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Issue 1 2017

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**coal**

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**DAWNS**

Fundamental Change to  
Prevent an Unchecked  
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Next Generation Coal  
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*By Rep. Liz Cheney (R-WY), Member of Congress*  
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1101 Pennsylvania Avenue N.W., Suite 300  
Washington, DC 20004  
Tel: 202-756-4540  
Fax: 202-756-7323  
[www.americancoalcouncil.org](http://www.americancoalcouncil.org)

Editor

T.L. Headley

**ACC Editorial Board**

Carolyn Evans, Norfolk Southern  
Trygve Gaalaas, Hawk Consulting  
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**Publisher:** Marcus Weston

**Project Manager:** Mike Ross

**Editor:** Susan Christmas

**Marketing Associate:** Kaydee Brown

**Publication Director:** Anthony Land

**Project Support Specialist:** Amanda Glass

**Advertising Representatives:**

Scott Mckenzie, Marjorie Pedrick  
Joseph Watkins, Matthew Yates

**Layout and Pagination:**

Sunny Goel

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has flattened every mountain in Appalachia – that every stream in the region and anywhere mining is practiced is polluted, that our miners live on minimum wage and are treated poorly. Telling the truth doesn't fit their narrative and if they did their donations would dry up.

We often say these groups don't care about jobs. The truth is they do care about jobs – THEIR JOBS. They care about them a lot. They just don't care about the jobs of coal miners and others they are willing to harm to fill their coffers. That is why our stories must be told to the people of America. America needs these stories. They need to see our faces, hear our voices, and read our stories. They need to know that we are real people.

So tell me about the mom or dad who spends all day at work in a coal power plant and evenings on an athletic field coaching. Tell me about the black hat that runs the roof bolter and spends his free time as a pastor ministering to the needs of his community. The stories are there. I want to hear about companies that go above and beyond in reclamation or volunteering in their communities.

I want to include the stories in ACC's various publications, including this bi-annual magazine and our bi-monthly newsletter. They can be used to tell America who we are – who you are. I want to post them to our Coalblog and social media sites, which are growing significantly – our followers on social media since I joined ACC last fall have nearly doubled already. All of these outlets can be used to bring our stories to life for people across the country.

It is easy to demonize others when they aren't seen as "people" – when they see their "enemy" as "Big Coal" or "Dirty Coal." But when you show them the toll their policies and donations take – hurting real, living, breathing men, women and children – it becomes a lot harder to justify hurting them to help a bat or a salamander.

In addition to my time working for the West Virginia Coal Association, and my experience with social media, I have nearly 30 years of experience in journalism, including both print and broadcast writing, design and production. I have a good sense of what the general public relates to. I also have the experience to communicate with editors who might otherwise be looking for a reason to discard a news release or ignore a story idea.

These personal interest stories – properly done – can be a way to attract the attention of editors, especially when they can tie it into a major news focus at the time. To have these stories truly resonate requires good storytelling that makes it clear to the everyday person on the street why the issue affects them.

These personal interest stories are but one component of my plans as ACC communications director and editor of this magazine. I am excited about the breadth and diversity of the ACC member and stakeholder base and want to reflect that across our broad communications and publications platforms, across our advocacy programs and initiatives. I continue to build our media list and I want to make sure that the major news editors and reporters around the country receive regular copies of our publications and are regular viewers of our social media and Coalblog.

We can't do it as effectively without you, so I ask you, our readers, to help me. Send your stories about your friends and your family to me at [theadley@americancoalcoal.org](mailto:theadley@americancoalcoal.org). Help me tell the people of the United States who coal people really are. ■



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## NEWS RELEASE: ACC APPLAUDS ACTION ON STREAM PROTECTION RULE

Published by the American Coal Council

The congressional action this week to strike down the "Stream Protection Rule" issued December 19, 2016 by the Department of the Interior's Office of Surface Mining Reclamation and Enforcement is a welcome step in the right direction for the federal government and for coal. The swift action recognizes the severe flaws in a regulation that would needlessly restrict access to our nation's abundant coal reserves, increase mining costs, erode federal and state tax revenues, and result in the loss of high numbers of well-paying jobs.

This rule is a shining example of policy that would be harmful, not helpful. It was one of the most punitive of the many federal regulations for coal mining and use issued over the past several years. While lacking in benefits, the rule would have been enormously bureaucratic. It was lengthy, redundant, and duplicative and would have delivered absolutely none of the regulatory certainly touted when it was proposed in 2015.

The American Coal Council appreciates this congressional recognition of the regulatory relief needed for coal and looks forward to continued efforts to restore balance and common sense to regulation.

—americancoalcouncil.org

## NEWS RELEASE: PRESIDENT TRUMP DELIVERS ON ANOTHER CAMPAIGN PROMISE

Published by the American Coal Council

With the signing of an Executive Order, President Trump delivered on his pledge to help coal by lifting energy restrictions and canceling job-killing regulations. The remarks by President Trump and key members of his cabinet warmly acknowledged the contributions of our nation's coal miners. They pledged to level the playing field and eliminate federal overreach.

President Trump called for an immediate re-evaluation of the "so-called" Clean Power Plan and a lifting of the ban on (federal) coal leasing. Coupled with decisive steps already taken by this administration, today's move signals a much-needed change in policy direction. It shows that America's rich energy resources are valued once again. It recognizes that we can be pro-energy and pro-environment. In short, it provides opportunity.

The American Coal Council appreciates President Trump's efforts to restore balance and fairness to the regulatory process, support job creation, strengthen energy independence, and lay the foundation for rebuilding and sustaining our nation's vital coal industry.

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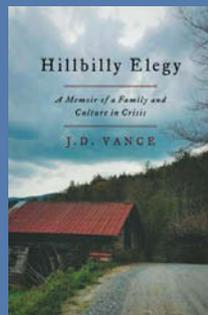
### SOMETHING TO DO:

Coal Market Strategies Conference  
August 14–16, 2017  
Stein Eriksen Lodge  
Park City, UT

Coal Trading Conference  
December 4–5, 2017  
Crowne Plaza Times Square  
New York City, NY

### SOMETHING TO READ:

*Hillbilly Elegy: A Memoir of a Family and Culture in Crisis*  
By J.D. Vance (2016)



### SOMETHING TO REMEMBER:

"Coal ... We may well call it black diamonds. Every basket is power and civilization; for coal is a portable climate. ... Watt and Stephenson whispered in the ear of mankind their secret, that a half-ounce of coal will draw two tons a mile, and coal carries coal, by rail and by boat, to make Canada as warm as Calcutta, and with its comforts bring its industrial power."

Ralph Waldo Emerson

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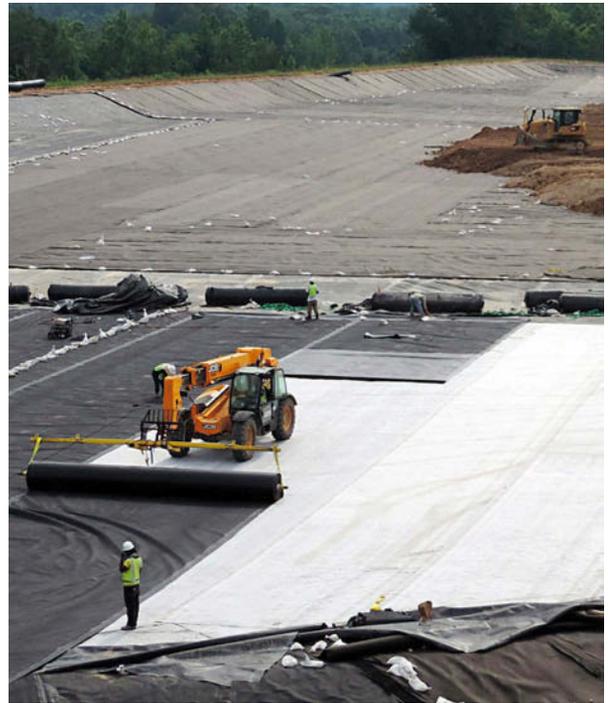
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# Finding Common Ground for Energy, Economy and Environment in 2017



Michael Siebers, ACC  
2017 President and  
Senior Vice President,  
Sales & Marketing,  
Peabody Energy

Since my predecessor as ACC President, Matt Schicke, wrote to readers in the Issue 2, 2016 of *American Coal*, a lot has changed for the U.S. coal industry.

Among the biggest shifts, U.S. thermal and metallurgical coal pricing have improved from early 2016 levels, and the election of President Donald Trump, a surprise to many, offered some much needed hope. Trump himself has promised to reinvigorate the industry by rolling back regulations and allowing coal miners to get back to work.

With the Trump Administration and 115th Congress beginning to make its mark in Washington, the time is now for Americans to find common ground in achieving shared policy goals for low-cost energy, a strong economy and a clean environment.

The world has doubled its energy use in the last 25 years. We depend on energy every day to improve our lives, through alarm clocks, phones, computers, dishwashers, laundry machines, air conditioners, and much more. All of these conveniences have become an everyday part of life and require energy to function.

Coal is an integral source for bringing these items to life and an essential part of a balanced energy portfolio that helps maintain lower electricity costs for family budgets. In order to ensure electricity remains reliable and affordable for all Americans, a true “all of the above” energy strategy is needed to guide our country into the future. This strategy would recognize the benefits and limitations of each energy source, including coal, which has a track record of reliability and scalability, affordability and security of supply.

