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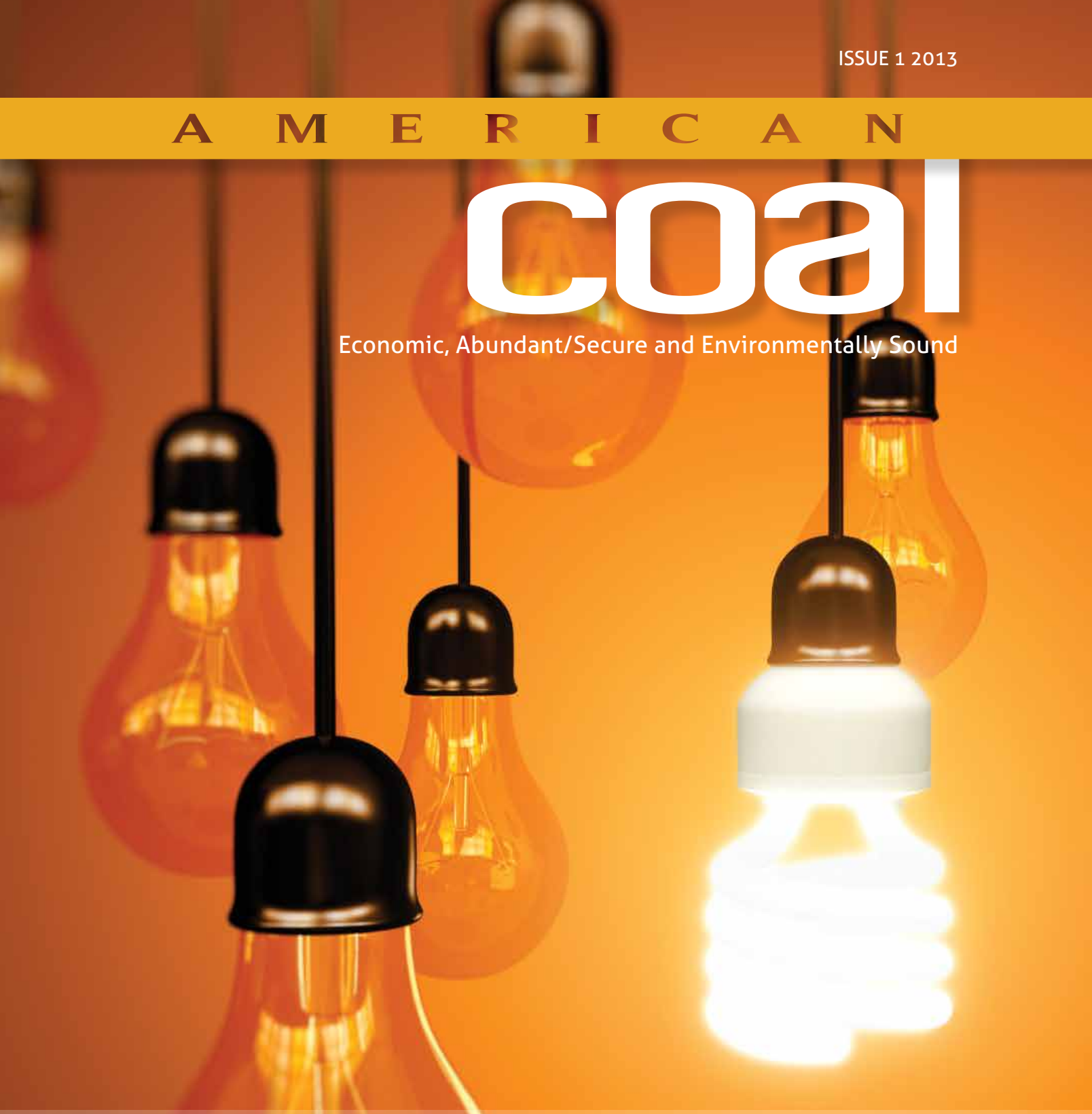

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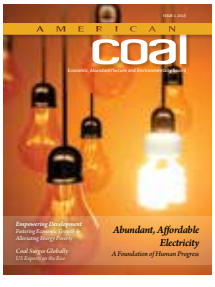

ON THE COVER

Energy is a key factor in socioeconomic development and essential to transforming agrarian societies into modern industrial ones
See page 26

COVER: GALINA PESHKOVA/PHOTOS.COM
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1101 Pennsylvania Ave. N.W., Suite 600
Washington, DC 20004
Tel: 202-756-4540
Fax: 202-756-7323
Fax: 732-231-6581
www.americancoalcouncil.org

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Could PR Spin Really Have it Wrong?

"Now is the winter of our discontent."

As Shakespeare penned this dramatic opening line to *The Tragedy of King Richard the Third*, he must have had some notion that his words would have an impact on the legacy of the fallen English king.

History, as replayed in Shakespeare's words, painted Richard as a scheming, resentful and malevolent murderer. Shakespeare described the past king as "deformed, unfinished, sent before his time into this breathing world, scarce half made up." Rejected by his people – even the "dogs barked at him as he halted by" – filled with contempt for those who refused to respect him, the play fashioned Richard's character as "determined to prove a villain."

Even the slightest introduction to public relations and media spin today will make it clear that occasionally a story can be told in a way that highlights the negatives and ignores, distorts or downplays the positives of an individual or group.

Those of us who work in the coal industry have endured this reality over the past several years. Coal has been targeted by false and misleading multimillion-dollar PR campaigns that are put together by wealthy multinational green corporations and fostered by many in the media as well as our federal and state governments.

But, occasionally, a story comes along which proves that even in the darkest winter storms, a ray of hope can still shine through. We can rest assured that time will prove the falsifiers false.

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Unfortunately for Richard, that didn't happen until long after his death. The descriptions and the characterizations of him as a physically and mentally deformed usurper took on a life of their own for hundreds of years. However, with our much-improved science and research abilities today, new facts are coming to light. The discovery, late

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last year, of King Richard III's skeleton under a Leicester car park in central England on the former site of a Greyfriars' monastery has added some balance to the image of the one-time king.

Researchers have scanned the unearthed skeleton and used 3-D printers and facial reconstruction techniques to show that Richard was not the horribly distorted, hunch-backed monster of legend. In fact, his skeleton confirms that while he did have scoliosis, he had only a slight drop in his left shoulder. Apart from that, he appeared normal. While he was of slim build, historical reports show that he was well disposed toward athletic pursuits. Additionally, reports of his exploits in the Battle of Bosworth Field stated that he fought bravely, in the midst of the fray, until his death.

With regard to his ability to rule, Richard clearly took part in the political intrigues of the day, as did most (if not all) of his contemporaries. However, history shows that he instituted changes in the British legal system that are now considered basic rights and continue to benefit us today. Among those changes is the system of bail that still allows people charged with crimes to post a bond and be released from jail until the time of their trial. He also mandated that the law of the land be written in the language spoken by the people of the land. Before this change, commoners who did not speak Latin could not read the laws under which they lived. Richard also standardized weights and measures, meaning that a pound of meat in one store would be the same in another. He also halted the system of benevolences that allowed the wealthy to purchase their way into positions of power. Under Richard, the "best one for the job" was selected, regardless of their social status.

Through Richard's story, we begin to see that what is often widely accepted as fact is, in reality, a figment of a writer's mind; a detailed façade, invented to prop up a political movement and detract from a political foe. This imaginary world is also clearly the case with the anti-coal façade and PR spin that many today consider "common knowledge".

In this issue of *American Coal*, we continue to provide research and balancing information that breaks down the media distortions and pseudo-science on our energy supply by demonstrating how the provision of abundant, affordable, reliable/secure and clean coal-fueled energy is a boon to humanity. Dr. Frank Clemente returns to our pages to look at coal's role in benefitting human development. Our CEO, Janet Gellici, describes how the coal industry can reposition and refocus to ensure success through these uncertain times. I then take a look at how American coal is seeing increased demand around the world.

In the body of this issue, Dr. Mary Poulton of the University of Arizona describes the UA's School of Mining and Geological Engineering, their research and opportunities for students.

Bob Burnham and John Hanou provide a timely update on PRB production and forecasts. Moving over to the West Coast, we have invited Lauri Hennessey from the Alliance for Northwest Jobs and Exports to describe the importance of proposed port developments both to the economy of the Pacific Northwest and the country's coal industry.

Taking a look at new, cleaner coal technologies, Ann Banks of Summit Power describes the Texas Clean Energy Project and the promise of multi-product solutions for the coal industry. Then, continuing in the theme of how coal is running cleaner and cleaning up after itself, Paul Franklin of the American Chestnut Foundation discusses "Operation Springboard" and the work to restore the American chestnut on reclaimed mining lands.

Closing up the issue, author and energy industry expert, Chris Skates, plays a two-fold role. In his article, Chris discusses the cultural mindset that is driving climate change policy and research. I will then review Chris' latest publication *Going Green*, an environmentally based novel that follows a young engineer's hair-raising ride through international conspiracies and the use of global warming as a powerful political weapon.

"We can remember that we have the facts, economics and science on our side. Our story will take time and effort to get out, but we will stick through to the end and demonstrate that providing clean, abundant, affordable energy is a boon to humanity."

The story of King Richard III shows that determined adversaries can, and often will, be successful in their PR smears. During the darkest storms, we will have times where it seems easier stop fighting and to pack it in. The haters and the malcontents will attack and attempt to paint us as monsters that value money over health and the environment. They will spin wild tales and tell people to fear us and push governments to regulate us out of existence. Despite the seemingly endless funding of our adversaries and their boundless appetite for distortion, however, the truth can win out in the end.

We can remember that we have facts, economics and science on our side. Our story will take time and effort to get out, but we will stick through to the end and demonstrate that providing clean, abundant, affordable energy is a boon to humanity.

As an excellent next step in that expenditure of time and effort, we welcome you to this issue of *American Coal*. ◆

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"WHINY" COLUMN ATTACKS GREEN CONSULTANTS FOR DARING TO WORK ON NW EXPORT PROJECTS

The first thing that popped into my head as I read David Roberts' recent spittle-flecked, frothing tirade was a quote, often attributed to Gandhi:

"First they ignore you, then they laugh at you, then they fight you, then you win."

Clearly the staff at *Grist* have moved beyond ignoring and laughing and are now jumping, with both feet, into what they hope will be a fistfight. Demonstrating the truth of my contention is Roberts' recent column, "Seattle 'green' consultants sell out for coal money, whine." Roberts' efforts can best be described as a public hissy fit, complete with four-letter words, logical fallacies and all the personal hatred, vitriol and *ad hominem* one can dish up in a few hundred words. Roberts' choice of title was also somewhat ironic, given that the only whining one notices here is within his own column.

– coalblog.org

STUDY SAYS WIND POWER POTENTIAL OVERSTATED

Add this new study to the recent discovery that the economic life of wind farm installations has been overestimated by as much as 45 percent and one might start to wonder if we are putting the cart before the horse with all the tax money we're pouring into renewables.

"The global generating capacity of wind farms has been overestimated and the world may not have access to as much wind power as thought," U.S. researchers say.

– coalblog.org

SOMETHING TO DO

Coal Leadership Advancement Seminar Session
June 4-6, 2013, Union Station Hotel, St. Louis, MO

Coal Market Strategies
Aug. 19-21, 2013,
Ritz-Carlton Lake Tahoe, Lake Tahoe, CA

SOMETHING TO READ

Going Green: For Some It Has Nothing To Do With The Environment
By: Chris Skates

Roosters of the Apocalypse
By: Rael Jean Isaac

SOMETHING TO REMEMBER

"Coal is a staple energy source [and] will remain a key primary energy source and an important part of fostering economic growth and alleviating energy poverty." – Maria van der Hoeven, Director, International Energy Agency (IEA, January 2013)

In the 2013 *ACC Membership Directory,* the listing information for Savage Services in the Transportation tab was incorrect.

Please update your directories to include the following information for Savage Services contacts:

SAVAGE

Savage Services, Inc.
6340 South 3000 E., Suite 600
Salt Lake City, UT 84121
www.savageservices.com

Fred Busch
Sr. VP – Group Business Development
Phone: 801-944-6621
Fax: 801-944-6520
Email: fredb@savageservices.com

Rob Davidson
Title: VP – Mining Group Business Development
Phone: 800-827-4439
Fax: 801-944-6520
Email: rob@savageservices.com

Jeff Chesler
VP – Power and Mining Group
Phone: 304-842-8634
Fax: 304-842-1025
Email: jeffc@savageservices.com

We regret the error.

