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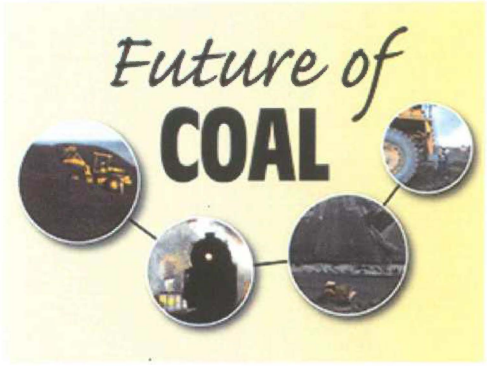
After already big losses, US coal burn to tumble further

By Annalee Grant and Everett Wheeler and Molly Christian and Steve Piper

This is the sixth article in a multi-part series looking at the state of the U.S. coal industry. Part six explores what forecasters are predicting for future coal production and consumption when accounting for a host of environmental regulations targeting emissions from coal-burning plants.



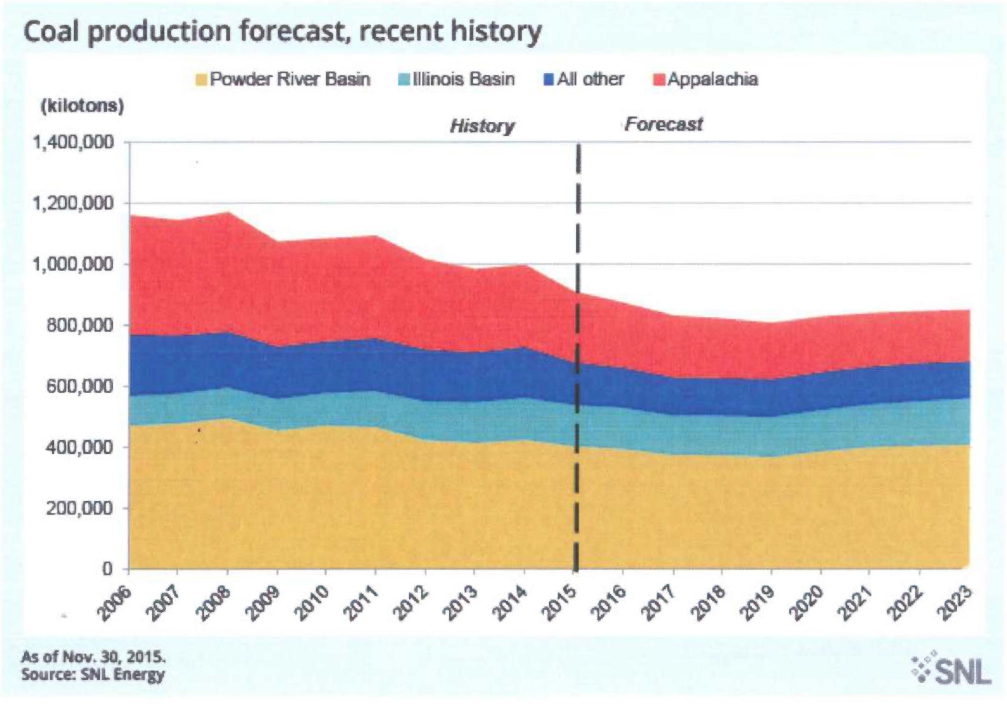
Market and regulatory factors could push U.S. coal consumption and production down by almost 20% by 2020 from recent levels after already substantial demand losses in the past few years.

The twin forces of coal retirements to comply with the U.S. EPA's Mercury and Air Toxics Standards, or MATS, and ongoing price competition from natural gas have substantially eroded coal demand. Those fundamentals have created a vicious cycle for coal-fired generators, as weak wholesale power prices brought on by low natural gas prices have made it tough to recover the costs of environmental retrofits while reducing their dispatch.

This has hastened decisions to retire coal plants, particularly for merchant operators who have direct exposure to wholesale markets. Owners of regulated coal plants have been impacted as well, as shown by announced retirements for large power producers including the Tennessee Valley Authority and Southern Co.

Given the ongoing expectation that natural gas prices will remain low over the next several years, both coal plant retirements and displacement by natural gas are entrenched as features of the coal market.