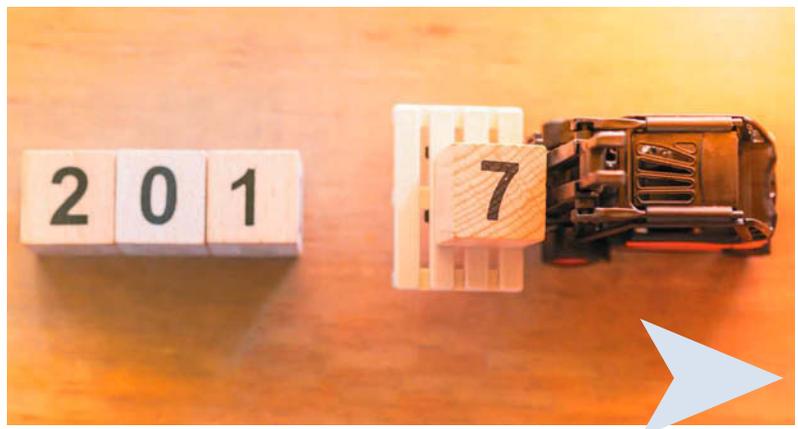
The industry, in particular, can capitalize on the change in political climate and use this opportunity to provide a fresh perspective on why coal should be a leading component of America’s energy mix moving forward. This can be accomplished by accelerating the use of clean coal technologies including high-efficiency, low emissions (HELE) coal generation and supporting development of next generation carbon capture use and storage (CCUS) technologies.

HELE generation can result in reducing the emissions of SO<sub>2</sub>, NO<sub>x</sub>, particulate matter, mercury and others, resulting in a smaller environmental footprint, and CCUS technology, once operational, can help meet long-term global climate goals. HELE generation and CCUS technology must be utilized and advanced, and national and international sources should allow these technologies to receive public funding for further development.

In addition to clean coal technologies, the rolling back of regulations designed to limit the role fossil fuels play in the U.S.’s energy mix would also go a long way in sustaining coal’s future. The Trump Administration has promised to end several regulations that have restricted the coal industry’s progress and has vowed to discontinue funding for the Obama Administration’s Clean Power Plan. Trump has also said he plans to end the Interior Department’s moratorium on leasing federal land for coal mining and has already signed a bill undoing the Office of Surface Mining’s Stream Protection Rule.

Despite these positive developments, coal will continue to face steep competition from natural gas and renewable energy sources such as wind and solar. In 2016, coal accounted for slightly more

**AS the American Coal Council celebrates its 35th anniversary of service to the coal sector in 2017, our association is well-positioned to continue representing coal interests in the marketplace and policy arenas.**



than 30 percent of the U.S. energy mix, and states that predominantly used coal for electricity generation enjoyed significantly lower rates than states that used minimal or no coal. Renewables remain an expensive and unreliable energy source for Americans from coast to coast.

Improved pricing and political pledges to roll back burdensome regulations that have held back our industry provide promise, but we must remain diligent in keeping coal at the forefront of the energy discussion. As we know and as we've undoubtedly experienced, notably in the last decade, our industry is susceptible to market conditions, competition, regulations and other external forces. These factors will always be part of the landscape. But we also know, through our perseverance during those challenging times, coal plays a critical role in achieving our country's energy, economic and environmental goals now and well into the future. That is the message we must convey through good times and in bad.

As the American Coal Council celebrates its 35th anniversary of service to the coal sector in 2017, our association is well-positioned to continue representing coal interests in the marketplace and policy arenas. The organization has continued to adapt to energy industry trends and changing coal sector conditions. A recent change for our association was ACC's combination with another coal organization, the Coal Trading Association (CTA). This combination was approved by members of both associations in February 2017. The combined organization will operate under the existing American Coal Council name and organizational structure and be managed by CEO Betsy Monseu and current ACC staff. Two CTA Board Directors were added to the ACC Board of Directors: Steve Watson with Arch Energy Resources, and Ginny Farrow with NRG Energy. We appreciate their engagement and commitment. We're pleased to welcome other CTA member representatives to ACC and we encourage their involvement in our programs, committees, and initiatives.

Following a great Spring Coal Forum conference in Florida in March, I look forward to seeing ACC members and other industry representatives later this year at ACC's other conferences – the Coal Market Strategies Conference August 14–16 in Park City, Utah and the Coal Trading Conference December 4–5 in New York City, N.Y. Information on the conferences and other ACC events and educational programs is available on ACC website ([www.americancoalcouncil.org](http://www.americancoalcouncil.org)) or our social media platform.

In the meantime, ACC will leverage its resources and communication platforms in outreach to the industry, policy makers, public, and the media to capitalize on the change in political climate, using the opportunity to continue informing and educating on the essential role of coal in an "all of the above" energy policy. ■



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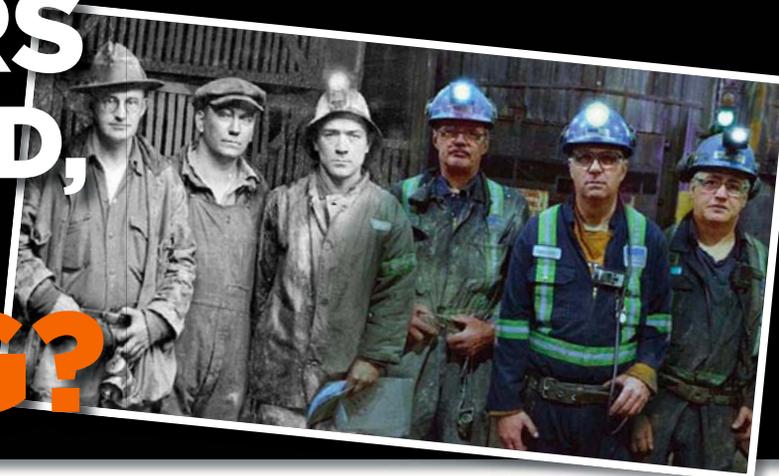
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# A Turn for the Better



Betsy Monseu,  
Chief Executive Officer,  
American Coal Council

Out with the old and in with the new – 2017 is off and running! In Washington D.C., where the wheels often seem to turn SOOOOOOO slowly, the new administration has shown a sense of urgency in tackling important issues addressed during the campaign. And that includes coal!! After years of a stifling regulatory environment intent on keeping coal in the ground rather than fostering its responsible development and use, the veil of regulation is being lifted. This is indeed a meaningful turn for the better.

Even so, we must not cease our efforts in educating everyone from the public to the media to policymakers about our industry. Because it's not that we are anti-regulation – our industry is filled with experts in regulation who are focused on compliance with the stringent standards that guide our everyday operations at coal mines, in coal transportation and handling, and in power and industrial plant consumption and beneficial use of coal by-products. It's that we believe in and are committed to what we do and the importance of coal to our nation and the world. We know that American energy and the economy go hand in hand, and that our diverse energy resources support our way of life.

On a more local level, coal communities are some of the best communities in our country. I started my career at a midwestern utility, and our coal power plants and the towns they were located in or nearby were great places for me to spend time. I was educated on many levels. Certainly there's nothing like being at an operation to get that hands-on learning experience. But beyond learning about power plants, I observed something else – *happy people*. The power plants were spotless and humming 24/7. Employees there had good jobs, the ability to sustain themselves and family members, and a positive attitude about the future. They had a sense of making a contribution to an industry, accompanied by a purpose for positively impacting their communities. Townspeople mirrored that, as the ripple effects of the plant generated jobs and the means for others to prosper.

I saw this replicated later as I worked in other parts of the coal supply chain – on the railroad where railroad towns were often THE towns in a county, and in mining towns across the different states I traveled to with my job for a coal company. In recent years, the growing number and expanding scope of regulations for coal mining and coal power plants have significantly increased the cost of coal for electricity generation and industrial use, made it less competitive against other fuels, and resulted in the closure of a large number of coal power plants. There have been devastating impacts on these coal communities. The jobs lost cannot easily be replaced, if they can be replaced at all. Economic diversification has a nice ring to it, but all too often it's not achievable – or at least not on a scale that could possibly translate to the equivalent of life before that devastation.

With a significant loss of coal demand made permanent due to plant closures, it will be critical to protect the investments made in the remaining coal generation fleet. Regulatory relief and a supportive policy environment will help. Not only will that preserve coal and related sector jobs, it will retain plants that are needed for our nation's power sector to deliver reliable 24/7 electricity to American homes and businesses. The path forward for coal must also include new technologies and uses.

The American Coal Council appreciates the new administration's focus on regulatory reform. We support efforts to restore balance and reasonableness and reduce

**WE support efforts to restore balance and reasonableness and reduce the costly burden of regulations that lack commensurate benefits. We will work to ensure that coal has the best possible opportunities to compete and grow again.**



the costly burden of regulations that lack commensurate benefits. We will work to ensure that coal has the best possible opportunities to compete and grow again.

As the American Coal Council celebrates our 35th year of service to the coal sector this year, we're grateful to represent the industry and advocate for the policy change that's in the air. In 2017, ACC is changing as well. In February, the American Coal Council and the Coal Trading Association agreed to combine. Our two organizations had a working relationship for many years to co-host the annual Coal Trading Conference in December in New York. On a bigger picture level, the missions, activities, and programs of the organizations fit well together. Bob McLean, longtime Executive Director of the Coal Trading Association, has retired and I will lead the combined organization operating under the existing American Coal Council name. I wish Bob all the best in this new phase of his life. I saw him recently and he seems to be handling it quite well. Bob mentioned that he was reading four books at the same time. What a luxury! I hope he'll have a chance to fit reading this *American Coal* magazine into his repertoire!

I welcome our new Coal Trading Association members and look forward to extending American Coal Council resources and services to them. CTA programs and events to be continued under ACC include:

- The reception at the Eastern Fuel Buyers Conference in Orlando on May 2, 2017.
- The Coal Trading Conference, in New York on December 4-5, 2017.
- The Fundamentals of Coal Trading class, which is being converted to an online education program.

As a result of the ACC-CTA combination, the popular ACC "BOGO" membership benefit of one free conference registration per Member Company with a paid conference registration for is being extended to include the Coal Trading Conference beginning in 2017. If you are an ACC member and did not use your company BOGO at Spring Coal Forum in March, you can do so at Coal Market Strategies (August 14-16, Park City, UT) or the Coal Trading Conference (December 4-5, New York, NY). We're also expanding sponsorship opportunities and benefits.