Doug Glass, ACC 2013 President
and Vice President & General
Manager, Coal, Union Pacific Railroad

Why I Have Confidence in the Future of Coal

"If I have learned one thing during my 37-year tenure with the railroad, it is that industries and markets are never as good as they appear at their peaks and are never as bad as they feel during their depths."

The news of coal generation closures, new and growing supplies of natural gas and the idling of Central Appalachian coal mines has caused a great deal of consternation across our industry, not to mention the loss of well-paying jobs and families struggling to make ends meet. Given the state of affairs in Washington, D.C., we can expect to see continued division on the legislative front, with fresh pressure to expand renewable energy, the persistent creep of regulations on air quality and the potential for legislative or administrative action to address climate change. With this as a backdrop, we can look forward to a continued, slow, steady drip of pressure against our industry for at least the next four years. Yet, despite the challenges faced by those of us in the coal-based electricity industry, I remain positive about the future of coal.

Let me explain my thoughts with a few examples.

PHOTO BY VICTOR KOCHETKOV / PHOTOS.COM

Economics

First, coal is one of our country's cheapest and most abundant resources. Barring another dramatic change in the relative price of natural gas or a tax on carbon, many agree that coal will continue to remain a low-cost, competitive option for producing electricity for many years to come.

Technological innovation and emission reductions

Our country's power producers have made remarkable progress in reducing plant emissions over the past few decades. Coal-fueled power plants being built today are up to 90 percent cleaner than plants that were built in the 1970s, while emissions of major pollutants from coal-fueled power plants are down by nearly 90 percent per unit of electricity generated over the past several decades. This is remarkable progress that fails to get much attention.

No perfect fuel solution

While coal is receiving the lion's share of bad press right now, there really is no perfect solution to our energy conundrum – every fuel has its own unique Achilles heel. Nuclear, fracking, wind and solar all have their own share of social costs as well as economic and environmental consequences. We can't say for sure how the coal, gas and renewables competition will end up, but we do know that our energy system is, and always has been, strong because of its diversity. Absent a new discovery or a dramatic change in economics of any of our fuel choices, we still need all of the options on the table to fuel our world's voracious appetite for electricity.

Regulatory policy

Regulation has increasingly impacted our country's primary electrical energy resource. That fact has become a disturbing reality as we see mines being idled and utilities shuttered. But keep in mind that political winds shift back and forth and are generally an imperfect predictor of the future. Policy changes often reflect ideological changes that keep our country balanced, at least in the sense that over the long run, as a society, we tend to settle somewhere in the middle of the political spectrum.

None of us like to see our coal industry contract under the weight of federal policy, particularly if we do not agree with that policy. However, I see the current process, to some degree, as a mechanism for renewal. Older power plants are being retired so that new coal-fueled power plants can survive – new plants that produce significantly lower emissions, plants that are economically competitive with natural gas and contribute to the greater health and welfare of the American people.

Natural gas competition

We recognize that natural gas has gained significant market share at

"Coal-fueled power plants being built today are up to 90 percent cleaner than plants that were built in the 1970s, while emissions of major pollutants from coal-fueled power plants are down by nearly 90 percent per unit of electricity generated over the past several decades."

the expense of coal over the past few years. However, it's important to realize that we are seeing the gas industry at its nascent best. Natural gas development is akin to an energy gold rush, where everyone is scrambling to get in the game – at any cost. There is a lot of pushing and shoving to get to the front of the line and it is difficult to see who will be the clear winner. This "energy gold rush" has led to market imbalances and environmental issues that may not be sustained over the long run. However, one thing everyone may be able to agree with is that growth in the natural gas industry is supporting a generally weak economy and may contribute to energy independence at some point in the future. Regardless of the outcome, it still seems unlikely that gas will replace coal anytime soon.

Who will power the cloud?

Of all the remaining options, coal, natural gas and nuclear are the only resources that can provide the competitive priced baseload – always on – energy that our society requires.

A DTE Energy Resources executive recently stated at Platt's coal conference that, "diversified energy demand will ensure the industry's survival, while federal regulation threatens its growth." I believe this really sums up the current environment and outlook for our industry. While capacity will decline over the next seven to ten years, generation will see less impact as the remaining coal plants increase output.

These are just a few of the reasons why I remain confident in the future of coal. By sticking together and promoting the best interests of the industry, our co-workers and customers and by using good science and fact-based arguments, we will make it through these difficult times.

I told the American Coal Council's Board of Directors a few months ago that my mantra for 2013 is "surge forward!" Please join with me as we weather the many challenges we face in the coming year and then "surge forward" to preserve this great industry! ◆

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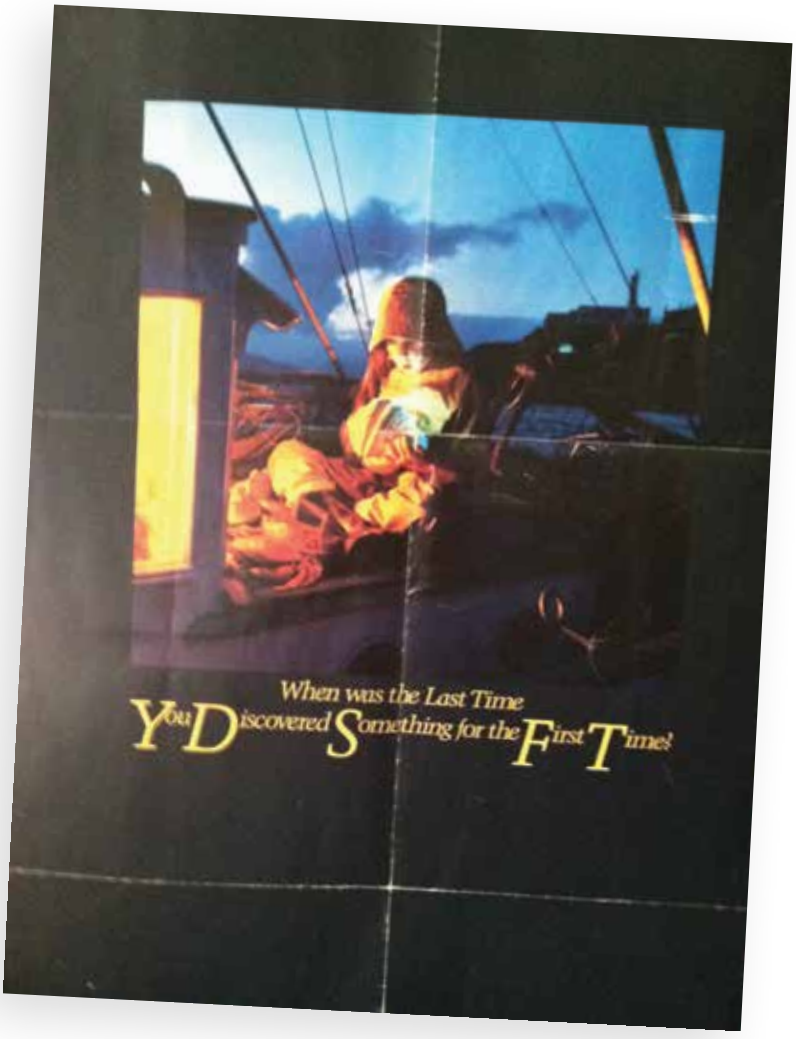
Janet Gellici,
Chief Executive Officer,
American Coal Council

New Horizons



My first real job was with the Western Governors' Association in Denver, Colo. where I served as a public information officer. It was 1979 and I was fresh out of college with a degree in journalism/public relations. I had my very own – albeit windowless – office in a building across from the old Stapleton Airport. I hung my college degree on the wall and one other prized possession that I'd brought with me from my days at the University of Iowa – a poster published by the Public Relations Society of America that read:

"When was the last time you discovered something for the first time?"

I still have that poster and it still hangs in my office. It's tattered and has accumulated a number of road miles during my various moves from Iowa to Denver to Phoenix to Annapolis. But it still inspires me. It's a reminder that I need to resist the urge to become complacent in either my professional or my personal life.

It's certainly been a guiding principle for me during my 30-year tenure with the American Coal Council (ACC) and its predecessor organizations – the Western Coal Council (WCC, 1987-2002) and the Western Coal Export Council (WCEC, 1982-1987). It served us well in our efforts over the years to continually reinvent the ACC – to make changes in response to market conditions, to try something new and learn from successes as well as failures, to evolve or run the risk of stagnating and becoming irrelevant.

I love my job as CEO of the ACC. I've loved it since I started as the WCEC's communications director and then later when I served as

WCC's conference marketing director. No, I haven't loved it every day, but most days I have. It's challenging and rewarding work; we've won some and lost some over the years but we've bounced back from the bad times and celebrated the good times.

The best part has been working with the people in this industry – dedicated, hard-working, conscientious people with a committed sense of purpose in doing their part to ensure the availability of affordable, clean, reliable energy. I consider these folks family, not just colleagues. I've also been fortunate in being able to work with staff over the years with exemplary work ethics and talent, most notably the ACC's current staff – Jason Hayes, Ingrid Abrom and Michele Rubin. They have each contributed in their own unique way to the success of the association, but most importantly have demonstrated the power of teamwork.

As I write this final column as CEO of the American Coal Council, I know that I'm leaving the association in good hands. In addition to our tremendous staff, we have a board of directors with strong leadership skills, significant industry experience and a willingness to give back to the coal community with their time and effort.

So, if I love my job and I love the people I work with, why am I leaving? Well, quite honestly, there are still some times

"Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."

– Mark Twain

PHOTO BY ANDREAS HERPENS/PHOTOS.COM

I wake up at 3 a.m. and ask myself that very question! Then I remember that first time/last time poster. After 30 years, I think it's time to turn over the reins and allow the ACC to benefit from the fresh perspective that a new CEO will bring to bear. For me, personally and professionally, it's an opportunity to try something new, to meet a new challenge, to extend beyond my current comfort zone.

I'm a sailor; Dave and I spend our free time sailing the Chesapeake Bay and beyond whenever we can. When I think of taking on a new responsibility as executive director of the National Coal Council (NCC), I recall Mark Twain's admonishment:

"Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."

Of course, I'm not sailing too far away. The National Coal Council, which represents all segments of the coal industry, provides advice and guidance to the U.S. Secretary of Energy on policies, technologies, science, engineering and research related to coal. I was first appointed to the council in 1998 and have served on the NCC Executive Committee for a number of years. I know that the studies conducted by NCC represent the best efforts of the best minds and leaders of our industry, academia and the consulting community.

It's important work. It provides us with an opportunity to envision a viable future for our industry and to serve as a catalyst in defining how we get from where we are today to what we can be tomorrow. I'm pleased to be able to continue to work in support of the coal industry and mindful of the responsibility associated with the job.

We're experiencing some challenging times right now, as reflected by many of the topics addressed in this issue of *American Coal*. Our ability to weather the challenges ahead will require both patience and perseverance. That brings to mind some inadvertent advice I got from my recently departed granddad who, at the age of 94, had his own challenges to overcome, including hearing and speed of motion. In response to these challenges, he posted the following sign on his apartment door; I think it offers some sage wisdom for us to consider in the coming years as we wrestle with various marketplace and public policy challenges.

"KNOCK VIGOROUSLY … AND WAIT PATIENTLY!"

"The best part has been working with the people in this industry – dedicated, hard-working, conscientious people with a committed sense of purpose in doing their part to ensure the availability of affordable, clean, reliable energy. I consider these folks family, not just colleagues."

Thank you, again, for the opportunity to have served as chief executive officer of the American Coal Council. It's been an honor.

Cheers,
Janet Gellici, CAE
ACC Chief Executive Officer ◆

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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.

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Join the 180 companies that recognize the importance of belonging to an association that serves as the pre-eminent business voice of the American coal industry and advocates for coal as an economic, abundant/secure and environmentally sound fuel source.

The American Coal Council (ACC) is an alliance of coal, utility, trading, transportation, terminal and coal support service companies, advocating a non-adversarial, partnering approach to business.

The ACC facilitates the lawful exchange of ideas and information regarding the American coal industry. It serves as an essential resource for companies that mine, sell, trade, transport or consume American coal. The ACC also serves as a resource for those wishing to expand or enhance business relationships in North American and international coal markets.

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ACC events are widely recognized as an essential means of maintaining up-to-date industry and policy knowledge, as well as high-level networks. Our event agendas that are packed with timely, critical marketplace and public policy issues, detailed operations updates, cutting edge management techniques, and – of course – expert speakers.