Coal production for 2015 will test the 900 million ton level, lower than at any time in the last 20 years. And production is very likely to fall further still, along with U.S. demand for the fuel, even before newly finalized rules to control carbon emissions take effect next decade. In its latest SNL Coal Forecast, SNL Energy projects electric sector coal demand will drop to around 700 million tons in 2020, when production including coking coal will total 830 million tons per year, nearly 17% below 2014 levels. Just between 2014 and 2016, power sector coal burn is on track to fall by 125 million tons per year before eroding a further 45 million tons per year by 2020. Those estimates do not account for the EPA's Clean Power Plan, which requires power sector carbon cuts beginning in 2022.



Against the prospects of a shrinking market, every producing region risks losing demand over the next few years, with some basins more vulnerable than others.

Central Appalachia has experienced the largest production and demand declines, the result of higher mining costs and increased regulatory scrutiny of mountaintop surface mines. This has put upward pressure on unit costs of coal production, making it difficult for many producers to remain profitable amid weakening prices.

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The Powder River Basin and Illinois Basin are in a better position due to more competitive cost structures. Low-priced natural gas reduces the customer base for these mines, but to a smaller degree than for Central Appalachian mines. The Illinois Basin can steal market share from gas when Henry Hub gas prices move above $3/MMBtu.

The PRB can compete when gas drops as low as $2.50/MMBtu to $2.75/MMBtu, according to one producer in the region. But even the PRB hasn't been immune from sinking gas prices.

The impact of low natural gas prices, combined with falling power prices and increased environmental compliance costs have led to coal's ceding market share to gas-fired generators. Indeed, U.S. power sector coal demand peaked at 1.05 billion tons in 2007, but short-term government and industry projections for annual coal consumption do not reach 80% of that level even with the expected lackluster growth in power sector demand.

No near-term relief from cheap gas

U.S. Energy Information Administration estimates indicate gas output reached a peak in June and that production growth could slow or reverse in response to low prices. But other data suggest production continued to grow through the summer, which could keep gas prices low enough to displace more incremental coal-fired generation.

"It's hard to predict commodity prices [five to 10 years into] the future," Moody's analyst Sajjad Alam told SNL Nov. 30. "The marginal cost of production generally dictates market prices and those costs continue to decline in North America with the massive production increases in the Marcellus and to some degree in the Utica Shale plays. We believe prices will be range bound over the next several years and fluctuate between $2/Mcf and $4/Mcf."

Alam outlined factors on both the supply and demand side that could drive the natural gas market higher, all of which have some dependence on government policy.

"Other than unusually cold temperatures during winter months, the two factors that could support a greater than $3/Mcf price over the long run are the establishment of a large LNG export platform and an accelerated shift away from coal due to increased regulatory costs/pressures," Alam said.

According to an SNL Energy analysis, 56.28 Bcf/d of LNG export capacity has been announced. Of that, 48.21 Bcf/d of capacity is expected online by 2025. But of that, less than one-fourth is in either advanced development or under construction.

"Volatile global LNG prices (which are often linked to crude oil prices) and new LNG supply from other regions have suppressed the economic motivation to accelerate construction of the multi-billion dollar LNG export facilities in North America," Alam said.

US LNG export facilities by estimated year in service, development status (Bcf/d)

Estimated year in service	Announced	Early development	Advanced development	Construction begun	Total
2016	-	-	-	1.38	1.38
2017	0.36	0.35	-	2.20	2.91
2018	0.57	1.07	-	5.64	7.28
2019	2.68	7.66	0.70	0.70	11.74
2020	8.92	4.52	-	-	13.44
2021	8.91	-	-	-	8.91
2025	2.55	-	-	-	2.55
Unknown	8.07	-	-	-	8.07
Total	32.06	13.60	0.70	9.92	56.28

Dash (-) indicates a null value.
Only capacity for train 5 is currently under construction for SNL tracked phase three of the Sabine Pass Liquefaction Project. .
Sources: SNL Energy, U.S. Department of Energy, FERC