I look forward to seeing ACC members and industry colleagues at all of our events this year. To all coal stakeholders, please don't hesitate to contact me to discuss ways that we can cooperate across the industry to optimize the opportunities for coal. Change is in the air, and it's a turn for the better! ■



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# ACC Membership Has Benefits

## ACC Welcomes its New Members!!

The Board of Directors have reviewed and approved the following applicants for membership in the American Coal Council. The Board and staff would like to welcome these new members, as it is only through the support of our membership and industry that the ACC can continue to provide educational programs, market intelligence, advocacy support and peer-to-peer networking forums whereby we advance members' commercial and professional development interests.

With the many changes occurring in our industry, it is essential that we continue to work together to represent the collective interests of the American coal industry – from the hole-in-the-ground to the plug-in-the-wall – and advocate for coal as an economic, abundant and environmentally sound fuel source.

Welcome to:

- Combustion Blending, LLC
- The C. Reiss Coal Company
- Nebraska Public Power District
- Seminole Electric Cooperative
- Bunge
- EDF Trading North America, LLC
- Evolution Markets Inc.
- Energy Ventures Analysis, Inc.
- Energy Policy Network
- Lignite Energy Council

The ACC represents the coal industry from the hole-in-the-ground to the plug-in-the-wall. Our more than 155 member companies include coal suppliers, coal consumers, coal transportation companies, coal traders and coal support service firms operating throughout North America. No other association in our industry represents as diverse a membership base.

## WHY JOIN THE ACC

As a member of the ACC you'll benefit from premier educational programming, broad-based, high-level networking, energy advocacy, policy input and enhanced industry visibility. Along with a suite of ACC events and publications, you'll also see the benefits of frequent member communications and business

referrals. Additionally, ACC programs, committee memberships and activities provide opportunities for members to advance their professional skills, keep current on emerging trends and industry developments, gain experience and make new contacts.

Follow this QR Code to learn more about membership in the ACC. Or contact us at American Coal Council – 1101 Pennsylvania Ave. N.W., Suite 300, Washington, D.C. 20004, [info@americancoalcouncil.org](mailto:info@americancoalcouncil.org), to request membership information. ■





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**Spring Coal Forum**  
March 7–9, 2017  
Opal Sands Resort  
Clearwater, FL



**Coal Market Strategies Conference**  
August 14–16, 2017  
Stein Eriksen  
Lodge, Park City,  
UT



**ACC Reception at the Eastern Buyers Conference**  
May 2, 2017  
Disney's Yacht & Beach Club Resort,  
Lake Buena Vista,  
FL



**Coal Trading Conference**  
December 4–5, 2017  
Crowne Plaza  
Times Square  
New York City,  
NY



## VISION STATEMENT

ACC advances the power, the promise & the pride of America's coal industry.



## MISSION STATEMENT

American Coal Council (ACC) provides relevant educational programs, market intelligence, advocacy support and peer-to-peer networking forums to advance members' commercial and professional development interests. ACC represents the collective interests of the American coal industry – from the hole-in-the-ground to the plug-in-the-wall – in advocating for coal as an economic, abundant and environmentally sound fuel source. ACC serves as an essential resource for industry, policy makers and public interest groups. The Association supports activities and objectives that advance coal supply, consumption, transportation and trading.

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# ACC Committee Updates

## TOMORROW'S LEADERSHIP COUNCIL

The Tomorrow's Leadership Council (TLC) program began in 2009 as a means of helping to bring in, vest and advance new executive talent in the coal industry. Since its inception, the annual program has hosted more than 100 executives, all of whom have had the opportunity to better

their professional skills and networks throughout the industry.

If you're new to the industry or are early in your coal industry career, you'd be a perfect fit for the ACC's TLC program. Get involved, and help build your industry.

Improve your knowledge, skills and career prospects. Gain respect and recognition from industry colleagues.

## ACC COMMUNICATIONS COMMITTEE

The ACC's Communications Committee provides input and feedback on strategies and tactics related to association communications and advocacy, including through ACC's publications, website, and social media.

## COAL 2.0 ALLIANCE

The ACC's Coal 2.0 Alliance is focused on advancing the development and utilization of engineered coal fuels and coal preparation technologies by enhancing awareness of the performance benefits of treating and enhancing coal prior to combustion, which result in improved energy conversion efficiency and environmental performance.

## COAL TRADING COMMITTEE

The ACC's Coal Trading Committee is newly established as a result of the recent ACC-Coal Trading (CTA) association combination, and will carry on the CTA's work to develop and maintain industry standards for coal trading activity.

Additional information on ACC committees is available on the ACC website ([www.americancoalcouncil.org](http://www.americancoalcouncil.org)) or by contacting Betsy Monseu or Terry Headley at 202-756-4540 or by email at [info@americancoalcouncil.org](mailto:info@americancoalcouncil.org). ■



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# Fundamental Change to Prevent an Unchecked **Bureaucracy**

By Patrick Morrissey, Attorney General of West Virginia

Did Congress give EPA the power to make states like West Virginia change the way we get our electricity? And even so, is EPA's plan to do so even realistic?

Those were the questions that my office and other challengers to the so-called "Clean Power Plan" addressed last fall in an historic court proceeding in Washington, D.C., where lawyers argued for more than six hours before ten judges.

Fast forward four months and the country has a new president whose

administration holds the promise of a much more appropriate and lawful EPA.

But change, while good for a time, can be temporary. For that reason, I've led a coalition of states urging President Trump and the 115th Congress to enact long-term solutions to ensure the lawlessness of this past administration never returns.

If you haven't heard yet of EPA's "Power Plan," you need to look into it.

The Power Plan was one of former President Obama's many efforts to

**WHATEVER** you think about climate change, the exercise of this kind of power by an unelected administrative agency should make you pause.

circumvent Congress. This attempt involved the regulation of carbon dioxide emissions from existing fossil-fuel-fired power plants. Except it wasn't about making those power plants burn cleaner; it was about closing them down.

The whole point of EPA's aptly-named "Power Plan" was to restructure our energy economy. It mandated unachievable emission rules precisely to force the shut-down of existing fossil-fuel-fired power plants and push us toward the EPA's preferred forms of low- or zero-carbon energy generation, like wind and solar.

Whatever you think about climate change, the exercise of this kind of power by an unelected administrative agency should make you pause. Should an agency charged with reducing pollution be permitted to require sweeping and fundamental changes to our nation's energy policy?

Not even the Federal Energy Regulatory Commission has that authority.

Moreover, the Power Plan itself was based on flawed reasoning.

One key part of the rule is EPA's projection of the amount of new wind generation that can realistically be expected to be built. EPA based those projections, however, on numbers artificially inflated by those seeking to take advantage of a tax credit that expired at the end of 2012.

The amount of new wind generation in 2012 was 13,131 megawatts; the next year, it had dropped to 1,100 megawatts. This isn't just tilting at windmills; it's a fundamental and obvious error that reflects a deeper problem with having an *environmental* agency making *energy* policy.

The argument from EPA and many of its supporters is basically that the ends justify the means. But that is not only unconstitutional, it is unworkable as a system of government. It may be convenient today for those who like the former President's policies. But what about a year or ten years from now, when another person or another party is in power?

In February 2016, this troubled the Supreme Court enough to cause the high court to take the unprecedented step of putting the Power Plan on hold while the lower court reviews it.

That stay has made it possible for the new president to take steps to undo the lawlessness of the previous administration and to take longer-term steps.

West Virginia, along with 23 other states and state agencies, has

urged President Trump to rescind his predecessor's Climate Action Plan and take administrative action to ensure the Rule is formally withdrawn.

We have also asked Congress to enact legislation to prevent any future EPA from drafting similarly unlawful and more extreme rules.

Such legislation could require congressional approval for rules exceeding an annual economic impact of \$100 million and also mandate that agencies conduct cost-benefit and job-impact analyses to ensure an understanding of the direct impact a proposed rule may have on a state's economy and workforce.

Profound, fundamental change is needed to permanently rein in the unelected bureaucrats who have taken control in Washington, D.C.

We in West Virginia will be waiting – not just to see whether we will be spared the devastating economic impact of this rule, but also to see what kind of a country we really live in.

Are we still a nation with three co-equal branches, or one where a President's claimed urgency trumps all? ■



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# CO<sub>2</sub>-EOR: A Win-Win-Win for Energy, the Economy, and the Environment

By Janet Gellici, National Coal Council

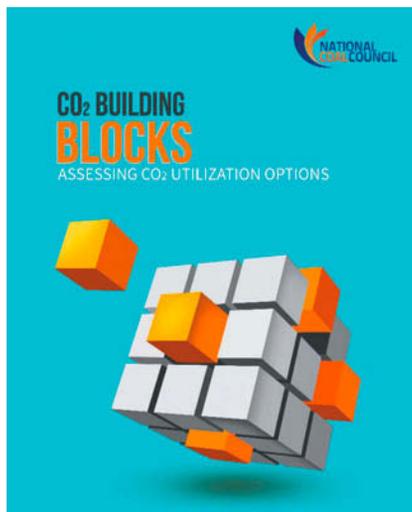
The U.S. has the opportunity to produce billions of barrels of domestic oil and generate new sources of revenue, while simultaneously reducing significant volumes of carbon dioxide (CO<sub>2</sub>).

CO<sub>2</sub> for enhanced oil recovery (CO<sub>2</sub>-EOR) represents the most immediate, highest value opportunity to utilize the greatest volume of anthropogenic CO<sub>2</sub> – estimated at up to 77,500 MMmt of captured CO<sub>2</sub>. CO<sub>2</sub>-EOR provides significant economic benefits and new revenue to a variety of stakeholders – with generated revenues estimated at \$5.7 billion. CO<sub>2</sub>-EOR also has the potential to recover up to 284 billion barrels of oil, representing about 69% of the United States' estimated domestic oil resources of 414 bb.