Attending an ACC event plugs you into your industry.

events

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June 4-6, 2013
St. Louis, MO

Coal Market Strategies Conference
Aug. 19-21, 2013
Lake Tahoe, CA

Coal Industry Briefing
In association with McGuireWoods
Oct. 24, 2013
Washington, DC

Coal Trading Conference
In association with the Coal Trading Association
Dec. 9-10, 2013
New York, NY

*We also hold regular webcast events, such as our **Coal Q&A Webcast.***
*Please refer to **www.americancoalcouncil.org***
*or call **202-756-4540** for additional dates and registration information on our events schedule.*

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American Coal Council

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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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The ACC's Tomorrow's Leadership Council (TLC) is designed to advance and vest executive talent in the coal industry. The council provides **a meaningful opportunity for up-and-coming executives** to enhance their industry knowledge and networks through projects and activities that advance industry-wide objectives as well as professional development goals.

This year, TLC will focus their annual project effort on the theme of "Coal 2035: The Future of American Coal." The group will prepare a forward-looking perspective on the benefits and use of coal 20 to 25 years from now.

Past TLC projects have included:

- 2012 – Coal: the Fuel for America's Future – Listing the benefits of coal-fueled electricity, debunking anti-coal myths and a path forward for coal
- 2011 – Social Media for the Coal Industry – Making social media work for our industry
- 2010 – Coal Unplugged – Demonstrating that coal is used to produce much more than electricity
- 2009 – Coal Fundamentals – An overview of coal supply, consumption and transportation

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**.

If you relish the thought of taking an **active role** in the **future of your industry**, we'd encourage you sign on for a 12-month commitment. TLC is a close-knit community of more than 60 ACC member company "graduates" representing the full spectrum of the coal industry.

As part of the **TLC community**, you will have the opportunity to build your:

- Research and project management skills
- Business and industry experience
- Professional networks and industry contacts
- Leadership skills (through focused training and seminars at key industry events)

Get involved and help build your industry. Improve your knowledge, skills and career prospects. Gain the respect and recognition of your industry colleagues. ◆

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Sign up for Tomorrow's Leadership Council today!

For more information on TLC, please visit the ACC website (www.americancoalcouncil.org). You may also contact Jason Hayes, the ACC's communications director, at 202-756-4540 or jhayes@americancoalcouncil.org.

class

Coal Leadership Advancement Seminar Series (CLASS)

Definition: *class* /klas/
Noun: a course of instruction
Adjective: showing stylish excellence

New to their industry and seeking to make a difference in their lives and places of work, young professionals look for a way to become more involved, better networked and better educated. The American Coal Council (ACC) is addressing those needs with the **Tomorrow's Leadership Council**.

Already well established in their industry, senior executives often seek out a means of giving back, through mentoring and service. ACC provides opportunities for senior executives to serve on our **Board of Directors**, in our various committees and event planning.

Recognizing that **mid-career executives** require additional career and educational development opportunities, ACC has created the **Coal Leadership Advancement Seminar Series (CLASS)** to address their interest in:

- Advancing professional **career objectives**
- Building and enhancing long-term **relationships** with industry colleagues
- Obtaining timely, in-depth and analytical industry **knowledge and resources**
- Learning about the **operations** of, and **interrelationship** between, various sectors of the coal industry – coal supply, consumption and transportation

As part of the CLASS program, mid-career executives seeking that extra push to expand their connections, options and abilities enjoy in-depth seminar sessions covering a wide variety of key industry topics, such as:

- Environmental policy
- Renewable energy mandates
- Smart grid
- Transportation infrastructure and advances/constraints
- Coal trading
- Industry advocacy

ACC's annual CLASS brings together coal suppliers and marketers, utility and industrial coal consumers, rail/barge/port transportation management and coal support service providers. This seminar provides a series of in-depth training sessions on technical, legal, financial and business administration subjects, as well as timely updates on critical marketplace and public policy issues.

Sign up for the Coal Leadership Advancement Seminar Series today.

For more information on CLASS, please visit the ACC website, (www.americancoalcouncil.org). You may also contact Jason Hayes, the ACC's communications director, at 202-756-4540 or jhayes@americancoalcouncil.org. ◆

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ACC Webcasts

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 and transporters. Each program begins with a topic briefing by a leading industry analyst, expert or representative, followed by a moderated Q&A session.

Late in 2012 and early this year, our webcast presentations have covered a wide-range of content, including the development of coal-direct chemical looping technology and developments in global coal markets.

- December 2012 – Implications of 2012 Elections for the Coal/Utility Sector
- January 2013 – State of the Coal Industry – What's Ahead for 2013
- February 2013 – Global Coal Market Developments

Upcoming webcasts will look at natural gas markets and fuel switching.

Be sure to check out the ACC website (www.americancoalcouncil.org) to stay up-to-date on our conferences and webcasts. ◆

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Committee Updates

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 through enhancing awareness of their environmental and efficiency performance benefits. The committee's specific functions include:

- Development of fact sheets
- Agenda participation in the ACC and other industry conference programs
- Development of new ACC-hosted conference programs, seminar and/or webinars devoted to engineered coal fuels and coal preparation technology utilization
- Establishment of an information clearinghouse on the ACC website of relevant reports and studies
- Development of original data and/or reports as deemed necessary and appropriate
- Promotion of the environmental and efficiency benefits of engineered coal fuels and coal preparation technologies through various communications and advocacy channels, including but not limited to:
  - Preparation and placement of industry trade publication and mainstream media articles
  - Meetings with public policymakers

If you are interested in serving on, or recommending someone for, the Coal 2.0 Alliance, please contact the ACC at 202-756-4540 to discuss this opportunity.

ACC Communications Committee

The ACC's Communications Committee principally serves as a sounding board for the ACC staff and board of directors, providing feedback on strategies and tactics associated with association communications and marketing materials. The committee's specific functions include:

- Serving as a sounding board for ACC staff regarding objectives of various ACC communications outlets – publications (print and electronic), websites and social media
- Bringing diverse perspectives to bear in reviewing messages and materials for member and public distribution
- Gathering intelligence on what competing organizations or "frenemies" are doing to help ACC staff stay abreast of important trends and developments
- Serving as a community antennae – what's the latest buzz in the industry, what are folks saying about ACC and other associations, what questions need to be addressed by ACC staff/board
- Friend-raising by speaking publicly and privately about ACC's good work
- Researching target audiences to focus and improve communications and marketing strategies
- Assisting with development of member surveys
- Providing input on website content, Coalbog content, magazine and newsletter content

The ACC's existing *American Coal* Editorial Review Board serves as a sub-committee of the ACC Communications Committee.

If you are interested in serving on, or recommending someone for, the Communications Committee, please contact the ACC at 202-756-4540 to discuss this opportunity. ◆

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Coal: Empowering Human Development

Key to socioeconomic development, this energy source has been crucial to modern industrial evolution

By Dr. Frank Clemente, PhD,
Penn State University

"Coal is a staple energy source [and] will remain a key primary energy source and an important part of fostering economic growth and alleviating energy poverty."

– Maria van der Hoeven, Director, International Energy Agency (IEA, January 2013)

Coal provides over 40 percent of the world's electric power, is crucial to the production of steel and cement and is convertible to liquid fuel, substitute natural gas, chemicals and a variety of other useful products. Further, the carbon dioxide (CO_2) produced from coal consumption can be captured and utilized to support Enhanced Oil Recovery (EOR). The United States alone can produce 4 million barrels of oil per day from EOR while permanently storing large quantities of CO_2. Coal has been, is and will continue to be an abundant, affordable and reliable pillar of global energy. The IEA and the Organization of the Petroleum Exporting Countries (OPEC) both agree that by 2030 coal will be the world's leading source of energy – surpassing oil. Further, with the advent of clean coal technologies, a world with over 1 trillion tons of recoverable coal can secure a sustainable fuel supply throughout the 21st century.

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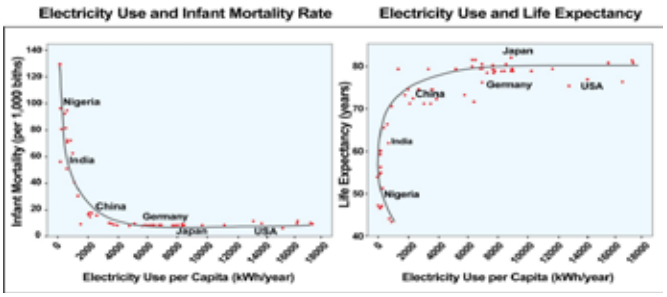
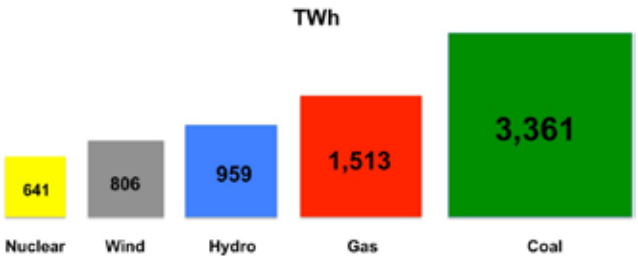




Coal as the leading source of incremental electricity: 2010-2020

To understand the full value of coal, the role of energy in human progress must be appreciated. Energy is a key factor in socioeconomic development and essential to transforming agrarian societies into modern industrial ones. This societal transformation, driven by the accumulation of income and wealth, eliminates many contagious diseases, reduces child mortality and lengthens adult life expectancy. This pattern has been demonstrated over the past two centuries in dozens of countries around the world. The emergence from poverty begins as countries develop extensive transportation structures using petroleum and build electricity networks, frequently based upon coal. These systems are capable of achieving massive economies of scale that provide large amounts of energy at a low cost. Such abundant and reliable supplies of energy spur technological change, enhance productivity growth and elevate living standards.

Coal was the backbone of the Industrial Revolution in England during the 18th century, America's emergence as a major economic force during the late 19th and 20th centuries, Germany's manufacturing prowess during the early 20th century and Japan's emergence at approximately the same time. Now coal is fueling the remarkable 21st century economic miracle unfolding in China. Further, the dependence on coal will continue apace as India and other developing countries are emerging from the wings to seek a better life for their citizens through the use of coal.

Coal and electricity

Electricity is so important that everybody wants it. From 1970 to 2010, worldwide electricity generation increased 300 percent and coal comprised 41 percent of that increase. Even more importantly, these increases are continuing in the current century. The rise of coal power has been steady and is now swift. Coal was the world's most rapidly growing source of electricity throughout the past decade, increasing from about 5,500 terawatt hours (TWh) in 2000 to more than 8,600 TWh in 2010. Just as importantly, coal generation will continue to grow to almost 40 percent over the current decade, reaching over 12,000 TWh by 2020. In essence, the world is turning to coal as extensive reserves around the globe are brought to bear. In a future world of 8.5 billion people by 2035, "all of the above" will be needed, but coal will be the continuing cornerstone. Coal produced 37 percent of the world's power in 1990, produces 40 percent today and by 2035 will produce 42 percent. Of course, coal has this central role for measurable reasons – abundance, security, affordability, versatility and amenability to clean coal technologies.

As these numbers and projections indicate, coal's story is far from told. Yet, despite its distinguished history of supporting socioeconomic progress around the world, coal is really a fuel of the future. As the coming decades unfold, vast multitudes of people will increasingly rely on coal to meet much of the electricity required for their rapidly expanding march toward modernization. Meanwhile, the more developed countries will continue to rely upon coal to meet the increasingly complex electricity and reliability needs of modern society. In the United States, for example, the Energy Information Administration projects coal as the leading source of electricity through the entire forecast period (to 2040).

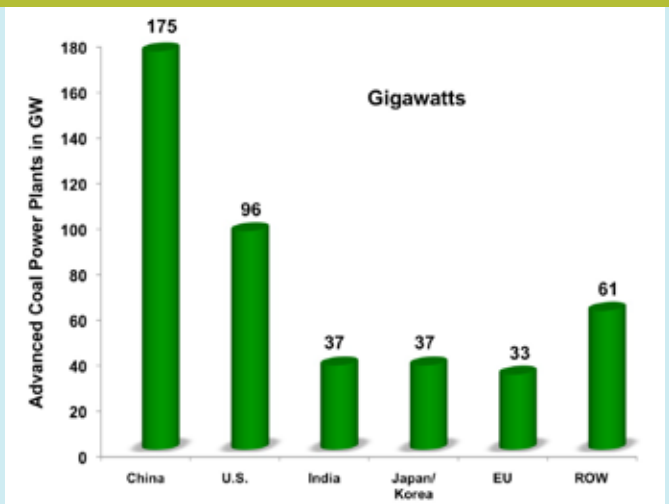
In the developing world, countries with populations of hundreds of millions (some entering into the billions) are depending upon coal to provide much of their electricity going forward. As one looks to the future of dramatic growth in coal-based electricity, one must necessarily turn first to Asia, where the growing reliance on coal for incremental electricity is stunning. By 2030, China will obtain 66 percent of its electricity from coal, India will get 67 percent and a number of

other developing countries in Southeast Asia will receive up to 50 percent. These nations seek to increase the standard of living of their population. China has served as a shining example for the region. Since 1990, coal consumption in China has increased 185 percent and the outcome has startled the world with the emergence of the second largest economy. The plan to build China's future on coal is working in regard to quality of life measures as well. In terms of absolute numbers, no nation has made more progress toward the U.N. Millennium Development Goals than China.

