudes? We believe GenOn has largely written off these plants in expectations

NRG investors expect the GenOn MD units to retire – not quite for PPL

In contrast to Talen, where investor expectations continue to assume their continued operations on the back of comments from management, we see announcements made earlier this year to PJM around the retirement of the Dickerson/Chalk Point as providing more clarity. <u>We suspect finalization of the rules later this year could prove a negative datapoint for the Talen/PPL portfolio, albeit it remains a de-minimus portion of this portfolio</u>. Meanwhile, the fate of the GenOn units is particularly relevant for the Mid-Atlantic lease. We emphasize given the principal payments involved in this segment, it is unclear if this specific segment of the business will survive assuming the two plants are converted/retired.

What does this mean for capacity prices? Depends how quickly done

Depends on when retired – and if converted to gas.

We suspect the BGE/PEPCO load zones could yet find themselves 'constrained' should all four plants retire (two from NRG, two from Raven). The question to this point remains <u>how quickly</u> rules are implemented, with an expectation for at least a gradual implementation of regulations (2018-20) potentially tempering the impact. We flag the state has seen new gas plants proposed in the recent capacity auction – and we think we will continue to see further CCGTs in future auctions, emphasizing that Dominion's new greenfield gas pipeline into Virginia will likely reduce gas basis regionally here as well, improving the relative economics of new gas in the state (sourcing cheap gas, reliably has been the critical driver behind the continued slew of new gas plants elsewhere in PJM, specifically PA).

Listing out the new gas plants in Maryland

We include a full list of the four proposed/under construction CCGTs in the state. We also emphasize Exelon continues to pursue new plants as part of its original merger deal with Maryland to approve the Constellation acquisition.

Figure 7: Maryland New Gas Assets – unclear what *has* already cleared the RPM auction

Project Name	Project Owner	Capacity (MW)	Prime Mover	In Service	Status	Estimated Cost ($Mn)	Cost Est By SNL
Wildcat Point	Old Dominion Electric	1,000	Combined Cycle	2017	Advanced	1,100	Y
Mattawoman Power	Panda Power Funds	859	Combined Cycle	2018	Advanced	945	Y
Keys Energy Center	Genesis Power LLC	755	Combined Cycle	2017	Early Development	750	N
CPV St Charles	CPV Power	725	Combined Cycle	2016	Construction Begun	775	N
Perryman	Constellation Power	120	Gas Turbine	2015	Construction Begun	120	N
Riverside (MD)	Constellation Power	(74)	Steam Turbine	2015	Announced	NA	-
	Total	**3,385**					

Source: SNL Energy

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Source: UBS. Rating allocations are as of 30 September 2014.
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Company Disclosures

Company Name	Reuters	12-month rating	Short-term rating	Price	Price date
NRG Energy Inc.[16]	NRG.N	Buy	N/A	US$31.56	03 Oct 2014
PPL Corporation[2, 3, 4, 6a, 6b, 7, 16]	PPL.N	Neutral	N/A	US$33.48	03 Oct 2014

Source: UBS. All prices as of local market close.
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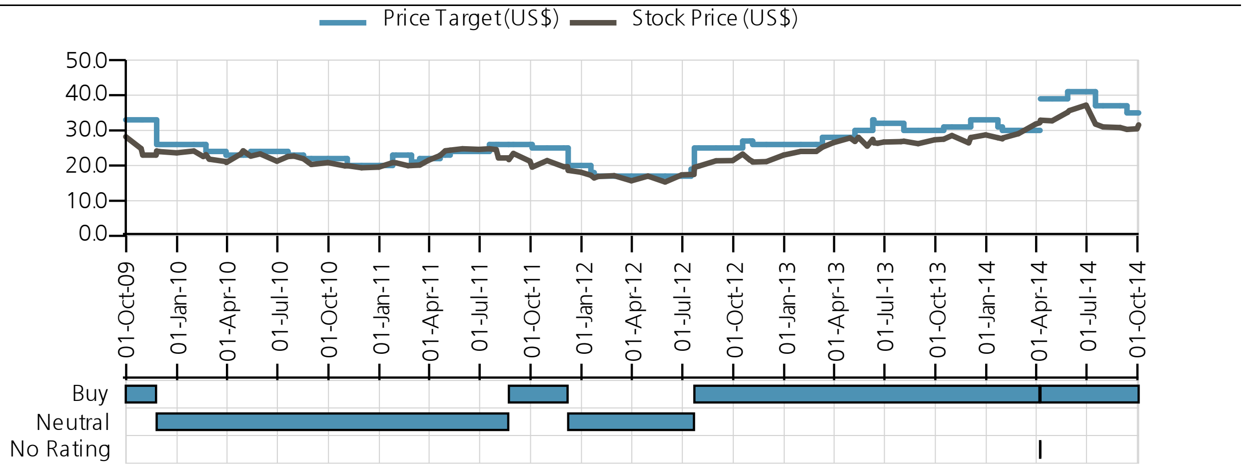

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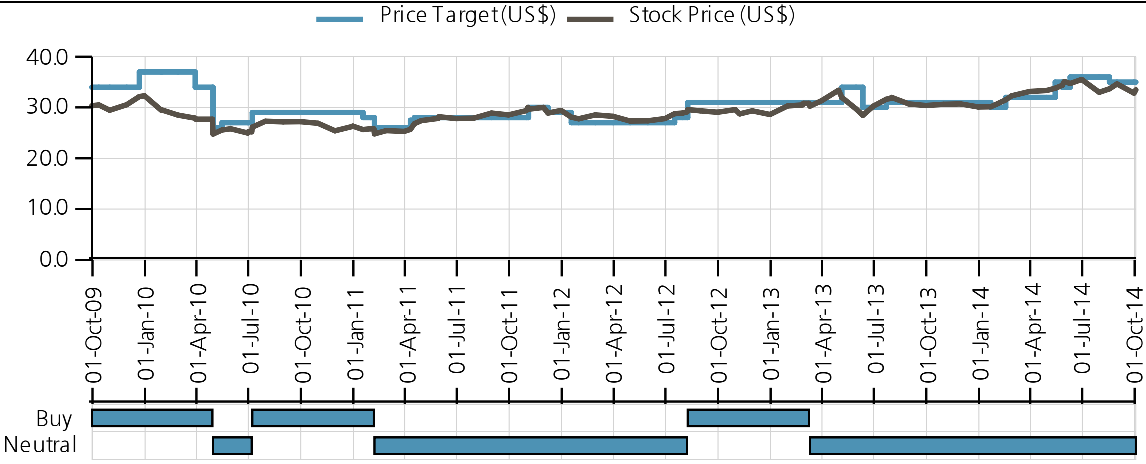

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