The National Coal Council, a federally chartered advisory group to the U.S. Secretary of Energy, recently completed a report for then Energy Secretary Ernest Moniz assessing market opportunities for CO<sub>2</sub> from coal-based power plants. This article highlights key findings and recommendations from the report, "CO<sub>2</sub> Building Blocks: Assessing CO<sub>2</sub> Utilization Options."<sup>1</sup>

## GEOLOGIC AND NON-GEOLOGIC MARKETS FOR CO<sub>2</sub> – HURDLES & OPPORTUNITIES

Fossil fuels – including coal, natural gas and oil – will remain the dominant global energy source well into the future by virtue of their abundance, supply security and affordability. There is a growing consensus among industry, the environmental community and governments worldwide that future CO<sub>2</sub> emission reduction goals cannot be met by renewable energy sources alone and that carbon capture, utilization and storage (CCUS)



technologies for all fossil fuels will have to be deployed to achieve climate objectives. The development of commercial markets for captured CO<sub>2</sub> can help promote the deployment of CCUS.

In its CO<sub>2</sub> Building Blocks report, the NCC assessed a variety of markets for CO<sub>2</sub> and the potential of those markets to incentivize CCUS. Geologic and non-geologic markets were evaluated. Geologic markets include technologies such as EOR, enhanced coal bed methane (ECBM), CO<sub>2</sub> shale, and less developed options such as enhance water recovery (EWR) and geothermal and subsurface energy storage. Non-geologic markets include chemical products and other value-added products, such as inorganic carbonates and bicarbonates, plastics and polymers, fuels, and fertilizers, as well as food and beverages – dry ice, baking soda and carbonated drinks.

Utilizing CO<sub>2</sub> in non-geologic applications faces a host of hurdles, including:

- Current U.S. policies that arguably favor geologic uses.

- The immature status of nearly all non-geologic CO<sub>2</sub> utilization technologies.
- Logistical and infrastructure issues related to either the siting of CO<sub>2</sub> utilization facilities close to utility or industrial CO<sub>2</sub>-emitting plants or transporting CO<sub>2</sub> from these plants to remote CO<sub>2</sub> utilization facilities.
- Market limits and impediments, e.g., products derived from CO<sub>2</sub> presumably would be competing against and endeavoring to displace comparable products made from other feedstocks.
- Technical barriers involved in the successful reduction of CO<sub>2</sub> to carbon products, including thermodynamics and kinetics (see sidebar).

Among geologic utilization technologies, CO<sub>2</sub>-EOR and ECBM are already commercialized while others, such as saline storage and CO<sub>2</sub> shale, remain subject to ongoing research and have not yet emerged as commercially available technologies at scale.

Taking into consideration policy objectives and timelines, the volume of CO<sub>2</sub> needed to be used/stored, the technology's commercial status and technical limitations, it's clear that CO<sub>2</sub>-EOR remains the most immediate, highest value opportunity to utilize CO<sub>2</sub> at scale and with the promise of some level of economic return. Given the technology's potential to produce significant quantities of domestic oil, CO<sub>2</sub>-EOR also represents significant potential in supporting U.S. objectives to achieve energy security and energy independence.

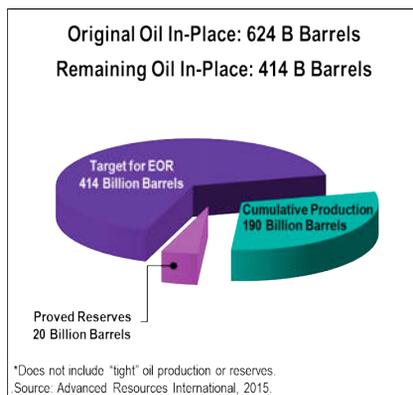
## THE PROMISE OF CO<sub>2</sub>-EOR<sup>2</sup>

CO<sub>2</sub>-EOR has been underway in onshore, Lower 48 (states) oil reservoirs for more than 40 years. Based on the 2014 Oil

and Gas Journal Survey, 136 significant CO<sub>2</sub>-EOR projects produced 300,000 barrels per day of crude oil by injecting 3.5 Bcfd (67 MMmt per year) of newly sourced CO<sub>2</sub>. With growth in CO<sub>2</sub>-EOR activity in the past two years (as of August 2016) and including co-production of natural gas liquids, the current CO<sub>2</sub>-EOR production estimate today is 400,000 B/D.

Advanced Resources International (ARI) estimates the original U.S. oil-in-place endowment at 624 billion barrels, located in several thousand already discovered domestic oil fields. Traditional primary recovery and water flooding have recovered about a third of this original oil-in-place, leaving behind a significant oil resource of 414 billion barrels. A significant portion of this 414 billion barrels of remaining U.S. oil endowment is technically favorable for application of CO<sub>2</sub>-EOR, estimated by ARI at 284 billion barrels.

## ORIGINAL AND REMAINING OIL

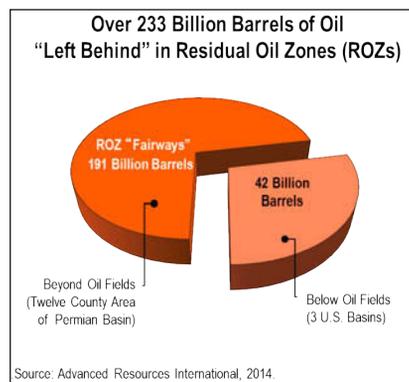


In addition to the remaining oil in-place in the Main Pay Zone of discovered fields, significant additional volumes of oil in-place exist in the Residual Oil Zones (ROZs) below existing oil fields and in ROZ "fairways."

## RESIDUAL OIL ZONE RESOURCES

The NCC report details the significant potential of CO<sub>2</sub>-EOR for utilizing and storing CO<sub>2</sub> in a diversity of geological settings.

- CO<sub>2</sub> floods in the Main Pay Zone (MPZ) of discovered oil fields (onshore L-48, Alaska and Offshore Gulf of Mexico) offer a technical potential for utilizing and storing 38,320 to 52,240 MMmt of CO<sub>2</sub> (depending on CO<sub>2</sub>-EOR technology) with significant associated



- production of crude oil ranging from 85 to 167 billion barrels.
- While the economically viable potential from the MPZ (at an oil price of \$85 per barrel and with CO<sub>2</sub> costs linked to oil prices) is more limited, the CO<sub>2</sub> utilization and storage volumes are still significant at 10,740 to 23,580 MMmt (depending on CO<sub>2</sub>-EOR technology) plus 28 to 81 billion barrels of economically viable oil recovery.
  - CO<sub>2</sub> floods in the ROZ resources assessed to date could provide an additional 25,300 MMmt of technically viable CO<sub>2</sub> utilization and storage, and significant volumes of associated oil recovery on the order of 42 billion barrels. Advances in CO<sub>2</sub>-EOR technology such as those embedded in the suite of "Next Generation" technologies would enable these ROZ resource to be efficiently recovered.

The growth of CO<sub>2</sub>-EOR has always depended on the availability of secure,

affordable sources of CO<sub>2</sub>. While currently the majority of CO<sub>2</sub> used by the EOR industry comes from natural sources, such sources are limited and increasingly expensive to develop. Experts anticipate that the supply of natural CO<sub>2</sub> for EOR will peak and then plateau at 3.4 Bcfd (65 MMmt/yr) before slowing declining and will be consumed in the next 15 to 20 years. As such, significant additional CO<sub>2</sub> supplies, captured from industrial and fossil fuel-based power plant CO<sub>2</sub> emissions, will be needed to accelerate EOR development and to enable CO<sub>2</sub>-EOR to realize its full potential.

## TECHNICALLY RECOVERABLE DOMESTIC OIL AND CO<sub>2</sub> STORAGE CAPACITY, STATE OF ART AND "NEXT GENERATION" CO<sub>2</sub>-EOR TECHNOLOGY

Integration of CO<sub>2</sub>-EOR and CO<sub>2</sub> storage would provide significant new revenues to a variety of stakeholders. With a potential for 81 billion barrels of economically viable oil recovery from mature oil fields and the ROZ (assuming use of "Next Generation" technology), the various CO<sub>2</sub>-EOR stakeholders would gain valuable revenue and economic benefits.

### Recipients of CO<sub>2</sub>-EOR Revenues\*

- CO<sub>2</sub> Capture and Transporters

### Revenues

\$1,210 billion

Basin/Area	Technically Recoverable Oil (Billion Barrels)		Technical CO <sub>2</sub> Demand/Storage (Million Metric Tons)	
	SOA	"Next Generation"	SOA	"Next Generation"
	<b>1. Main Pay Zone CO<sub>2</sub>-EOR</b>			
Lower-48 Onshore	55.6	105.5	22,270	33,050
Alaska	5.8	8.8	3,320	4,110
Offshore GOM	23.5	52.9	12,640	15,060
<b>Sub-Total</b>	<b>84.9</b>	<b>167.2</b>	<b>38,230</b>	<b>52,220</b>
<b>2. Residual Oil Zone CO<sub>2</sub>-EOR</b>				
ROZ Fairways*	n/a	25.7	n/a	17,100
Below Oil Fields	n/a	16.3	n/a	8,200
<b>Sub-Total</b>	<b>n/a</b>	<b>42.0</b>	<b>n/a</b>	<b>25,300</b>
<b>Total</b>	<b>84.9</b>	<b>209.2</b>	<b>38,230</b>	<b>77,520</b>

\*Four County Permian Basin San Andres ROZ fairway. JAF 2016\_036.kh

Source: Advanced Resources Int'l/DOE/NETL-2011/1504, July 2011 and DOE/NETL-2014/1631, 2014

## Thermodynamics & Kinetics of CO<sub>2</sub>

In recent years, extensive research has been conducted into two primary pathways of utilizing CO<sub>2</sub> in non-geologic applications. The first involves cleaving the C=O bond(s) and the second involves reusing the CO<sub>2</sub> molecule intact without breaking the C=O bond(s).