Since 2005, GDP growth in the United States has totaled a paltry five percent. In Europe, GDP has increased only three percent in seven years. Meanwhile, over the same period, China's GDP has grown 100 percent and India's 70 percent. And now both nations are building advanced coal power plants to ensure affordable and reliable electricity for decades. Indeed, by 2015 almost 60 percent of the world's most efficient coal power plants will be in China or India.

Asia is taking the lead in clean coal power plants

Advanced supercritical and ultra-supercritical coal generation utilizes less fuel and produces more power with reduced emissions. Improving efficiency levels increases the amount of energy that can be extracted from a single unit of coal. Such increases in the efficiency of electricity generation are essential in meeting climate change goals. A one percentage point improvement in the efficiency of a conventional pulverized coal combustion plant results in a two to three percent reduction in CO_2 emissions. Such advanced coal plants emit almost 40 percent less CO_2 than many existing plants. The average global efficiency of coal-fueled plants is less than 30 percent, compared to 45 percent for the most advanced plants.



Combined with carbon capture and storage, higher efficiency technologies can cut the global average CO2 emissions from coal plants by as much as 90 percent (see IEA website, 2013)

Clean coal technologies work

"Technologies…have helped to dramatically reduce potentially harmful emissions, even as coal use for electricity generation has risen substantially," concludes the National Energy Technology Laboratory (NETL). Now, the creative gaze of the scientific and engineering communities turns to carbon capture, utilization and storage (CCUS). Private sector companies have already demonstrated that underground storage of CO_2 is more than a waste disposal business, as shown by the success of EOR technology. The emergence of CO_2 as a commodity enables society to fully unlock the value of advanced, low-emission coal technologies.

The use of CO_2 for EOR is the CCUS approach, providing the greatest potential for economic and environmental payoffs over the next several decades. Department of Energy-sponsored research found that "next-generation" CCUS and EOR technologies would enable the economic recovery of 67 billion barrels of "stranded oil" which could be produced, assuming an $85/barrel of oil price. In addition, there is emerging recognition that the Residual Oil Zone (ROZ) resources are enormous and could yield yet another 33 billion barrels for a total of at least 100 billion barrels of oil that would otherwise remain unavailable.

But, the *sine qua non* of such recovery is the availability of adequate amounts of CO_2. New EOR projects are being delayed due to a lack of CO_2. Advanced Resources International (ARI) estimates that as much as 20 billion metric tons of CO_2 will be needed to produce this recoverable resource and, if potential ROZ production is included, the required CO_2 exceeds 33 billion metric tons. However, only about 2 billion metric tons of CO_2 will be available from natural sources and natural gas processing. Coal-based CCUS technologies can help meet this 31 billion metric ton shortfall to enable the U.S., in particular, to produce its own petroleum resources and avoid reliance on imported oil that severely impacts the trade balance of payments as well as national security.

Coal is the world's greatest energy resource. The German Institute for Geosciences estimates recoverable global coal reserves approach 1 trillion tons. The World Coal Association has noted that these reserves are distributed across 70 countries, thereby greatly enhancing energy security around the world. But even these staggering numbers are a fraction of the world's coal supply. The United States Geological Survey estimated total global resources exceed 16 trillion tons. Coal, indeed, is here to stay. ◆

Dr. Clemente is Professor Emeritus at Penn State University and publishes the Energy-Facts.org website.

HEARTH & HOME

Why keeping our home coal fires burning is so important

By Janet Gellici, American Coal Council

"Conversations about the future of the U.S. coal industry these days seem almost myopically focused on international market opportunities. Formidable domestic challenges associated with environmental regulation, inexpensive natural gas and an unyielding economic downturn would suggest that the U.S. coal's homeland prospects are not encouraging. The opportunity for the U.S. to help advance the interests of our global neighbors in emerging economies through exporting coal and advanced energy technology is certainly valid and worthwhile. But a short-term focus on only these more immediate markets and not on longer term opportunities for the best and highest domestic use of our abundant coal resources will impair our national economic, energy and environmental security." – Janet Gellici, CAE, Chief Executive Officer, American Coal Council

The value of hearth and home

A hearth has traditionally been an integral part of a home, providing a focal point for family gatherings while serving a vital role for heating and cooking. Today's "hearth" is more likely to be an ornamental, symbolic, occasional-use family room fireplace; the critical functions of heating and cooking are now relegated to utilitarian furnaces, ovens and stovetops.

But the phrase "hearth and home" is more than a quaint old word for fireplace and refers to more than just the physical structure of the house itself. Hearth and home has come to denote family bonds, the strength of familial relations, a "home" rather than just a "house."

It's these bonds we feel compelled to protect and fight for in troubling times. It's this intangible connection that we long for when we're away. It's the reason we strive to keep the home fires burning while awaiting the return of our loved ones, be it from war, college or just a day at the office.

As we become more and more engaged in a globalized economy, the notion of keeping the home fires burning may seem unimportant or trite; we may lose sight of the value of hearth and home. Admittedly, participation in international markets strengthens our economy in terms of diversifying our consumer base, providing access to products and services that compliment our indigenous resources and equalizing our balance of trade. But the initiatives and policies we advance in pursuit of global markets should not negate what's in our own national interest. Our initiatives and policies should not ignore or be driving us away from our hearth and home responsibilities.

"Pursuit of international markets also makes good business sense for U.S. coal suppliers as they seek to diversify their customer base outside of the domestic utility market, which has historically represented the majority of the industry's consumers. As of 2011, more than 90 percent of the coal consumed in the U.S. was used to generate electricity."

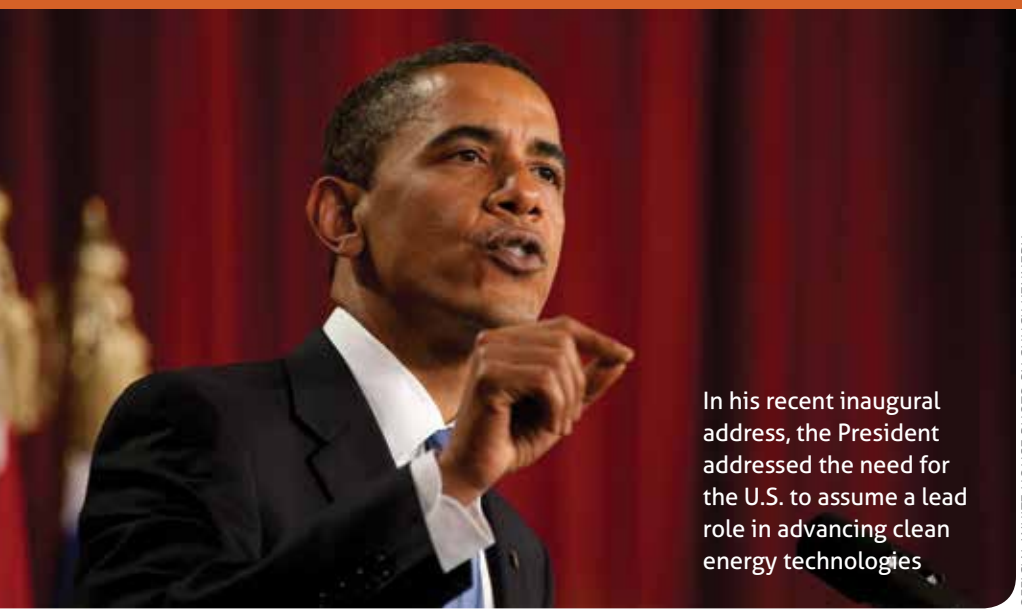
The coal at home conundrum

There's no denying that participation in the international marketplace holds significant promise for U.S. coal suppliers and the transportation industry, as well as for developers of advanced energy technologies. A record 123 million short tons (mst) of coal was exported in 2012, up from 111 mst in 2011 and besting the former record of 112 mst set in 1981.

There's also no denying that domestic U.S. markets for coal have been declining. As recently as 1993, coal fueled 53 percent of U.S. power generation; in 2011, coal's share was 42 percent and is projected at 39 percent for 2012.[1] Coal-to-gas switching and retirement of older, smaller, less efficient coal units, either through normal attrition or in response to regulatory mandates, have resulted in the actual and announced idling of 25-40 gigawatts (GW) of coal generating capacity.[2] Decreased domestic power demand has resulted in a 200 million ton decrease in utility demand for coal since 2008.[3]

To some extent, declining domestic markets has prompted the U.S. pursuit of international markets for coal. Electric power demand in our nation is down as a result of the recent economic downturn and the success of energy conservation efforts. Competition from inexpensive natural gas in the U.S. has driven down demand for coal and the price consumers are willing to pay for British thermal units (BTU).

Conversely, high natural gas prices outside of our borders have made U.S.



In his recent inaugural address, the President addressed the need for the U.S. to assume a lead role in advancing clean energy technologies

OFFICIAL WHITE HOUSE PHOTO BY CHUCK KENNEDY

coal imports a relatively inexpensive option for overseas utility and industrial consumers and a lucrative market for U.S. coal producers. Finally, the tremendous growth in demand for coal in emerging economies – especially in Asia – has also fostered growth in U.S. coal exports. In its *Medium-Term Coal Market Report*, the International Energy Agency (IEA) noted that "coal demand is growing everywhere but in the United States" and that coal would surpass oil as the world's top energy source by 2017.[4]

Pursuit of international markets also makes good business sense for U.S. coal suppliers as they seek to diversify their customer base outside of the domestic utility market, which has historically represented the majority of the industry's consumers. As of 2011, more than 90 percent of the coal consumed in the U.S. was used to generate electricity.[5]

Economic and marketplace fluctuations are a fact of business life; commodity markets ebb and flow in response to economic conditions and the laws of supply and demand. These are factors U.S. businesses and markets can plan for, respond to and typically adapt to. What's less manageable, however, are public policy initiatives, which oftentimes force market shifts, either intentionally or as an unintended consequence.

In the case of the U.S. coal industry, for example, the Obama administration's aggressive energy and environmental regulatory agenda have contributed to declining domestic demand for coal, bolstered natural gas and renewable energy markets and, consequently, enhanced the attractiveness of international coal export market development.

Our national energy and environmental policies are well intentioned in seeking to advance aspirational goals. Implementation of the tactics in pursuit of these goals, however, presents daunting hurdles, such as:

- During the recent election campaign, President Obama advocated for an "all-of-the- above" (AOTA) energy policy with the national security objective of achieving energy self-sufficiency. Agreed! The key question now, post-election, is will coal be considered an equal partner in an AOTA energy strategy? Our domestic energy portfolio can and should be determined by an "all may compete" approach[6] that advances our citizens' and business' interests for energy that is environmentally sound and affordable and reliable and abundant and secure.
- In his recent inaugural address, the President addressed the need for the U.S. to assume a lead role in advancing clean energy technologies. "The path towards sustainable energy sources will be long and sometimes difficult. But America cannot resist this transition, we must lead it. We cannot cede to other nations the technology that will power new jobs and new industries, we must claim its promise,"[7] he noted. As a corollary to this call for advancing energy technology, the President also renewed his commitment to combating global warming saying that, "We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations." Yes indeed! The key question here is: are we willing to support these objectives with public-private technology research, development and demonstration, financial, permitting and policy support?

Public policy in the public interest

President Obama's recent energy and economic development plans certainly seem to support an equitable AOTA approach for domestic energy sources and international relations initiatives that have U.S. domestic interests at heart.

"The implementation of clean, state-of-the-art coal-based technologies will help insure America's energy security,"[8] states the President in his *Blueprint for a Secure Energy Future*.

The logical extension of these stated objectives is the advancement of technologies that reduce carbon

Continued on page 34

Energizing our homes and fueling our future.

Union Pacific understands the vital role coal plays in our nation's homes and industries, and we are proud to be part of the supply chain.