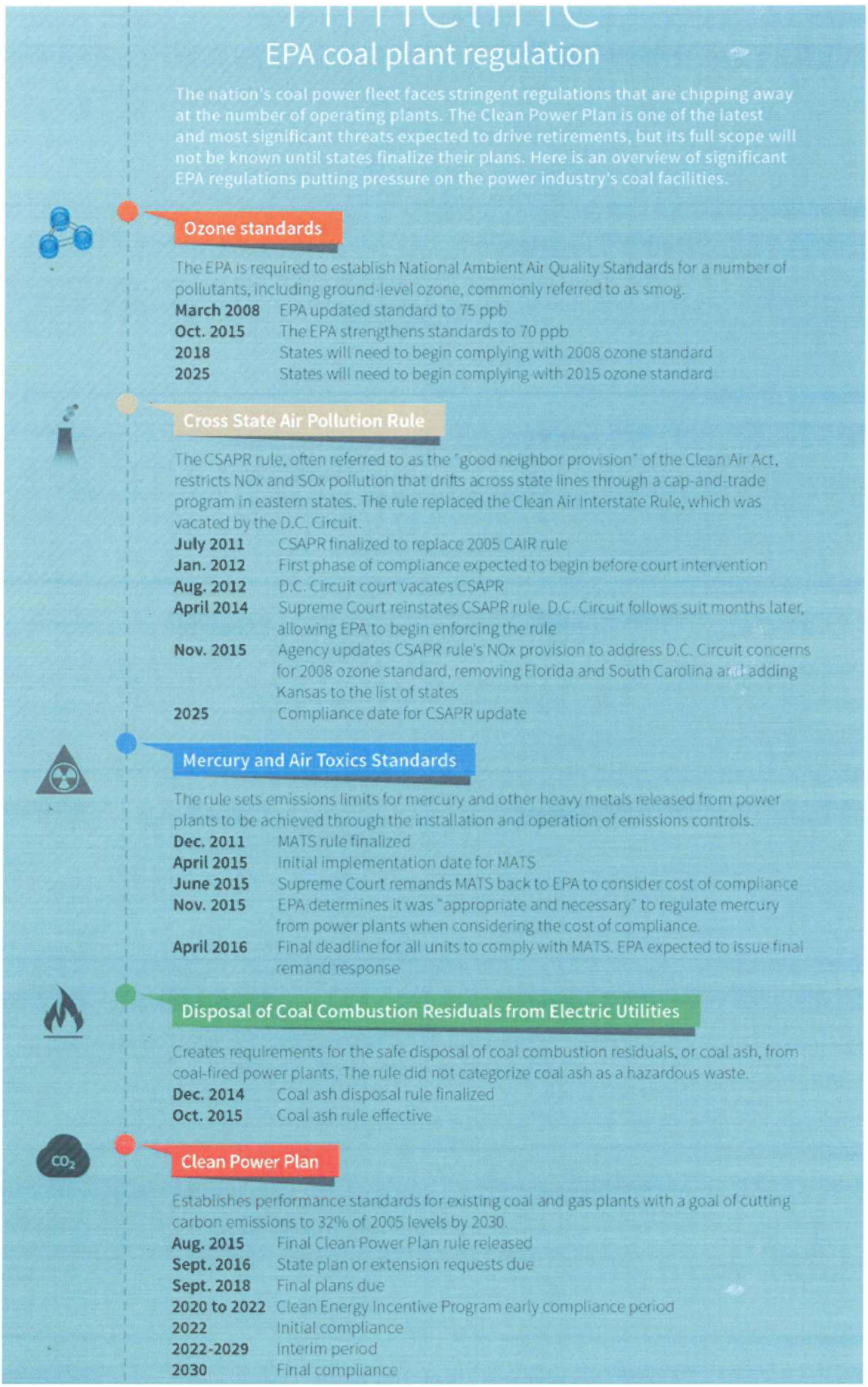
U.S. LNG export expansion has the industry worried about fears of an overbuild, and industry watchers expect the next wave of facilities constructed will be much smaller in scale.