Both hold promise but the latter has advantages over the former in that cleaving CO<sub>2</sub> bonds requires more energy and typically results in fuels that are, in turn, combusted resulting in the emission of CO<sub>2</sub> to the atmosphere. Converting CO<sub>2</sub> to fuels or other high energy state molecules requires more energy input than could ever be derived from the end products.

Retaining the CO<sub>2</sub> molecule intact, in contrast, typically takes less energy and may result in products, such as polymers, that are highly stable, long-lived and thus capable of "fixing" the CO<sub>2</sub> in a manner akin to geologic storage. For this application, the principal challenge is the scale of available reactants and the size of the markets for the products, both of which are dwarfed by global CO<sub>2</sub> emissions.

- State, Local and Federal Treasuries \$1,130 billion
- CO<sub>2</sub>-EOR Investors (including Return on Capital) \$1,270 billion
- General Economy/ Mineral Owners \$2,060 billion
- Total \$5,670 billion**

\*Assuming an oil price of \$70/B.

Clearly, CO<sub>2</sub>-EOR represents the best opportunity to utilize CO<sub>2</sub> at scale while providing an economic return for stakeholders and bolstering U.S. efforts to attain energy

independence. In its CO<sub>2</sub> Building Blocks report, the NCC recommends that the U.S. Department of Energy (DOE) support current CO<sub>2</sub>-EOR technology by clarifying regulatory barriers, advancing the development of infrastructure such as pipeline networks, and offering financial incentives for CCUS technology deployment. NCC also encouraged DOE's support for deployment of next generation CO<sub>2</sub>-EOR technologies to realize further benefits associated with ROZ CO<sub>2</sub>-EOR.

Despite the many barriers to deployment of other geologic and non-geologic

markets for CO<sub>2</sub> use, NCC recommended that further investment in CO<sub>2</sub> utilization technologies should be undertaken. On a case-by-case basis (at a specific coal power plant, for example), deployment of a CO<sub>2</sub> utilization technology may hold promise for turning an uneconomic project into an economically viable one. Establishing a technology review process to assess the benefits and challenges associated with the various CO<sub>2</sub> utilization technologies could be used to prioritize candidates for research development and deployment.

A steadfast commitment to the urgent deployment of CCUS technologies can advance U.S. environmental stewardship goals while simultaneously providing economic and energy security benefits.

Win-Win-Win! ■

## REFERENCES

- 1 National Coal Council (2016 August). "CO<sub>2</sub> Building Blocks: Assessing CO<sub>2</sub> Utilization Options." [www.nationalcoalcouncil.org/studies/2016/NCC-CO2-Building-Block-FINAL-Report.pdf](http://www.nationalcoalcouncil.org/studies/2016/NCC-CO2-Building-Block-FINAL-Report.pdf).
- 2 Data and analysis in this section of the article was provided by Advanced Resources International. <http://www.adv-res.com/>

## Procurement



Cost containment in the utility industry has caused power companies to reconsider their conventional ways of conducting business. They must now consider all options to reduce costs and redeploy capital. In response to these changes facing utilities, the NexGen Coal Services Group provides a range of services

# nexgen

NexGen Coal Services, Ltd.  
5251 DTC Parkway, Suite 800  
Greenwood Village, CO 80111  
Tel. (303) 751-9230

[www.NexgenCoalServices.com](http://www.NexgenCoalServices.com)

# THE NEXGEN DIFFERENCE



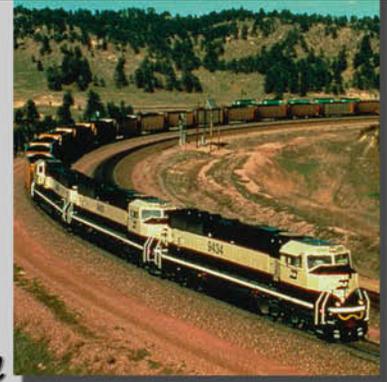
## Operations



encompassing coal procurement, coal transportation, and coal yard operations which can include owning and operating your coal facilities.



## Transportation





# Coal is One of America's Greatest National Treasures

By Rep. Liz Cheney (R-WY), Member of Congress

Wyoming is America's largest coal producing state, mining close to 40 percent of the coal consumed by our nation every year. Common estimates give Wyoming close to 145 billion tons of recoverable coal and 1.4 trillion tons in total coal reserves. This coal is a national treasure.

Tens of millions of American homes and businesses rely on coal every day to provide electricity because it generates some of the most affordable energy in America. According to the American Coalition for Clean Coal Electricity (ACCCE), the national average price for electricity is around 10.42 cents per kilowatt hour. States which generate a majority of their electricity from coal pay on average 13 percent less than this national average. Conversely, states that generate less

than 8 percent of their electricity from coal pay 24 percent more than the national average. Despite coal's abundance and affordability to American consumers, the Obama administration spent eight years trying to destroy the industry.

In 2016, Wyoming's Powder River Basin produced 285.2 million tons of coal compared to the previous year's total of 363.4 million tons. In addition to the decline in production, according to ACCCE, 37 states have seen coal fired unit retirements and conversions caused by Obama-era EPA policies. The American Action Forum estimates that the Obama war on coal imposed \$312 million in regulatory costs to the coal industry and cost 180,000 jobs. This has amounted to more than \$9.7 million in lost wages.

This deliberate War on Coal has certainly done significant damage to Wyoming's state economy, impacting every community, and putting thousands of our neighbors out of work. Early last year, our state witnessed the loss of hundreds of jobs at Wyoming mines in the Powder River Basin. These mass layoffs were heartbreaking for those who lost their jobs and heartbreaking for their families. The federal government had no right to target an industry in this way and destroy the jobs connected with it.

My family's involvement in the Wyoming energy industry reaches back a hundred years. My great-grandfather began working in the Salt Creek Oil Fields in the early 20th century. My grandmother and her siblings were raised there in a hard-sided tent on the edge of the oil fields. We have seen the cycles of boom and bust that have long characterized Wyoming's energy economy. Sadly, for the last eight years, we have been living through something altogether different – an all-out assault on our nation's vital fossil fuels industry. With no regard for our economy, our security, or our livelihoods, a select few over the past eight years were determined to kill the coal industry at any cost.

I have talked with Wyoming citizens in every corner of our state about the damage done by the War on Coal. I carry their concerns and comments with me to D.C. and know each day that my most important job in Congress is to fight

for Wyoming and her way of life. A big part of that life has included being a faithful steward of a national treasure, America's coal.

Understanding Wyoming's role in that stewardship, it is not surprising we are on the front lines of this fight. A fight that requires building a nationwide coalition to stand up for our coal industry. This includes leading an effort to educate Americans about the importance of coal in the generation of electricity, about the tremendous strides in clean coal technology that have already been made, about the stewardship of the land by our coal companies through reclamation efforts, and about the national security implications of continuing to pursue policies that threaten the reliability of our power grid, threaten to put thousands of our fellow citizens out of work and raise our utility prices.

We have started much of this important work over the last three months in Washington. I was pleased to see President Trump lift the moratorium on coal leasing on federal lands. I have introduced legislation that would prevent future such moratoria without congressional approval. The President also took necessary steps to begin repeal of the Clean Power Plan and curtail other Obama-era regulations strangling the energy industry. Using the Congressional Review Act process, Congress has taken steps to roll back the Stream Protection Rule. We also began work in the House to provide fundamental regulatory reform. Passage of the REINS Act requires Congressional oversight on any new regulation that will have an economic impact of \$100 million or more.

The first bill I introduced, which was passed by both the House and Senate and signed into law by President Trump, repealed BLM Planning Rule 2.0. Planning 2.0 would have taken authority away from our local leaders and stakeholders and centralized decision making in Washington about issues related to local land use and resource planning. We are making important progress, but we also know much remains to be done. As a member of the Natural Resources Committee, I am committed to working on these important issues to ensure energy production on

our federal lands are not stymied by past ideologically driven and flawed federal policy.

Congress should adopt policies and standards that recognize the clean coal advancements already made by our coal industry and we should incentivize additional investment in clean coal technologies. In Wyoming, we have important work under way in this regard at the University of Wyoming and the Dry Fork Power Station.