Janet: Your colleagues at Union Pacific thank you for your dedicated service to ACC and the entire coal industry. We wish you all the best in your new endeavors! – Doug Glass, vice president and general manager-Coal

www.up.com/coal

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"The proposed NSPS and MATS rule are just two examples of many in the recent regulatory arsenal of mandates that are impeding forward progress in development of fossil fuel emissions reduction technologies and the availability of affordable, reliable energy."

emissions, including more efficient supercritical and ultra-supercritical coal power plants, along with carbon capture, utilization and storage (CCUS). Supercritical and ultra-supercritical power plants can improve power plant emissions rates by 25 percent over the average existing U.S. coal fleet and by 40 percent over some of the older coal units that are currently being replaced.[9] Additional efficiency improvements are possible to achieve at existing coal plants through the use of retrofit technologies and operations and maintenance upgrades. A 2001 National Coal Council (NCC) study identified an additional 40,000 MW of electric capacity that could immediately be brought on line through the installation of standard improvements and clean coal technologies.[10]

More recently, the NCC completed a study for U.S. Secretary of Energy Dr. Steven Chu that indicated "advanced coal technology, coupled with capturing carbon emissions for use in enhanced oil recovery (EOR), could lead to annual revenues of $200 billion in industry sales and $60 billion in federal, state and local taxes and to the creation of over 1 million jobs. Further, we could reduce our imports of petroleum by over 6 million barrels per day, thereby increasing our energy independence and reduce carbon emissions equivalent to almost 100 GW of coal-based electric power."[11]

There is a growing consensus that global climate goals can't be achieved without development and deployment of CCUS technologies. In January 2013, the IEA renewed its call for action to accelerate the deployment of CCUS, noting that, "Despite all the attention given to renewable energy, fossil fuels still produce about four-fifths of the energy consumed worldwide. And there is only one way to burn fossil fuels without adding more carbon dioxide (CO_2) to the atmosphere: carbon capture and storage (CCS)."[12]

In consideration of our stated national energy objectives to advance energy security and self-sufficiency, take a leadership role in advancing clean energy technologies and reduce greenhouse gas emissions, we need to examine existing and pending public policies and assess whether they support or hinder our achievement of these goals. Many recent regulatory initiatives related to coal supply and consumption are inhibiting our ability to advance our environmental and technological aspirations. We seem willing to place ourselves at a competitive disadvantage vis-à-vis other nations, selecting energy resource winners and losers in a vacuum that dismisses considerations that have long-term economic, environmental and energy security consequences.

Case in point – later this year, the Environmental Protection Agency

(EPA) is expected to finalize New Source Performance Standards (NSPS) for greenhouse gas emissions for new power plants, which will then trigger the EPA to proceed with promulgating an NSPS rule for existing facilities. As currently proposed, the NSPS regulation would require new fossil fuel units (coal and natural gas) to emit less than 1,000 lbs. of CO_2 per megawatt hour (MWh). According to the EPA, 95 percent of all natural gas combined cycle (NGCC) power plants presently meet this standard; no existing coal plants come close (the more efficient coal units emit about 1,800 lbs. CO_2/MWh on average). New coal plants could meet the NSPS requirements if they are equipped with CCS technology, which would add between 35-80 percent to the cost of the plant. Obviously, NSPS effectively precludes the building of new coal generation and severely curtails the deployment of supercritical and ultra-supercritical technologies.

Another case in point – the pending Mercury Air Toxics Standard (MATS) would require the installation of controls for hazardous air pollutants (HAPs) at both existing and new coal power plants. In 2015 (the initial year of compliance), the rule is expected to cost $10.4 billion ($94.8 billion in total costs over the full compliance period) and result in peak year job losses of 180,000 to 215,000 and the retirement of up to 23 GW of coal generation.

The proposed NSPS and MATS rule are just two examples of many in the recent regulatory arsenal of mandates that are impeding forward progress in development of fossil fuel emissions reduction technologies and the availability of affordable, reliable energy.

Energy policy: The hearth and home of U.S. economic vitality

Economics informs many policy initiatives these days and *The President's Plan for a Strong Middle Class & a Strong America*[13] is no exception. The plan opens with the statement that, "A thriving middle class has always been America's engine of economic growth. Reigniting that engine is the defining challenge of our time." Many of the points addressed in the plan relate to energy and many of those points can be addressed by more favorable policies and a greater commitment to our nation's most abundant domestic fuel source – coal.

"By investing in clean energy, we can continue to create good American jobs, reduce our reliance on foreign oil and reduce the cost of energy for

families and businesses," states the President's plan.

A strong domestic coal supply sector, fueling utility and industrial coal consuming businesses, can support all of the President's objectives:

- "Slash reliance on foreign oil"
- As noted earlier, there is significant potential to use our valuable commodity, CO_2, for EOR, thus reducing our petroleum imports by over 6 million barrels per day. The development of coal-to-liquids (CTL) plants would also help us achieve this objective; using domestic coal resources to produce transportation fuels would reduce our need for foreign oil imports.
- "Take significant action to address climate change"
- Again as noted earlier, using captured CO_2 for EOR could offset the emissions of approximately 100 GW of coal-based electric power. "Stand-alone synfuel plants and coproduction synfuel plants (e.g., plants producing fuels and electricity) offer the lowest (carbon) capture cost of all the technologies considered, coal or natural gas,"[14] notes the most recent NCC study.
- "The President's all-of-the-above energy plan invests in homegrown energy sources"
- The U.S. is home to 27 percent of global coal geographically dispersed throughout the nation. Doesn't get more "homegrown" than that.
- "Continue to take sensible steps to confront climate change"
- The recent and planned construction of higher efficiency coal power plants with higher output rates and lower emissions can contribute greatly toward this goal. Supercritical and ultra-supercritical power plants offer improved efficiencies that can result in CO_2 emission rates that are up to 40 percent below existing units. Integrated Gasification Combined Cycle (IGCC) and oxy-combustion units also represent significant technological advances toward the goal of near-zero emissions.
- Retrofits and existing unit upgrades, such as combustion improvements and enhanced heat transfer, can improve plant efficiency, reduce emissions and increase plant capacity factors. American Electric Power estimates that upgrades would yield reductions of more than 3.5 MMT of CO_2 per year in its generation fleet.
- "The President remains committed to doubling American exports"

East Asian nations have taken the lead in building advanced coal power plants; by 2015, 50 percent of the world's most efficient coal plants will be located in China and India.[15] The U.S. risks being left behind and missing out on a win-win market opportunity to develop and deploy advanced coal technologies that can be used here in the U.S. to improve our emissions portfolio and exported to major coal-using nations to help meet their growing power demands safely and cleanly.

Some U.S. companies are taking the initiative to advance export markets for clean coal technologies, such as Energy Industries of Ohio (EIO), a consortium that works to develop, demonstrate and incubate technologies that will improve the competitiveness of Ohio industry through increased energy efficiency, reduced operating costs and improved environmental performance.[16] Working with Ohio's Energy Research Division,

"We can have an economically viable, environmentally sound coal industry here in the U.S.; an industry that supports hearth and home needs reliable, affordable, clean energy."

PHOTO BY ROSTISLAV GLINSKY / PHOTOS.COM

EIO is developing international markets for clean coal plant components that would be manufactured in the U.S. and exported to places like India. "Ohio's industrial metal casting, forging and fabrication industries are being promoted to address the critical shortage of suppliers capable of meeting the high quality/high integrity demands of the Advanced Energy market," according to EIO.

We can have an economically viable, environmentally sound coal industry here in the U.S.; an industry that supports hearth and home needs reliable, affordable, clean energy. In nine reports that it has prepared for the Secretary of Energy since 2000, the National Coal Council has documented a clear vision for coal in the 21st century and a path toward achieving near-zero emissions including undertaking:

- Efficiency improvements at existing plants
- Building new supercritical and ultra-supercritical power plants
- Demonstration and deployment of IGCC and carbon capture utilization and storage technologies
- Advancing CCUS and BTU conversion
- Retrofitting existing coal-based generation with carbon capture and storage capability for up to 90 percent lower CO_2 emissions
- CO_2-EOR, producing 4 million barrels/day

It will take a commitment on the part of both industry and government to establish business practices, investments and policies that advance these goals. And it will take vigilance to ensure that an all-of-the-above energy policy approach genuinely includes coal and not just as an afterthought. It will take patience but keeping the home fires burning will be worth the fight and worth the wait. ◆

Janet Gellici is the CEO of the American Coal Council (www.americancoalcouncil.org) and has recently accepted the role of executive director of the National Coal Council (www.nationalcoal.org).

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Coal Surges Globally

By Jason Hayes, American Coal Council

Much is being made of sagging coal sales across U.S. markets. Media and environmental groups trumpet the "decline of coal" in article after article and an endless stream of media releases. However, early in 2013 coal is experiencing a resurgence in U.S. markets as natural gas prices climb back up from their 2012 lows. Coal is also seeing massive increases in demand around the rest of the planet. In fact, energy experts expect coal to match oil as the primary world energy resource before the end of this decade. Exact numbers are difficult to pick out, but there is no denying coal's growing role in world energy.

Natural gas and fuel-switching

One of the key arguments made for decreasing American use of coal over the past few years has had natural gas prices as the primary premise. Natural gas as a factor for fuel switching was clearly the case when gas was in the sub-$2 range. However, in an October 2012 presentation at the BERC Energy Symposium at University of California, Berkeley,

Despite a challenging domestic scene, American coal has proven popular in international markets

Andre Peterhans, manager of strategic planning for Chevron, explained that $2 gas has come and gone.

"Two-dollar gas is really not sustainable when you look at what it takes to go and drill shale gas wells and further develop our industry – you're not looking at $2 gas forever. It's more likely to be $4 or above. That's the message that the market is delivering."[1]

Speakers at the ACC's 2013 Spring Coal Forum repeated Peterhans' assessment, noting that gas prices are likely to fall between $4 and $6 well out into the future. With gas trading at almost $4 per 1 million British thermal units (mmBtu) in mid-March, those predictions were obviously accurate. When $4 gas is compared to eastern coal's much more mild price of $2.40 per mmBtu, reports are now indicating that, at least in early to mid-2013, many utilities are shifting back toward coal.

Prolific writer and energy expert, Barry Cassell, has also discussed coal's ability to recapture its lost market share, noting in a recent GenerationHub column that Powder River Basin (PRB) producers would likely take back "over 25 million tons of the roughly 30 million tons of coal markets they lost in 2012." Cassell continues by citing an Arch Coal investor presentation, which argues that when gas is at $4 per mmBtu, "there is basically no displacement of PRB coal," and when Henry Hub moves to $4.50, Central Appalachian coal will also regain lost markets.[2, 3]

Reuters expanded on changing energy demand, and the reverse in last year's fuel-switching trends, as utilities begin to see a return to previous price structures. Price differences between Central Appalachian coals and Henry Hub gas are at over $1.50 per mmBtu, the widest seen since June 2011, making coal a far more attractive generation option.[4]

"Prices of Central Appalachian coal have slipped to their lowest levels since late January. … Meanwhile, natural gas prices climbed to their highest levels since November due to four straight weeks of larger-than-expected drawdowns from inventories."

Regulations still play a big role

While normalizing fuel prices are taking some of the pressure off of the coal industry, American utilities continue to move forward with plans to shutter over 45 gigawatts (GW) of coal-fueled capacity. This move reinforces the role of impending Environmental Protection Agency (EPA) regulations in these closures.

The rules and regulations listed below are anticipated to make up the most expensive slate of environmental regulation the coal industry has ever faced:

- The Utility Mercury and Air Toxics Standard (MATS) rule
- The Carbon Pollution Standard (CPS) for New Power Plants rule
- The proposed Carbon Combustion Residuals (CCR) rule
- The Cooling Water Intake Structures rule, CWA Sec. 316(b)
- The Ozone NAAQS Standard
- The expected follow up rule(s) to the Cross-State Air Pollution (CSAPR) and Clean Air Interstate Rule (CAIR)

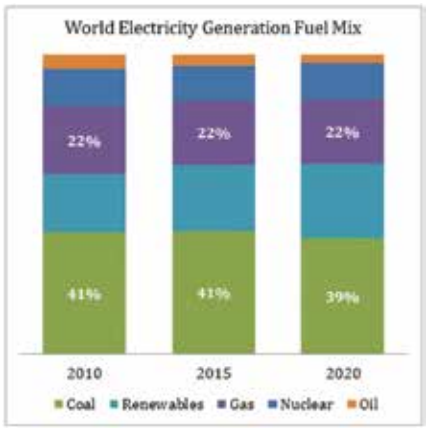
Further compounding this problem, proposed greenhouse gas (GHG) regulations are making it essentially impossible for utilities to propose or build new coal plants to replace this lost coal-fueled capacity.

U.S. exports growing

Despite last year's decreased demand for coal in the U.S., worldwide demand for coal continues to spike upward. Last year was a banner year for U.S. coal exports, proving the statement of one speaker at the ACC's 2012 Coal Leadership Advancement Seminar Session program, that "even if no one in the U.S. wants our coal, the rest of the world does."