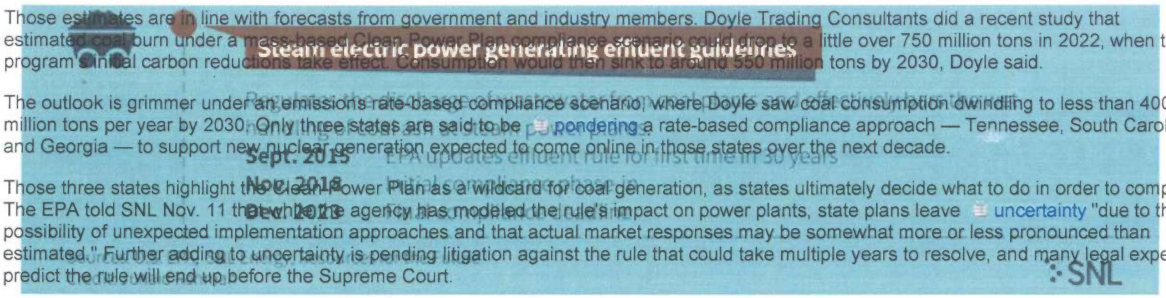
"Unfortunately, it does not appear that coal producers will get a break," Alam said. "However, stricter regulations related to carbon emissions or fracking could introduce new costs raising the floor for natural gas prices."

Clean Power Plan: The train at the end of the tunnel

A longer-term large threat to U.S. coal demand will come from the EPA's Clean Power Plan, which will require hefty carbon emissions cuts from the existing electric power fleet. The rule is likely to drive further coal-to-gas switching as a means of compliance. The final rule calls for states to submit compliance plans starting in September 2016, with the option to request an extension to 2018, and compliance beginning in 2022.

Looking at the history of recent displacement of coal by natural gas generation provides a rough estimate of potential market impacts of the Clean Power Plan. If an effective price of $10 per ton of CO_2 emissions were assigned to generation, it would roughly equate to a $0.90/MMBtu drop in natural gas prices against coal prices. SNL Energy estimates that the switching effect of this pricing differential alone would put an additional 150 million tons per year of coal demand at risk.


Timeline
EPA coal plant regulation
The nation's coal power fleet faces stringent regulations that are chipping away at the number of operating plants. The Clean Power Plan is one of the latest and most significant threats expected to drive retirements, but its full scope will not be known until states finalize their plans. Here is an overview of significant EPA regulations putting pressure on the power industry's coal facilities.
Ozone standards
The EPA is required to establish National Ambient Air Quality Standards for a number of pollutants, including ground-level ozone, commonly referred to as smog.
March 2008 EPA updated standard to 75 ppb
Oct. 2015 The EPA strengthens standards to 70 ppb
2018 States will need to begin complying with 2008 ozone standard
2025 States will need to begin complying with 2015 ozone standard
Cross State Air Pollution Rule
The CSAPR rule, often referred to as the "good neighbor provision" of the Clean Air Act, restricts NOx and SOx pollution that drifts across state lines through a cap-and-trade program in eastern states. The rule replaced the Clean Air Interstate Rule, which was vacated by the D.C. Circuit.
July 2011 CSAPR finalized to replace 2005 CAIR rule
Jan. 2012 First phase of compliance expected to begin before court intervention
Aug. 2012 D.C. Circuit court vacates CSAPR
April 2014 Supreme Court reinstates CSAPR rule. D.C. Circuit follows suit months later, allowing EPA to begin enforcing the rule
Nov. 2015 Agency updates CSAPR rule's NOx provision to address D.C. Circuit concerns for 2008 ozone standard, removing Florida and South Carolina and adding Kansas to the list of states
2025 Compliance date for CSAPR update
Mercury and Air Toxics Standards
The rule sets emissions limits for mercury and other heavy metals released from power plants to be achieved through the installation and operation of emissions controls.
Dec. 2011 MATS rule finalized
April 2015 Initial implementation date for MATS
June 2015 Supreme Court remands MATS back to EPA to consider cost of compliance
Nov. 2015 EPA determines it was "appropriate and necessary" to regulate mercury from power plants when considering the cost of compliance.
April 2016 Final deadline for all units to comply with MATS. EPA expected to issue final remand response
Disposal of Coal Combustion Residuals from Electric Utilities
Creates requirements for the safe disposal of coal combustion residuals, or coal ash, from coal-fired power plants. The rule did not categorize coal ash as a hazardous waste.
Dec. 2014 Coal ash disposal rule finalized
Oct. 2015 Coal ash rule effective
CO2
Clean Power Plan
Establishes performance standards for existing coal and gas plants with a goal of cutting carbon emissions to 32% of 2005 levels by 2030.
Aug. 2015 Final Clean Power Plan rule released
Sept. 2016 State plan or extension requests due
Sept. 2018 Final plans due
2020 to 2022 Clean Energy Incentive Program early compliance period
2022 Initial compliance
2022-2029 Interim period
2030 Final compliance



Those estimates are in line with forecasts from government and industry members. Doyle Trading Consultants did a recent study that estimated coal burn under a mass-based Clean Power Plan compliance scenario could drop to a little over 750 million tons in 2022, when the program's initial carbon reductions take effect. Consumption would then sink to around 550 million tons by 2030, Doyle said.