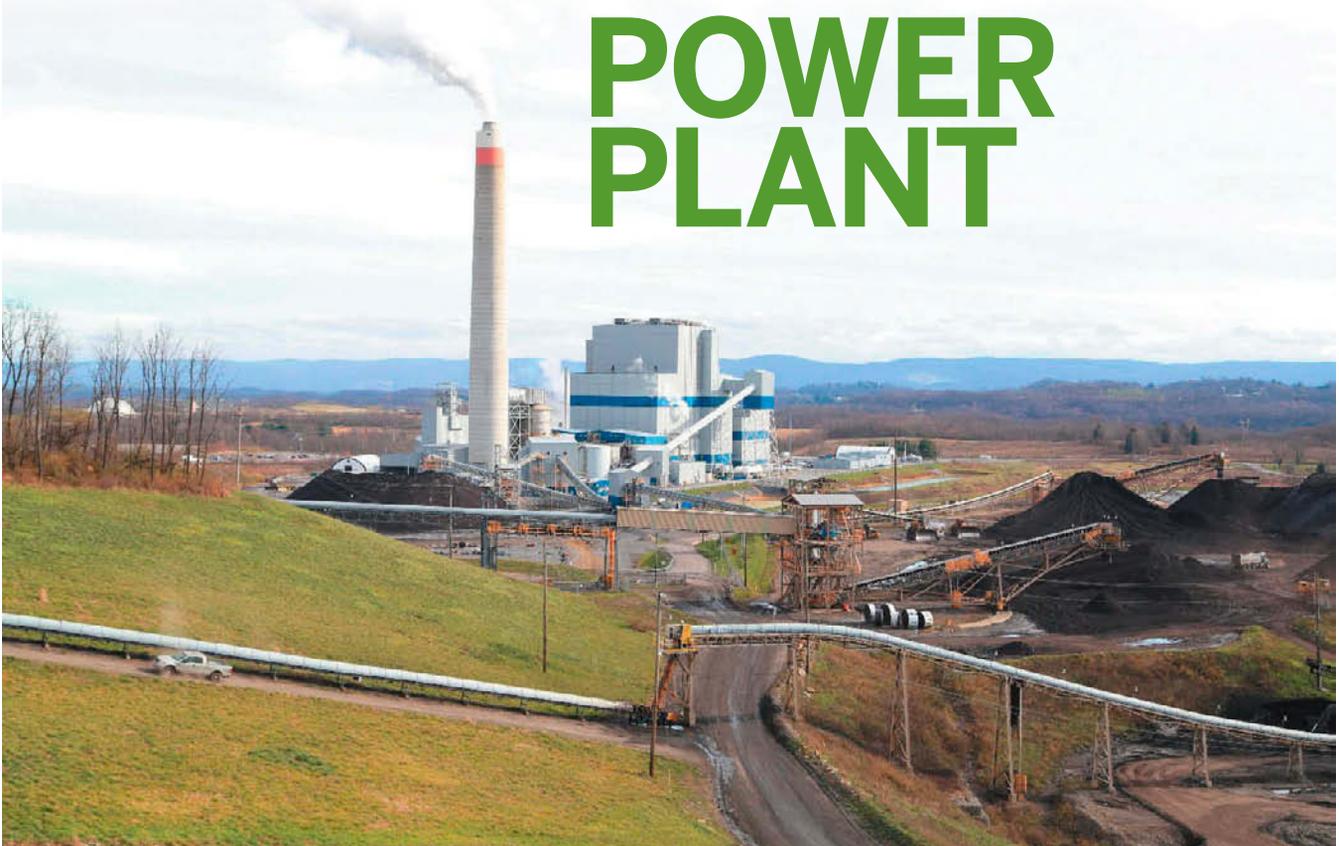
Congress must work to repeal the Environmental Protection Agency's (EPA) Mercury and Air Toxic Standards and the Regional Haze Rule and enact legislation that prohibits the regulation of CO<sub>2</sub> as a pollutant. All of this is an important part of the overall need to significantly reduce the size, scope and authority of the EPA.

Equally important is ending federal government favoritism of renewable sources of energy. The Obama administration wasted tens of billions of taxpayer dollars in an unsuccessful effort to promote renewable sources of energy at the expense of our fossil fuels. The U.S. government should pursue an all-of-the-above energy strategy on a level playing field. We should not be using taxpayer dollars to prop up unsustainable renewable fuel projects as they undermine and attempt to kill off America's fossil fuel industry.

As a member of the House Armed Services Committee, I know it is also important that we repeal renewable energy mandates, including those imposed on the Department of Defense. Our military should not be forced to divert funds away from military capability to fulfill the legacy projects and renewable energy fantasies perpetrated by Democrats.

There is nothing more important to our country's security and economy than the reliability of our energy. From our cell phones, computers and cars to our central air conditioning and electric fireplaces, America runs on energy. And a big chunk of our energy comes from coal. We must embrace a future that recognizes coal's unique and long-lasting contribution to our energy mix. Wyoming houses a national treasure and we stand ready to supply our nation with energy for many years to come. ■

# LONGVIEW POWER PLANT



## The Future of Coal-Based Generation

By T.L. Headley, American Coal Council

The future of America's coal industry may be sitting on a ridge just north of Morgantown, West Virginia, quietly building a reputation at the cutting edge of coal-based power generation.

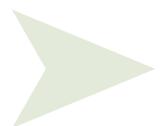
Commissioned in December 2011 at a cost of \$2.1 billion, Longview Power Plant is one of the nation's three newest coal power plants. It is also the nation's most efficient and cleanest. Longview is what is known as a mine-mouth plant – with a dedicated coal mine located literally next door providing its baseload fuel. Longview is also a "co-fired" plant, meaning it can burn both coal and natural gas, although coal is its primary fuel.

"Longview demonstrates what modern highly efficient clean coal-fired plant design and operation can be with full environmental compliance," said Jeff Keffer, President and CEO of Longview Power, LLC said.

### THE TECHNOLOGY

Longview features cutting-edge HELE (High Efficiency/Low Emissions) technology, including a state-of-the-art advanced supercritical boiler, a high-efficiency steam generator, a best-in-class combustion system, and it has zero surface water discharge. One of the interesting features of Longview is

**COMMISSIONED** in December 2011 at a cost of \$2.1 billion, Longview Power Plant is one of the nation's three newest coal power plants. It is also the nation's most efficient and cleanest.



“LONGVIEW should be the future of coal in this country,” Keffer said. “These plants are relatively low cost, highly efficient, and highly reliable with very low “emissions.”

that it can burn either coal or natural gas, and is started using natural gas. Despite its capability to burn both fuels, it is essentially a dedicated coal-fired plant. Sometimes the mix of natural gas has approached 20 percent, but Longview COO Steve Nelson said Longview’s delivered coal price is competitive with natural gas. The company does, however, actively manage the mix of coal and gas in order to take advantage of whichever fuel is cheapest on any given day according to Nelson.

Nelson noted that the gas pipeline to the plant can be subject to curtailments during peak season (winter). To ensure that start up fuel is always available, particularly in light of the new PJM Capacity Performance requirements, the plant installed the world’s largest mobile liquefied natural gas (LNG) system.

It is important to note that Longview is a mine-mouth facility, getting its coal from the Mepco LLC, a mine operation located near to the plant. In fact, Longview was designed to be fully integrated with the mine and to utilize run-of-mine coal, a situation that allows Longview to avoid the costs of fuel preparation and large scale storage. Longview gets its coal from the Mepco mine by means of a 4.5-mile-long belt line that substantially reduces transportation costs. The conveyor also minimizes the environmental and traffic impacts of trucking on local communities.

Since its commissioning in 2011, Longview has invested another \$120 million in improvements both to correct some problems uncovered in commissioning and to ensure reliability.

The improvements have resulted in a very high net plant efficiency of 39.5 per cent. This allows the plant to

produce full power using 17.5 percent less fuel than the average coal plant in the US. Alone, this saves Longview over \$10 million per year in the plant’s operating cost.

In terms of pollution controls, the plant utilizes the very latest best available control technologies, including low NOx burners, scrubbers, acid mist reduction systems, particulate matter removal achieving up to 99 percent reduction of particulates, SO<sub>2</sub> removal using wet flue gas desulfurization systems and Mercury and HAPS removal using MATS compliant AQCS equipment.

As a result, the plant achieves “orders of magnitude reductions” over conventional plants in SO<sub>x</sub>, NO<sub>x</sub> and PM emissions. It also achieves a 20 percent reduction in CO<sub>2</sub> emissions, according to Keffer.

Operating a more efficient plant means costs and emissions are reduced. Nelson said Longview has the lowest dispatch cost of all coal units in the PJM market.

“We’re cheap. Due to our low cost structure, efficiencies and consolidation with our coal supplier, we’re down with wind and hydro on our dispatch costs,” he said.

And being a low-cost electricity generator also means the plant’s equivalent availability factor (EAF) has been positively affected. Before Longview went through its rehabilitation, tube leaks and other problems caused the plant’s capacity factor to be in the low 70s – EAF was driving a poor capacity factor. Since all the modifications were completed, Longview’s 2016 annual EAF was 92.5 percent and capacity factor was 86 percent.

## SUMMARY

Longview’s Keffer, says bluntly that plants like Longview are the future for the

nation’s coal industry and argues that building more like it should be the focus for the industry.

“Longview should be the future of coal in this country,” Keffer said. “These plants are relatively low cost, highly efficient, and highly reliable with very low emissions.”

“Regulations including the Clean Power Plan and the New Source Rule have blocked development of advanced clean coal technology power plants in America,” Keffer said. “As a result, the coal fleet averages 40+ years in age and is not competitive with CCGT’s based on cost, efficiency and emissions. Other countries including Germany and China have built even more advanced technology coal plants and achieved greater efficiencies with low emissions.”

Keffer said the Trump Administration intends to roll back regulations and will likely seek to repeal the Clean Power Plan or seek guidance from Congress regarding EPA’s authority to regulate CO<sub>2</sub> under Clean Air Act.

“The EPA also could rewrite the Clean Power Plan to focus on regulating CO<sub>2</sub> emissions as actually permitted under the Clean Air Act using ‘best system of emissions reductions’ at the source (i.e. within the fence line of power plants),” Keffer said. “Longview demonstrates the ‘best system of emissions reductions’ for coal plants and is the plant to be replicated to maintain coal fired power in the USA.”

“By building advanced high efficiency low emissions coal fired plants, we could continue to use coal to provide reliable low cost electrical power while creating and preserving thousands of good paying jobs in the industry.” ■

# Metallurgical Coal Markets:

## A VOLATILE PRICE RIDE



By Jim Truman, Wood Mackenzie

2016 was a year of enormous volatility in metallurgical coal markets and many uncertainties remain for 2017. Spot prices for Australian low-volatile coal started out 2016 in the doldrums, averaging below US\$80/t and by mid-November, ascended to nearly US\$315/t ... only to later fall to US\$150/t. We will endeavour here to describe the factors that led to such dramatic movements and lessons for future expectations in the market.

Much work is done by analysts looking at the fundamentals of supply and demand to forecast trends, but the largest recent drivers of metallurgical coal price movements have been what are known as “black swans” – somewhat unpredictable shocks to the system.

Extreme weather conditions have flooded mining pits, damaged transportation routes and interrupted loading activities at ports. Underground mines encountered unexpected difficult conditions that led to temporary outages and force majeure notices to customers. And a new factor appeared: the Chinese government imposing restrictions to the number of working days for domestic mines in an attempt to harness excess capacity.

Although these supply shocks cause major movements in prices and global seaborne demand, the examination of fundamentals provides a base level that the market should be drawn to approach. Similarly, in times of tight supply and skyrocketing prices, producers are drawn

to bring on more production to capture strong profits. For these companies, a determination must be made as to the duration of the high prices and whether the environment is right to justify capital outlays for new mines and equipment or just a temptation that will shortly fade away.