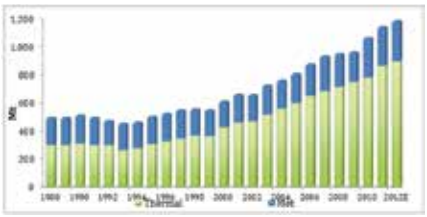
Reports from the Energy Information Administration (EIA) and the International Energy Agency (IEA) state that coal currently provides 41 percent of the world's electricity and it will continue to supply approximately 40 percent over the next several decades. While some may point to that statistic and claim that coal's growth has flat lined, overall demand for energy is growing so rapidly that remaining at 40 percent of the world's energy entails an equally rapid growth in coal supplies.

IMAGE BY BARIS SIMSEK / PHOTOS.COM

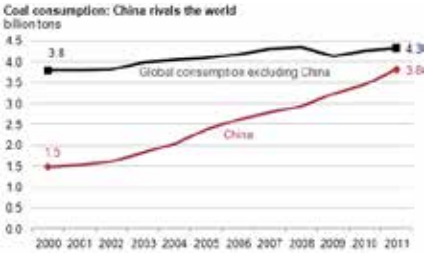


SOURCES: EIA, IEA, ALPHA NATURAL RESOURCES

Global Coal Trade



SOURCES: ALPHA NATURAL RESOURCES, NMA, DEPARTMENT OF COMMERCE IEA



SOURCE: EIA

From 1990 to 2010, global production of energy increased by 450 terawatt-hours each year. IEA forecasts expect that rapid growth rate to continue past 2035 and that coal will rival oil as the world's top energy source by 2017.[5,6] Keeping up with that foot race, since 1999, world coal use has seen an average annual four percent increase and that use ramped up to a 6.6 percent increase in 2010.[7]

The rapid depreciation of the U.S. dollar relative to other world currencies has partnered with stable supply, well-developed means of production and transportation, established tenures and difficulties for other suppliers around the world to make American coal even more attractive to international markets. As a result, U.S. coal producers exported 125 million tons in 2012, about double export levels of ten years ago.[8]

Asia

Chinese demand for coal has grown at a spectacular rate over the past several years. Some reports indicate Chinese markets will begin to slow that growth. However, on its own, China currently burns almost as much coal as the rest of the world combined.[9] Based on their rapid and continued economic growth, China's demand for coal averaged nine percent increases from 2000 to 2010 and they now account for 47 percent of world coal consumption.

With a growing population of over 1 billion, rapid infrastructure development and regular electricity shortages, Indian demand continues to surge as well. Current Indian demand topped 585 million metric tonnes in 2011. IEA forecasts predict coal demand will grow by over six percent annually, passing 640 million metric tonnes by 2017.[10]

Europe

Europe remains the primary market for U.S. coal exports and those markets ensured their continued use of coal as they match green energy mandates, high European natural gas prices and a growing push to shutter nuclear power. As a result, U.S. coal exports to Europe grew by 26 percent in the first nine months of 2012. Over the same period, British imports of American coal rose by over 73 percent. Looking forward, however, IEA forecasts predict the European surge will tame as renewable mandates and carbon prices grow while gas prices moderate in 2015 and beyond.[11]

World energy markets are in a state of flux that makes it difficult to nail down specifics moving forward. Changing energy policy, changing commodity prices, expanding world trade, and an ever-increasing demand for affordable, reliable and clean energy ensure a dynamic marketplace.

"Whatever you think the future holds for energy, you're probably wrong," noted Art Holland, vice president of Pace Global Energy Services, at the ACC's Spring Coal Forum in Clearwater, Fla. this March.

Our best attempts to pin down exact levels of coal demand will be like feeling our way through a smoky room. We do, however, know that people around the world – especially those in developing nations – are demanding improved access to electricity. We also know that continuing volatility in gas prices, resistance to post-Fukushima nuclear and the inability of renewables to meet baseload requirements will ensure coal's growing role as one of, if not the, primary world energy resource.

So will coal be 30 percent of world supply? 40 percent? More? Something in between? Absolutely! ◆

Jason Hayes is the communications director for the American Coal Council (www.americancoalcouncil.org) and editor-in-chief of American Coal (www.americancoalonline.com).

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THE NEW FACE OF MINING

The University of Arizona's Mining and Geological Engineering Program

By Mary Poulton, PhD, UA Mining and Geological Engineering Department

Four years after the shoot-out at the O.K. Corral, Arizona's territorial legislature approved the creation of the University of Arizona (UA), with founding schools of agriculture and mining: a visionary move in 1885 considering there was not a single four-year high school in the territory. The School of Mines was formally launched a few years later in 1888 as the last brick was laid for the iconic Old Main Building.

Much has changed in the UA mining years that have touched three separate centuries, but, at the core, the program's purpose remains rock solid.

Now, in 2013, the UA's mining program is celebrating its 125th anniversary with a mission still rooted in the old days: to provide advanced education, innovative research and invaluable services to state, national and global mining industries. Perhaps most importantly, AU provides the worldwide mining community with an exceptional workforce – the new face of mining.

From mules to robotics

The exceptional workforce in training in 1888 was learning how to consider mules for material haulage; today students are learning robotics, automation and positioning technologies. In 1888, the School of Mines was providing assay and other technical services to a growing industry scattered across 113,000 square miles of hostile territory; today the Mining and Geological Engineering Department (MGE) and the Lowell Institute for Mineral Resources are transferring technology and knowledge worldwide via lectures streamed online, startup companies, licensing agreements and short courses.

Using an extensive mineral collection they created themselves, 125 years ago the School of Mines faculty traveled the territory and nation by horse and carriage to teach the public about the region's mineral wealth. That mineral collection is now one of the largest university collections in the United States and today MGE education outreach programs touch more than 6,500 students and teachers in their Arizona classrooms and

Mining student, Ashlyn Hooten, participates in the drilling competition in front of the first mining building, Old Main, during Engineers' Week

PHOTO COURTESY OF PETE BROWN/UNIVERSITY OF ARIZONA COLLEGE OF ENGINEERING

after-school programs. Programs like MineZone, in which children from more than 50 school districts interact online with mining professionals, teach students about geology, mining methods, equipment, safety and environmental stewardship.

Partnering for life-changing innovations

The UA, a top-20 U.S. research institution among the top-50 public universities worldwide, has grown from a handful of dedicated faculty and persistent students to more than 40,000 students and 3,300 faculty and researchers in 345 degree programs.

Collaboration is the backbone of UA advancements and more than 85 percent of UA faculty members work on interdisciplinary problems. Capitalizing on that long tradition of collaboration, MGE partnered with the geosciences department and the Mel and Enid Zuckerman College of Public Health in 2009 to establish the Lowell Institute. Backed by Science Foundation Arizona, J. David and Edith Lowell, and 20 industry partners, the interdisciplinary research center has grown to include 120-plus faculty, staff and students in 23 disciplines across 10 colleges. They are tackling, and solving, the world's most pressing issues for sustainable development of mineral resources. Disciplines as diverse as philosophy for ethics and landscape architecture for reclamation are helping advance the minerals industry.

Health, safety and global reach

The UA's top-ranked management information sciences department partners with MGE on new information technologies. Systems engineering, the first such department in the country, is partnering with MGE on a unique simulator in use at a major U.S. coal mine. The simulator takes mine-specific data and, in seconds, re-creates mine operations to provide analysis for and testing of different operating scenarios. Collaboration with the Mel and Enid Zuckerman College of Public Health, Arizona's first and only accredited college of public health, has resulted in the expansion of MGE's mine health and safety program to

PHOTO COURTESY OF PETE BROWN/UNIVERSITY OF ARIZONA COLLEGE OF ENGINEERING

Women's mine rescue team at the Henry G. "Hank" Grundstedt San Xavier Underground Mining Laboratory supervised by laboratory director, John R. "Ros" Hill. From left to right: Lisa Rzechula, Allison Hagerman, Alyssa Hom, Jamie Mills, Ashlyn Hooten, Sarah Beal. Not pictured: Megan Naff and Danielle Taran.

42 researchers, staff and students working with 15 companies to improve worker training effectiveness, develop new training tools and approaches to serve the needs of an increasingly diverse mining workforce. For example, the program is creating a bilingual gaming simulator for coal mine emergency response based on the NIOSH-developed "Harry's Hard Choices." And, working with the UA's economics department, the Lowell Institute is helping the industry understand the full cost of worker injuries.

Every project in the Lowell Institute has an industry or government partner actively engaged in the research process. Technical advisory committees made up of industry and faculty leaders in mining, or extractive, metallurgy, economic geology, mine health and safety, environmental management and social license to define the research agendas. The Lowell Institute's Board of Directors is composed of senior leadership of mining companies, the World Bank, original equipment manufactuers (OEMs) and law firms.

In the early days of the School of Mines, faculty taught professional courses to miners, mining engineers and assayers. Today more than 1,000 alumni from 80 companies in 27 countries are involved in the Lowell Institute's professional programs in mineral resources. The 10-day field geology courses are often filled to capacity and 15 two-day short courses, taught by leading industry experts, are delivered on campus and online.

Students at the heart of UA mining programs

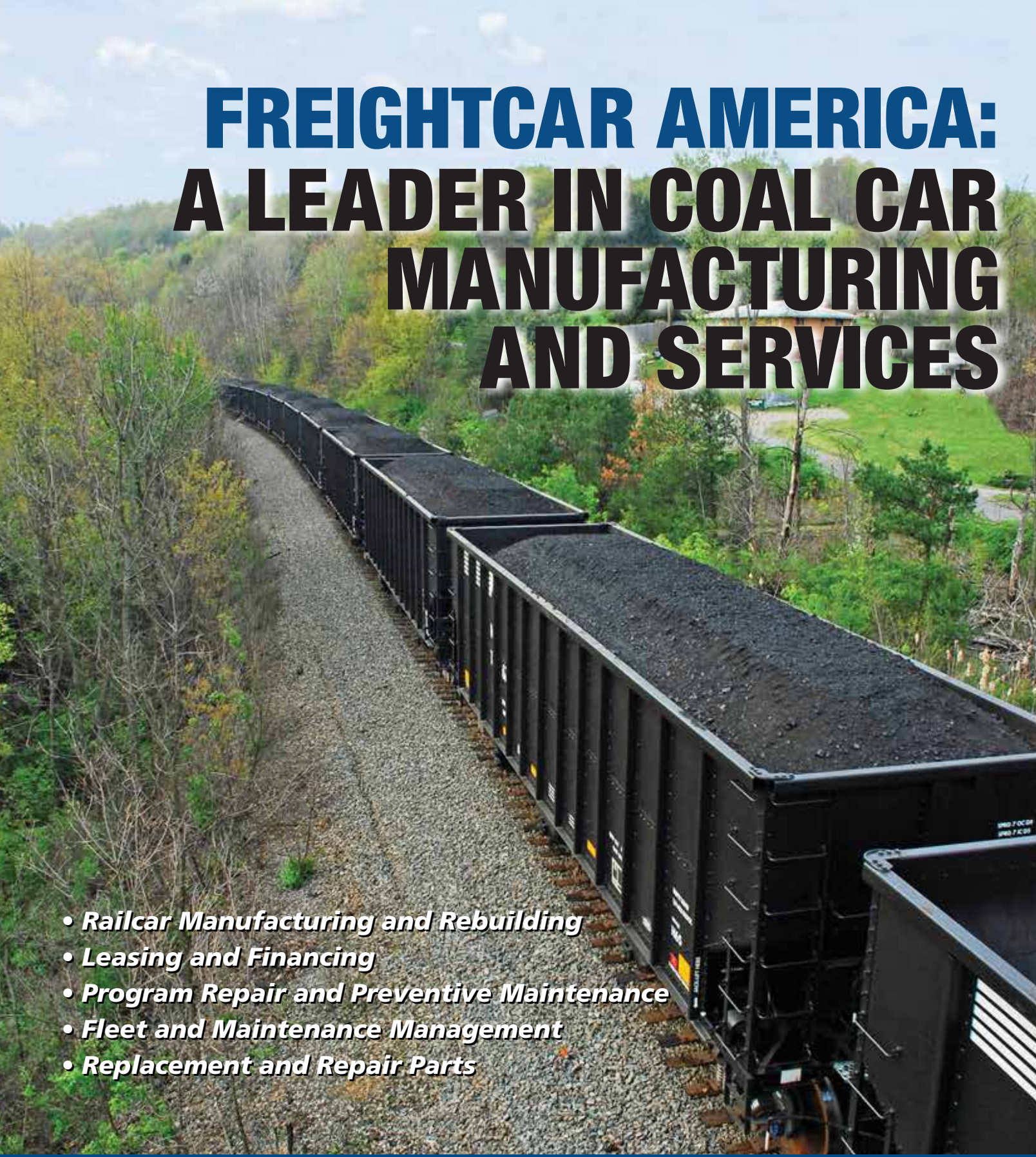
Students are, and always have been, at the heart of the UA's MGE programs. The UA has a legacy of producing leaders for the coal sector and, indeed, the entire mining industry. Students meet stringent admissions standards and 20 percent are chosen for the highly selective Honors College. All MGE students get hands-on experience working at the University's San Xavier Underground Mining Laboratory and are MSHA certified in underground miner safety.