The outlook is grimmer under an emissions rate-based compliance scenario, where Doyle saw coal consumption dwindling to less than 400 million tons per year by 2030. Only three states are said to be pondering a rate-based compliance approach — Tennessee, South Carolina and Georgia — to support new nuclear generation expected to come online in those states over the next decade.

Those three states highlight the Clean Power Plan as a wildcard for coal generation, as states ultimately decide what to do in order to comply. The EPA told SNL Nov. 11 that although the agency has modeled the rule's impact on power plants, state plans leave uncertainty "due to the possibility of unexpected implementation approaches and that actual market responses may be somewhat more or less pronounced than estimated." Further adding to uncertainty is pending litigation against the rule that could take multiple years to resolve, and many legal experts predict the rule will end up before the Supreme Court.

In the meantime, states are discovering they have little choice but to begin planning for compliance. Even West Virginia has begun work on its Clean Power Plan offering — albeit begrudgingly — with Gov. Earl Tomblin remarking in October that "until a final legal decision has been made, we cannot afford to ignore" the rule.

States that decline to submit a plan, or offer an insufficient one, will have one imposed on them by the agency. Some legal experts believe a clear picture of compliance plans may not emerge until 2020 for states that are subject to a federal plan after exhausting all compliance extensions.

Brian Potts, a partner at Foley & Lardner who has litigated the Clean Air Act and other environmental laws, told SNL Energy that the EPA's proposed federal plan has several issues that make a state developed plan more appealing. Specifically, the federal plan mandates a state's participation in the Clean Energy Incentive Program, an early incentive that encourages renewable and energy efficiency projects.

With a federal plan, Potts predicts coal states could be stuck with renewable projects they do not want, when they could instead ask for an extension and file a plan by September 2018 that better suits the individual needs of the state.

"There are states that are saying still, that they're going to just say no. I think their tune might change after they see the final federal plan," Potts said. "I just don't see any logical reason why you wouldn't submit an extension request, because you could just say no later."

Hits keep on coming

Generators will have more than just the Clean Power Plan to base their fleet decisions on in the coming years, as the EPA released two additional rules impacting coal-fired generation in the fall. The steam electric power generating effluent guidelines released Sept. 30 could impact as much as 185 GW worth, or 181 coal-fired power plants. Considering the proposed Clean Power Plan released in June 2014, the hit could be lessened to 134 plants.

The EPA also revised the ozone standard from 75 parts per billion to 70 ppb, but the focus of reductions is largely on the oil and gas and transport sectors. Only five power plant units are likely to need to make changes. Nevertheless, the rule is being challenged in the courts.

And on Nov. 11, the EPA updated the Cross-State Air Pollution Rule, or the "good neighbor provision" of the Clean Air Act. The update lowered nitrogen oxide emissions budgets for a collection of eastern states, although the EPA said the dramatic alterations reflect an already-changing power industry.

Kipp Coddington, director of the University of Wyoming's Carbon Management Institute and an expert in carbon capture and sequestration technology, is optimistic about coal's outlook, despite the notable declines. "The only thing I know about every energy forecast is that they're wrong. If I could predict the future, I'd be in Las Vegas, so the honest answer is I don't know," he said.

Coddington believes that coal's ability to weather previous EPA actions suggests that fossil fuels will survive the next round, however with impacts of environmental regulations and other market pressures already being felt in coal communities, he acknowledges the short term outlook for the industry is bleak. Ultimately, though, Coddington believes coal will be part of the power industry, just so long as technology can catch up to environmental policy.

"Energy infrastructure is so long-lived, almost century scale. Talking about what it's going to look like in 2030, it's probably going to look pretty much what it looks like now. I think in the year 2100, 2200, who knows. These things take a long time to sort," Coddington said. "The one thing I do believe in: I think the imperative to reduce carbon is never going to go away. ... That's the new policy goal, and that may take a hundred years."