### QUEENSLAND FLOODS

The largest of these shocks over the past ten years have been caused by heavy rains in the Queensland mining region. The eastern portion of Australia typically experiences a wet season between December and March. Occasionally, these are more intense than usual, due to patterns of temperature changes in the

Pacific Ocean. In 2008, heavy flooding in Queensland tightened supply by 15 Mt and drove annual contract prices from US\$98/t in 2007 to US\$300/t for 2008.

Flooding in 2010-11, proved to be worse than in 2008, taking at least 25 Mt out of the market and pushing the Q1 2011 contract price to US\$330/t. At that time, the US coal industry, which is the classic swing supplier to the seaborne market, was able to respond quickly. Shipments from the US to Asia increased from about 5 Mt in 2010 to 18 Mt in 2011 to make up for lost supply from Australia.

## PRICE DECREASE AND MINE CLOSURES 2011 TO EARLY 2016

As the Australian pits dried and production resumed, prices fell back to pre-flood levels and then continued to decline as miners in Queensland pushed output in order to lower costs and win back market share. These efforts were assisted by a weakening of the Australian dollar to the US dollar. As a result, between 2012 and 2016 costs fell by nearly 50% and price dipped to below US\$80/t. By early 2016, about 20 Mt of high-cost production had been shuttered and the market was in better balance on volume.

## CHINA ADDS WORKDAY LIMITS AND AUSTRALIAN MINES EXPERIENCE OUTAGES

Then in April 2016, China imposed a 276 day-per-year work restriction on their mines to combat overcapacity. As a result, total Chinese production, met and thermal, during the first seven months of 2016 was down about 10%. This move caused the spot market up to climb to about US\$100/t.

But, the big driver came in mid-July and early August, when a number of heavy storms hit northern China and damaged the highway network and railroads. The resulting domestic supply shortage translated to more demand from the seaborne market.

In addition to the closures necessary to generally balance the market, a number of Australian producers were having their own mining issues. Then, the Grasree and Appin longwall mines declared force majeure. Together these two operations



account for about 10 Mtpa of production, a loss approaching the magnitude during the Queensland floods. Many of the US producers, who came to the rescue when Asian steelmakers needed replacement coal in 2011, were sold out for 2016. So, spot prices increased rapidly to about US\$315/t in November 2016.

## SUPPLY RETURNS TO NORMAL

By late November both the Appin and Grasree mines returned to production. Also easing the market tightness, in mid-November China relaxed its work rule policy to allow mines with good safety records to produce 330 days per year through mid-March 2017. With the large Australian mines back and China's domestic mines at more normal levels, the price began to fall. By mid-February, the low-volatile price was cut in half to about US\$150/t.

## WHAT DOES THE REMAINDER OF 2017 HOLD FOR PRODUCERS

With prices still substantially above the averages for the past few years, coal producers are examining ways to increase output. BHP is looking to increase output by 2.0 Mt in H1 (implying 4.0 Mt for the year) and Anglo American plans about 2.5 Mt additional output from its Grosvenor mine. In Mozambique, Vale is pushing to export about 4.0 Mt more coal in 2017 than it did in 2016. These changes alone could add over 10.5 Mt to the global seaborne supply.

In addition to those changes, which would more than cover our expectation for demand growth, North American producers are nearly all engaged in expansions by working more shifts each day, working more days per week and in some cases opening new mines. Canada will see both the Brule and Wolverine mines return, as well as Donkin in Nova Scotia. In the US, all longwalls in Alabama are increasing output. Ramaco has re-opened the Elk Creek complex and plans to open Berwind this year. Nearly all other producers have plans for some level of expansion to capture some business. We estimate over 15 Mtpa of announced potential expanded output for 2017.

Wood Mackenzie believes that the market will be awash with available coal over the course of 2017, pushing prices down. As a result, not all of the announced production expansions are likely to come to fruition, only those positioned with the best cost structures and the ability to capture some of the modestly expanding demand.

Volatility will remain. The Chinese government's decision on whether to restrict domestic production is a new feature of the marketplace and will continue to add volatility to prices and volume requirements for imports. We expect their 276 day work rule will be reinstated for Q2 2017, but many mines will be exempt, having annual contracts with steel mills. Still, the seaborne market should be better poised to handle spikes in demand, with more supply at hand, than it was in 2016. ■

# NEXT GENERATION COAL TECHNOLOGY

## Comes to Life – Wyoming’s ITC

By Jason Begger, Wyoming Infrastructure Authority



Americans enjoy one of the most reliable, affordable power supplies in the world. Every time we flip on a light switch, we expect the lights to come on. And they do, in large part thanks to coal. Coal is a top U.S. energy source, and its reliability is a big reason those lights come on when we flip that switch. For decades, America has depended on coal to meet our energy needs. Wyoming, as the nation’s leading coal producing state for over thirty years, has been an important part of meeting that demand.

Despite mounting pressure from government regulations and increasing market competition, America still depends on coal. Alternative forms of energy are simply not ready to carry the nation’s energy demands. We can’t afford to leave coal behind.

Coal must innovate to secure its place as a responsible contributor to future global energy production. That’s why

Wyoming is investing in the future of coal-based energy solutions by building a next generation testing facility called the Wyoming Integrated Test Center (ITC). The Wyoming ITC will be a home for researchers to test and develop the technology-based solutions necessary to keep America’s lights on.

### COAL CAPITAL OF THE WORLD

Wyoming has enjoyed a long history of strength in coal mining, making it the ideal location to foster the next generation of advanced coal technology. Since 1865, Wyoming coal mines have produced 10.6 billion tons of coal.

Since 1986, Wyoming has been the United States’ number one coal producing state primarily because of the vast reserves found in the Powder River Basin (PRB). The PRB coal seams are one of the largest, most

economical energy reserves on the planet, and the PRB is the largest coal basin in the U.S. Roughly 40 percent of the all coal used annually is mined in Wyoming.

Wyoming’s low-sulfur, sub-bituminous coal is cleaner burning and found close to the surface, making it cheaper and easier to mine. Environmental stewardship is an important part of mining, and there is a strong history of that as well. According to the Wyoming Mining Association, almost 50 percent of Wyoming land that has been mined and that’s not currently in use, has either been reclaimed or is in the process of being reclaimed. Efficient mining means lower production costs and that helps Wyoming coal to compete and means better electricity rates for consumers.

### FEELING THE PINCH

In 2016, national coal production was estimated to have fallen 18 percent and

reached historical lows unseen since 1978. The PRB experienced the largest ever-single year decline in production, falling below 300 million tons for the first time in nearly 20 years. Hundreds of PRB coal miners lost jobs and Wyoming state revenue is facing alarming deficits.

Coal production has been the foundation of the modern Wyoming economy for over 40 years. The industry has provided jobs and a steady source of tax revenue that's used to fund schools and local government. But in the recent energy market, Wyoming's coal industry is feeling the pressure. And in a state where coal accounts for more than 30 percent of state revenue, education funding is facing serious shortfalls. Wyoming's education system depends on mineral-based tax revenues for 65% of its funding. Lower fossil fuel prices over the past two years have resulted in education funding deficits that could be as high as \$400 million annually and reach \$1.8 billion over the next 5 years.

Wyoming workers, communities, schools and local governments count on coal. Securing coal's place in the energy market for the long-term will not only allow Wyoming families to continue to thrive, but also help America responsibly utilize its energy reserves so we can independently meet our future energy needs. Achieving such a goal requires innovation and the development of breakthrough technology. And that's exactly what Wyoming is focused on achieving with the ITC.

## WYOMING INTEGRATED TEST CENTER

The Wyoming ITC is a next generation testing facility being built just outside Gillette, Wyoming at Dry Fork Station, which is jointly owned by Basin Electric Power Cooperative and the Wyoming Municipal Power Agency. It will provide researchers with pilot-scale demonstration sites to develop new ways of removing and utilizing carbon emissions from coal-fired power plants.

The center will feature six test bays; five small bays providing up to 0.4 MW of flue gas, and one large bay which can provide up to 18 MW of flue gas. Each site will be provided with scrubbed flue gas directed from the Dry Fork Station.

Upon its targeted completion in late Summer 2017, the ITC will be one of just a handful of facilities around the world, and only the second in the United States, capable of demonstrating the real world use of clean energy technologies at scale. Currently, most carbon capture technologies are developed in laboratories where researchers have to rely on simulated flue gas and are forced to transport technology between the lab and field to conduct tests. By putting researchers on-site, with direct access to coal fired power flue gas, the ITC will provide a nearly unmatched opportunity to advance and scale Carbon Capture Utilization and Sequestration (CCUS) technologies under real world conditions.

"The biggest goal is to build these technologies that will allow coal to be used long into the future. Coal is approximately one-third of state revenues and if that goes away, you know the state is going to be hurting", said Jason Begger, Executive Director of the Wyoming Infrastructure Authority.

Carbon capture technology has the potential to revolutionize how we use fossil fuels. By transforming carbon dioxide emissions into valuable, revenue-producing products, CCUS stands to improve the economics of carbon removal. And when it comes to what carbon can be used for, the sky is the limit. Researchers have been looking at ways to repurpose carbon dioxide emissions into products like carbon negative bio-fuels, cooking oils, fish food, plastics and enhanced concrete. A breakthrough in CCUS could be game changing for coal production, not only helping to boost production while addressing emissions concerns, but also in turning what was

once deemed a waste product into a valuable commodity.

## PUBLIC-PRIVATE PARTNERSHIP

Such a groundbreaking project was made possible through the hard work and joint efforts of the State of Wyoming, Basin Electric Power Cooperative, Tri-State Generation & Transmission Association, National Rural Electric Cooperative Association and the NRG COSIA Carbon XPRIZE. The ITC has proven to be a model example of public-private cooperation.