As a student-centered research university, all MGE students have opportunities to work with developing technologies and they take that knowledge and experience into their professional lives. The UA is home to the only integrated operations center laboratory for mining in the world. Students – many interested in the coal mining sector because of its complex operations, logistics, markets and environmental challenges – learn in real-time with real data how to integrate and act on information ranging from train schedules to mine fleet management.

The new face of mining

With the support of industry, alumni and friends, the UA's MGE programs have survived the ups and downs of the mining industry across three centuries, while growing stronger and more diverse. We believe our approach to bringing many disciplines to the table to tackle the complex challenges facing the mining industry today – coupled with diverse faculty and students, innovative research, new approaches to education and communicating with the public – defines the new face of mining. ◆

Mary Poulton, PhD, is the head director of the Lowell Institute for Mineral Resources in the University of Arizona's Mining and Geological Engineering Department.



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Powder River Coal Basin: Changing Times?

An update on the Powder River and Bull Mountain coalfields

By John Hanou, Hanou Energy Consulting & Bob Burnham, Burnham Coal

After four decades of rapidly escalating demand, Powder River Basin (PRB) coal producers are experiencing a prolonged decline in the domestic market. At least two venerable producers, Alpha Natural Resources and Arch Coal, Inc., find themselves in tenuous positions. Those are two of the many findings detailed in *Powder River Basin Coal Supply, Demand & Price Trends 2012-2031*, a new supply/demand study authored by John T. Hanou and Robert M. Burnham. This study covers the Powder River and Bull Mountain coalfields in Wyoming and Montana.

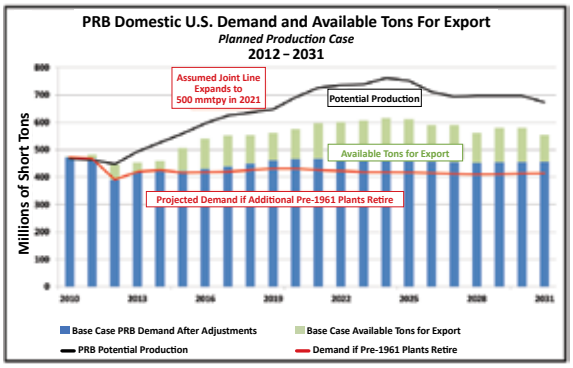
There was a time when the PRB had no problem growing. However, in 2008, PRB mines produced 496 million tons of coal. By 2012, production had fallen to 425 million tons.

Our analysis suggests some improvement over the next two years, with demand increasing by approximately 30 million tons; however, due to regulatory constraints, we envision the domestic U.S. and Canadian markets declining by approximately 50 million tons over the next 12 years.

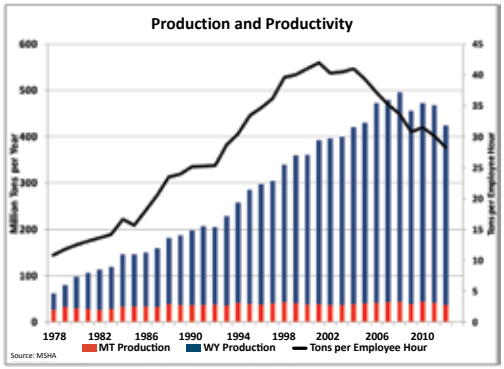
With producers facing a stagnant and/or declining U.S. domestic market, they are now eyeing the robust international thermal market, driven mainly by China and India. As a result, there are plans to expand existing export terminals in Canada and build greenfield terminals in Washington and Oregon, as well as developing brownfield terminals in Mexico. In 2011, about seven million metric tons (mmt) of PRB coal was exported through Canadian terminals. These terminals (Westshore and Ridley) are expanding capacity by 33 mmt over the next year or two. Unfortunately, most of this new port capacity is targeted for Canadian coal. Up to 159 mmt per year of export capacity is planned by 2020 at Greenfield terminals in Oregon and Washington (Gateway, Millennium, Grays Harbor, Morrow Pacific, Port Westward and Coos Bay).

Coal arrives via conveyer at the Colstrip power plant in Colstrip, Mont.

PHOTO COURTESY OF THE MONTANA DEPARTMENT OF COMMERCE



PRB Production and Productivity, 1978-2012



PRB Domestic U.S. Demand and Available Ton for Export

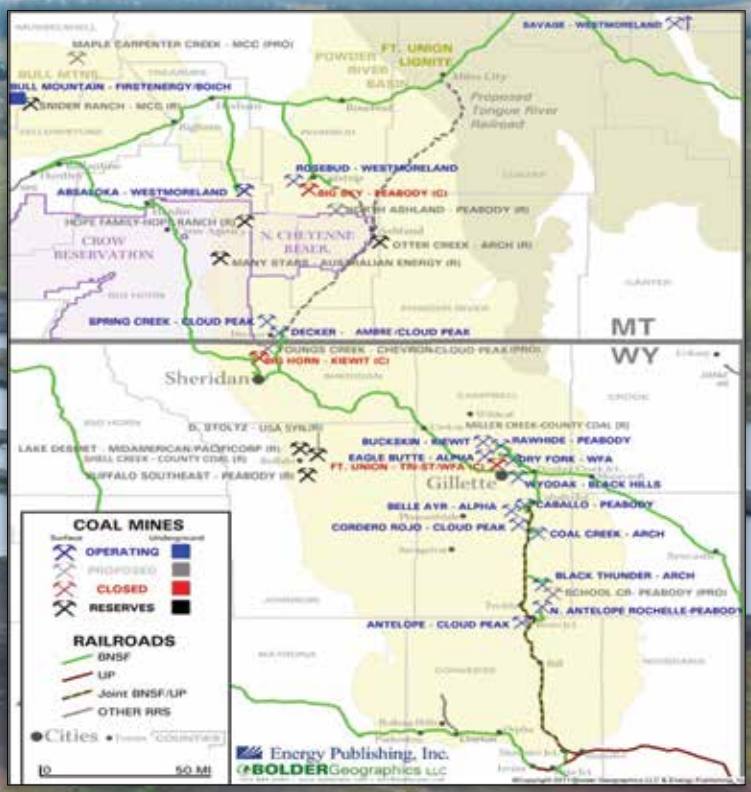
All face immense environmental, permitting and transportation scrutiny.

With falling domestic demand and increasing costs, as reflected by falling productivity, we anticipate changes at existing operations in the next 10 to 20 years.

Alpha has announced production cuts due to a combination of poor markets and high costs. Reserve depletion may be an additional factor. Alpha faces reserve depletion at its Eagle Butte Mine. At past production levels, the mine will run out of reserves around 2029. Higher ratio reserves are present but are not currently economical.

The Belle Ayr Mine has a challenge regarding its reserve position. Alpha expected to lease the Belle Ayr North LBA but lost the tract to Peabody Energy. With limited options, Alpha picked up the Caballo West federal LBA, but there is a question as to how Alpha will access the coal. While Peabody has direct access to the Belle Ayr North tract using existing pits, Alpha cannot access the Caballo West tract without crossing Peabody surface property, meaning they will have to open a new box cut. Alpha has applied for the 253-million ton Belle Ayr West LBA, but it may not come up for lease before Belle Ayr depletes its existing reserves without production cuts.

Arch has idled three draglines at its flagship Black Thunder Mine due to this year's market conditions. Production dropped from 116 million tons in 2010 to 93 million tons in 2012. Going forward, Arch must lease and develop a 1.4-billion ton federal reserve west of the Joint Line Railroad at its Black Thunder Mine. With recent lease bonus bids exceeding $1.10 per ton, acquiring the leases will be expensive. Developing the reserves will also be a costly endeavor, requiring a box cut at an in-situ ratio of 4.0:1 (8:1 effective); we estimate the total material to be moved to open the box cut is 800 million



Powder River Basin
Mine location map

yards. In order to keep Black Thunder at 90 million to 100 million tons of annual production, development must occur between 2018 and 2025.

Arch was successful in leasing the 1.3-billion ton Otter Creek reserve in Montana and has targeted the export market for the mine. In addition to overcoming strong environmental opposition to the mine, development of the reserve is dependent on the Tongue River Railroad (TRR) being built. A new route for the TRR has recently been announced, abandoning the longer but easier route along the Tongue River, connecting to the BNSF mainline near Miles City, to a shorter but more difficult alignment that will connect to the BNSF spur at Colstrip. This alignment will require new environmental reviews, so we expect construction of the TRR is at least five years away.

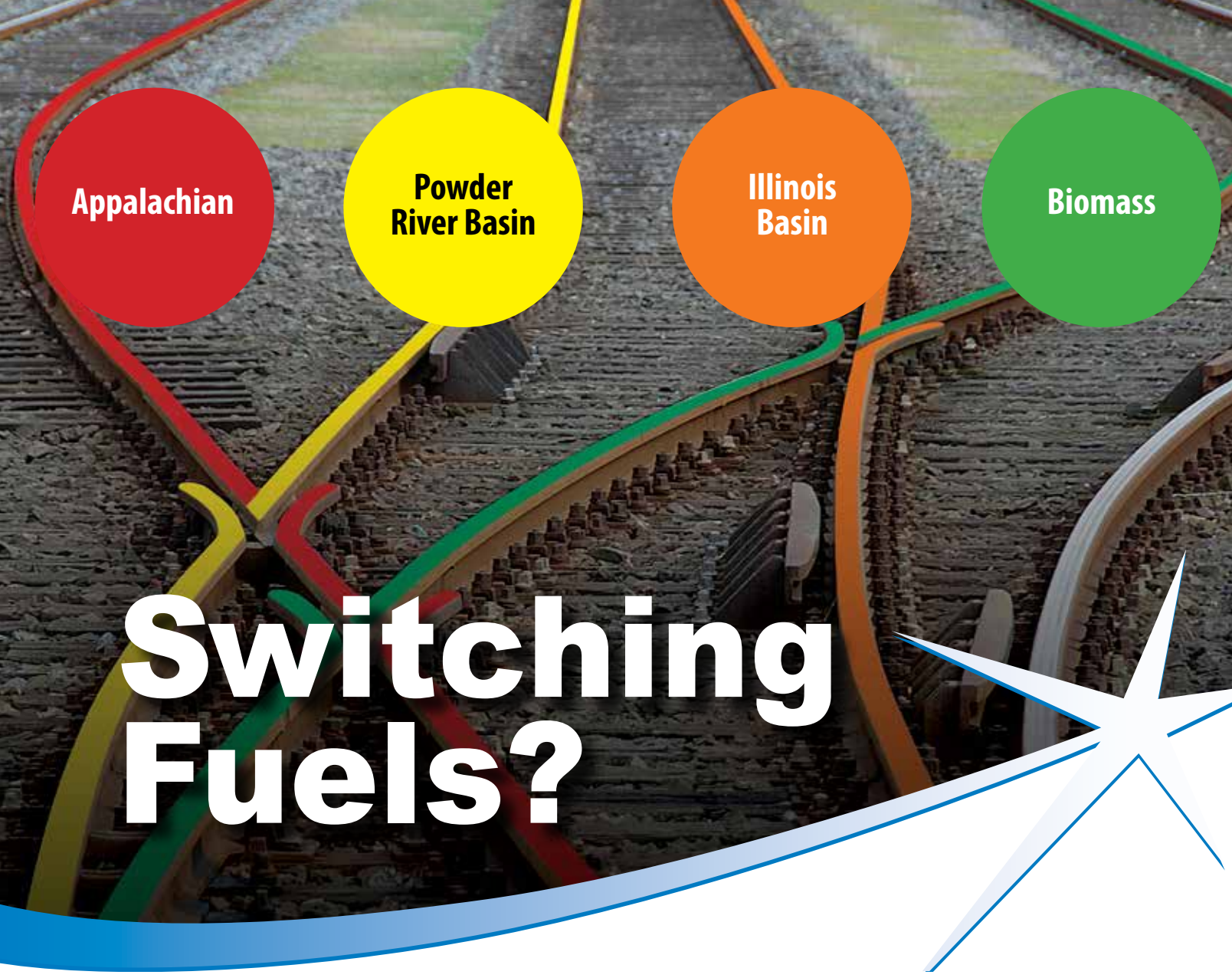
Peabody strengthened its reserve position with the leasing of 1 billion tons of coal in the North and South Porcupine lease tracts and has applied for an additional billion tons of coal in the Antelope Ridge LBA. All of this coal is east of the Joint Line.