Governor Matt Mead and the Wyoming Legislature have made it a goal to expand Wyoming's vast energy resources to new markets.

"We are making an investment in the future of coal. The research at the ITC will lead to new opportunities in petrochemicals and other commercial uses for carbon dioxide," said Governor Mead. "We lead the nation in coal production. This facility allows us to provide the same leadership in research and to do all we can to make sure the coal industry can continue to serve Wyoming and the country for many years to come."

XPRIZE, the world's leader in designing and managing incentive competitions to solve humanity's biggest challenges, will be the first tenant of the Wyoming ITC. The NRG COSIA Carbon XPRIZE is a global competition to develop breakthrough technologies that convert the most carbon dioxide emissions from power plant facilities into products with the highest net value. There are currently 27 teams competing as semi-finalists in the \$20 million competition. The teams hail from six countries – Switzerland, China, India, Scotland, Canada and the United States. Their innovative, diverse approaches to CO<sub>2</sub> utilization include converting carbon emissions into valuable products such as fish food, fertilizer, carbon nanotubes and building material.

The ITC will be available for testing in Fall 2017. For more information on the Wyoming ITC, visit [www.wyomingitc.org](http://www.wyomingitc.org). ■

# THE FIRST 100 DAYS: Coal at a Crossroads

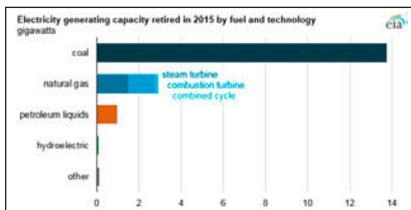


*“The will to succeed is important, but what’s more important is the will to prepare.”*

**Indiana Basketball Coach Bobby Knight**

By T.L. Headley, American Coal Council

To state the painfully obvious, the past eight years have been difficult for the nation’s coal industry.

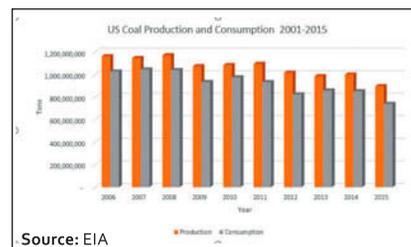


In 2008, coal production was booming. The industry was experiencing a shortage of miners and support personnel and was actively recruiting at high schools and colleges for people interested in the industry as a career. The future seemed bright.

That began to change on January 20, 2008, when President Barack Obama took office as the nation’s 44th president. Unlike his predecessor, George W. Bush, Obama saw coal as a problem. Concerned about climate change and the impact of coal on the environment, Obama moved quickly to begin pushing legislation and regulations that restricted the production and use of coal. It seemed that each new regulation and each new executive order increased the cost of production or restricted the use of coal.

In the ensuing years, coal companies have seen large swathes of their marketplace disappear – particularly the

market for thermal coal used in power generation, as 400 coal-fired boilers producing 60,000 MW of electricity closed down or converted to other fuels.<sup>1</sup>



Source: EIA

Domestic coal production has fallen by almost 40 percent between 2009 and 2016. Tens of thousands of coal miners and support workers lost their jobs. With rare exceptions, every year seemed worse than the last. The industry was stretched beyond the breaking point. The news media declared coal dead – a “fossil of our industrial past.”

To be clear, regulations were not the only factor in the downturn. Market competition from abundant, low-priced natural gas, periodic large coal stockpiles on the ground, and the ongoing international economic slowdown, but the impact of the Obama-era regulations were at the core of much of the problems.

That began to change again on January 20, 2017 when new President Donald Trump succeeded Obama. Trump

has signaled a commitment to the coal industry. Recent months have seen renewed growth as markets came into equilibrium, metallurgical markets soared, and production increased. Some idled mines began to reopen, putting some miners back to work, and plans for some new mines took shape.

Today, the nation’s coal industry is at a crossroads. Coal production is up approximately 17 percent year over year (source EIA), but the question remains as to whether this is sustainable or simply a response to a temporary swing in the overall economics.

Less than three months into his term, President Trump has already taken a number of actions that have helped the industry. And he has indicated he plans for additional steps.

## ACTIONS TAKEN OR PENDING:

1. Agency Appointment: Scott Pruitt to head the Environmental Protection Agency
2. Agency Appointment: Rick Perry to head the Energy Department
3. Agency Appointment: Ryan Zinke to head the Department of the Interior
4. Executive Order: 90-day regulatory freeze (Jan. 20, 2017)

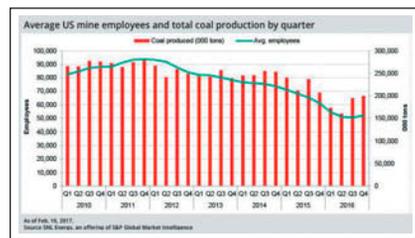
5. Executive Order: Agency review to cut red tape and unnecessary regulations (Jan. 30, 2017)
6. Executive Order: For every new regulation, agencies must cut two (Jan. 30, 2017)
7. Executive Order: Regulatory Reform (Feb. 24, 2017)
8. Executive Order: Rescinding the Waters of the United States Rule (Feb. 28, 2017)
9. Executive Order: Rescinding the federal coal leasing moratorium (March 28, 2017)
10. Executive Order: Ordered a review of GHG regulations (March 28, 2017)
11. Congressional Review Act Resolution: Rescinding the Stream Protection Rule (Feb. 2, 2017)
12. Congressional Review Act Resolution introduced in Senate (SJ Res. 21) to overturn the Cross-State Air Pollution Rule update to National Ambient Air Quality Standards (March 2, 2017)
13. Pending Budget: Cut EPA by 3,200 positions or 30 percent of its budget (March 16, 2017)
14. Pending Budget: Cut funding for implementation of Clean Power Plan (March 16, 2017)
15. Pending Budget: Cut support for the UN Climate Change efforts (March 16, 2017)
16. Possible: Congressional Bill rescinding the Coal Ash Rule (Passed House/ Pending Senate)
17. Possible: Action to reduce the further impacts of the MATS regulations

The choices of Scott Pruitt to lead the EPA, Rick Perry to lead the Department of Energy and Ryan Zinke to lead the Department of Interior were welcomed across the fossil fuel energy industry. In his capacity as Oklahoma AG, Scott Pruitt was a leader in challenging unwarranted regulation and fought against overreach by federal agencies. Mr. Pruitt is serious about cooperative federalism and has a track record to prove it. He has promised to return the EPA to its job of administering the laws as passed by Congress. He will change EPA's focus from environmental activism at any cost to a common sense approach that balances economic and environmental consideration. Perry is the former governor of the largest energy

producing state in the nation and, as governor, presided over the fastest growing economy in the nation. Zinke is a former Congressman from Montana, whose common-sense approach to legislation will be a tremendous asset to the nation. They share a vision with President Trump of a leaner regulatory approach that protects the environment while also fostering the development of industry and strengthening the nation's economy. This approach was outlined in the recently released outline of the Trump Administration's proposed budget for this year.

"The American people deserve a regulatory system that works for them, not against them – a system that is both effective and efficient," the Trump Administration wrote. "Each year, however, Federal agencies issue thousands of new regulations that, taken together, impose substantial burdens on American consumers and businesses big and small. These burdens function much like taxes that unnecessarily inhibit growth and employment. Many regulations, though well intentioned, do not achieve their intended outcomes, are not structured in the most cost-effective manner, and often have adverse, unanticipated consequences. Many more regulations that have been on the books for years – even if they made sense at the time – have gone unexamined and may no longer be effective or necessary. The President is committed to fixing these problems by eliminating unnecessary and wasteful regulations."

Combined with steps being undertaken by Congress, through the Congressional Review Act or through slower, regular legislative channels, the sun is beginning to shine through the regulatory cloud that has hung over the industry for the past eight years. And confidence in the future of the coal industry is beginning to build.



Still, it is important to note that this does not mean the industry will return to the levels it saw in the mid-2000s. The closures

of hundreds of coal units in the power sector won't be undone with the stroke of a pen or by the action of Congress. Most of those plants are now gone or have been converted to use other fuels, such as natural gas. In effect, those markets are lost.

However, with a return to more normal natural gas market pricing and the repeal of costly, restrictive regulations further threatening coal mining and use, as well as a more welcoming policy environment for coal, the industry can reclaim some of its former market. Combined with President Trump's stated goal of investing in rebuilding the nation's infrastructure, the nation's coal industry could be poised to take advantage of the increased demand for energy that will likely result from such projects and economic expansion.

## TAKING ADVANTAGE OF OUR OPPORTUNITIES

What a difference six months can make. In October, our industry was preparing to weather another four to eight years of regulatory challenges anticipated by a Clinton administration. The forecast was a bit bleak. Today, we are well on our way to a regulatory reset and a leveling of the playing field for coal.

As this article has outlined, the Trump Administration and its allies in Congress are moving quickly to eliminate many of the regulations targeted at coal for the past eight years. This is great for the industry, for coal-related jobs, and for our nation's future.

Looking ahead, how do we make sure that this doesn't happen again in four or eight years? What steps do we take now to secure our industry's future well into the 21st Century? There is a window to find that way forward and lay the groundwork to make it reality. Some policy approaches may be found in other articles in this issue of *American Coal*. ■

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# ACC Coal Q&A Webcast Program

The ACC's Coal Q&A Program is a monthly webcast, which provides a forum to address critical issues affecting the U.S. coal industry – including coal producers, consumers, transporters and services partners. Each program begins with a topic briefing by a leading industry analyst, expert or representative, followed by a moderated Q&A session.

Our webcast presentations cover a wide range of content, including:

- Domestic and international coal markets
- Coal and energy policy issues
- Carbon capture utilization and storage technology
- Coal plant efficiency improvements
- Changing federal regulation and impacts on the coal supply chain



Be sure to check out the ACC website ([www.americancoalcouncil.org](http://www.americancoalcouncil.org)) to stay up-to-date on our conferences and webcasts.



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