Cloud Peak Energy has consolidated its reserve position with the acquisition of federal coal leases at its Antelope Mine and the acquisition of the Young's Creek/CX projects adjacent to its Spring Creek Mine. In addition to acquiring the Young's Creek/CX Ranch reserves, Cloud Peak has signed an agreement with the Crow Tribe that could lead to the development of an additional 1.4 billion tons of coal.

Ambre Energy and Cloud Peak have settled their Decker Mine litigation with Ambre purchasing Cloud Peak's interest in the mine. With this dispute settled, Ambre is continuing its efforts to expand the mine to compete in the export market. As part of these plans, Ambre has obtained a coal exploration license, covering almost 9,500 acres around the West Decker Mine. These plans, however, are dependent on developing Ambre's west coast port projects, Millennium and Morrow Pacific.

Another mine pursuing the international market is Signal Peak's Bull Mountain Mine. After many difficult years, the mine appeared to take off in 2010 when production reached 4.4 million tons followed by 5.1 million tons in 2011. In the first half of 2012, production reached 4.1 million tons before faltering in the second half when 1.5 million tons were produced. Decreased production is believed to be due to a combination of a longwall move and difficult geologic conditions. ◆

John Hanou and Bob Burnham own and operate Hanou Energy Consulting, LLC (www.hanouenergy.com) and Burnham Coal, LLC (www.burnhamcoal.com).



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Heritage, Jobs and Economic Development in the Pacific Northwest

New export terminals bring opportunities and challenges to the region

By Lauri Hennessey, Alliance for Northwest Jobs & Exports

From microchips to wheat and apples to airplanes, the Pacific Northwest's economy has been built on exports and trade for generations. Billions of dollars in products pass through the ports of Oregon and Washington state every year as part of an industry that supports millions of jobs. Today, at least one in four jobs in the Northwest is dependent on trade. In Washington state alone, the number is closer to four out of ten jobs.

Due to its location, trade infrastructure and reserve of skilled workers, the Northwest is particularly primed to export products to Asian markets. These markets count as the region's largest recipient of goods, so it's only natural that, with Asian demand for energy growing year by year, coal companies from the Powder River Basin are looking to the Northwest to help meet demand.

To take advantage of this global trade opportunity, five new export terminals are proposed for Oregon and Washington. Taken together, these projects represent well over a billion dollars of private investment and will create thousands of jobs in manufacturing, construction, transportation and trade. And those are just direct jobs – economic studies have shown that the projects would also create thousands more indirect jobs and millions in new tax revenues to invest in such areas as schools, infrastructure and other vital services.

The inexpensive power coal provides fueled America's growth, and for many developing countries, it is fundamental for their own. Among those who study the energy market, there is no argument that these countries are going to buy it from somewhere. The question is whether they will get the higher quality coal America can provide, yielding the Northwest the economic benefits that go with it, or if we let those benefits go elsewhere.

Poll after poll shows that Oregon and Washington state residents favor bringing those benefits to the Northwest and

building the coal export terminals, sometimes by margins of three to one. Private citizens, businesses, labor unions and leaders from both political parties in Oregon and Washington have all expressed support for moving forward with Northwest coal exports.

Despite the broad array of local support, the projects have not been without detractors. In an attempt to delay the projects, opponents are calling for a drastically expanded environmental review process that, instead of considering these projects on their individual merits, would look at them all together. Furthermore, they ask that these reviews go far beyond their traditional scope, looking at everything from rail traffic throughout the entire region to climate change issues overseas.

This approach to regulatory policy is unprecedented, and if adopted, could have tremendous impact on other industries. It could mean a whole new way of looking at Environmental Impact Statements (EIS). Many in the region, including public ports and trade associations, labor unions and workers as well as the U.S. Grain Council have weighed in with serious

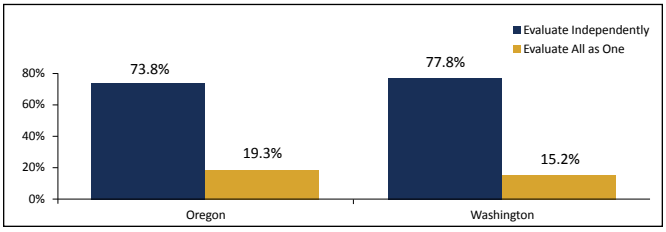
GRAPHICS COURTESY OF THE ALLIANCE FOR NORTHWEST JOBS & EXPORTS

Supporters of export projects at a public hearing on the environmental impact scoping process for the Gateway Pacific Terminal in Spokane, Wash.

concern about this approach. Polls show us that the lay public also has a concern. According to a recent survey, 78 percent of Washingtonians believe the proposed export facilities should be reviewed and evaluated individually, rather than in one broad review that could have implications for other industries.

Clearly, the majority of people in the Northwest understand that trade and the environment are not mutually exclusive – that we can build infrastructure to expand exports while protecting our environment. It was with this notion that the Alliance for Northwest Jobs & Exports came together last summer. Representing nearly 400,000 workers and 46,000 businesses, labor unions and civic organizations, the alliance was created to help present a case for growing trade and exports in the region, galvanize supporters and ensure the positive story of the terminals and their benefits is a part of the conversation.

Many of these benefits were highlighted during the recent public hearings on the environmental impact scoping process for the Gateway Pacific Terminal. The mayor of Ferndale, Wash. came to talk about his community and the much-needed jobs and economic boost the terminal would bring. The sheriff of Spokane, Wash. rejected myths about public safety being impacted by rail traffic.



One question that comes up in the wake of the hearings is: "What is at stake for business communities around the region?" An unprecedented expansion of environmental review could delay the projects for years and would give the region a reputation for being unfriendly or unpredictable regarding approving new trade developments. For an area that counts trade as a backbone of the regional economy, this is a reputation to be avoided.

When voters look into this issue, beyond all the rhetoric, they see it for what it is – an opportunity. Environmentally responsible construction and operation of new trade infrastructure will respect the Northwest's heritage while creating jobs and supporting a brighter economic future for the region. ◆

Lauri Hennessey is the vice president, corporate & public affairs at Edelman (www.edelman.com) and a spokesperson for The Alliance for Northwest Jobs & Exports.

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Developing Our Energy Future

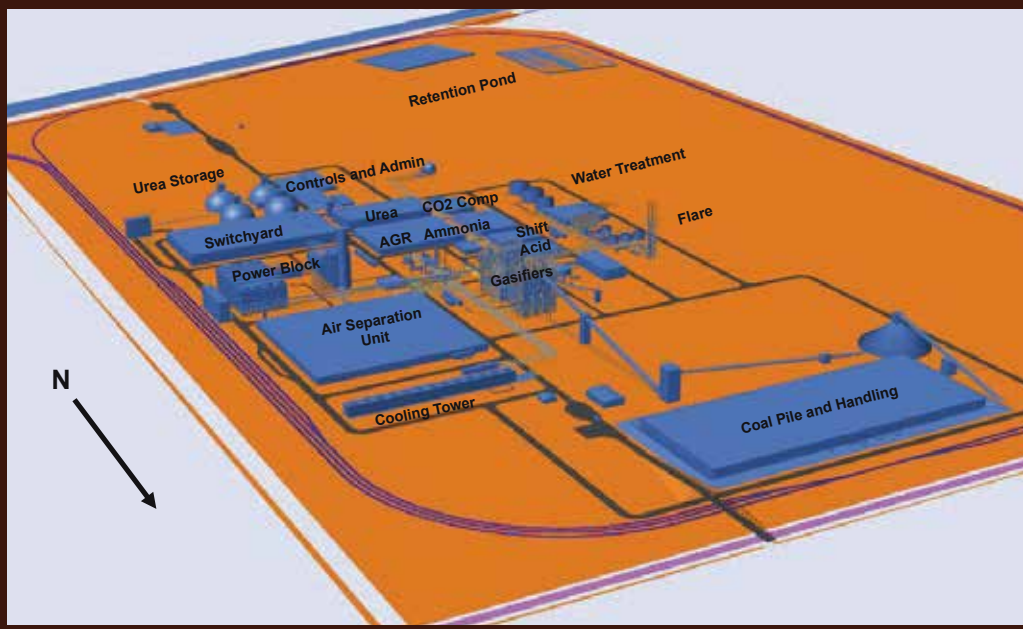
A case study of the Texas Clean Energy Project

By Ann Banks, Summit Power Group

Texas Clean Energy Project

Today's electricity marketplace creates a challenging environment for power developers. Stagnation in demand has been coupled with profound shifts in fuel pricing and an increasingly uncertain regulatory environment. The list of complicating factors is long and ever changing.

But consider the dramatic decline in natural gas prices, the economic recession (and subsequent erosion of electricity demand), the expiration and temporary renewal of renewable energy tax credits and federal greenhouse gas emissions regulations. In this context, the entire landscape of U.S. electricity generation is in flux. Existing power plants that were once seen as the baseload



3-D Rendering of TCEP Plant

COURTESY OF SUMMIT POWER GROUP

"TCEP is not envisioned as a unique demonstration but rather the first plant in a new business sector that Summit intends to pursue."

PHOTO BY ELENA VOLKOVA / PHOTOS.COM

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workhorses of the system have been increasingly pushed aside in many markets and activity around new power plant construction has mostly stalled (or, in the case of renewables, started and stopped) as the industry awaits greater certainty and clarity. Coal-based power generation has arguably been hit the hardest, as regulatory and pricing pressures have eroded margins for existing plants and essentially stopped all attempts to build new facilities that burn coal. In the midst of this down market, how has a new plant in west Texas using coal as a chemical feedstock continued its march toward construction? The Summit Power Group's Texas Clean Energy Project (TCEP) is an encouraging case study that perhaps offers a direction for the industry in the years ahead.

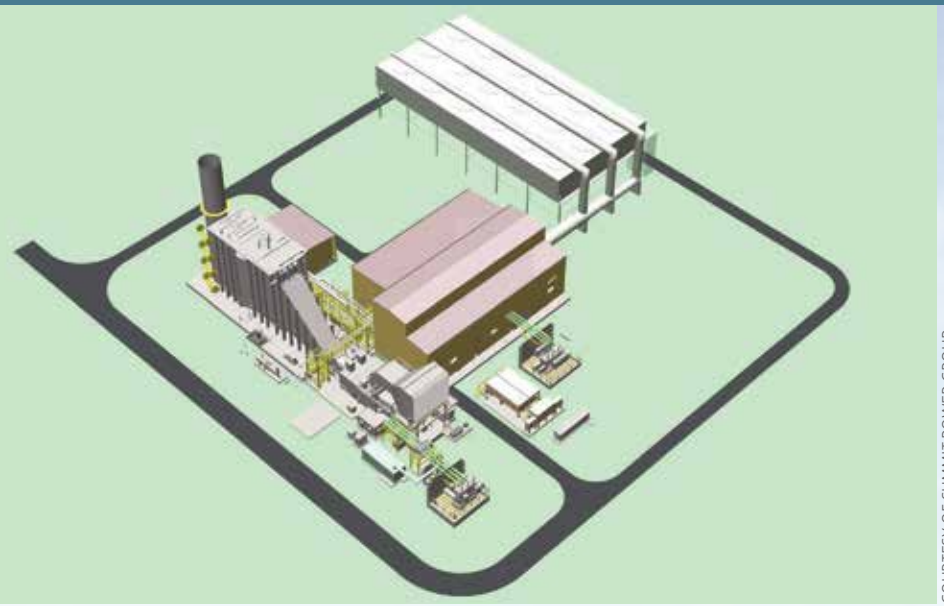
Summit's commitment to TCEP over the course of its seven-year journey from concept to construction readiness is due to our ardent belief that carbon capture projects are critical to national energy security and environmental sustainability; to critical support from the U.S. Department of Energy (DOE), industry, elected officials and environmental groups; and to our a vision for where the energy markets are headed. The vision originated when Summit and Siemens – the partner on many of Summit's more than 7,000 megawatts (MW) of currently operational gas and wind projects in nine states – conceptualized a coal gasification project at the urging of Summit's Chairman, Donald Hodel, former Secretary of Energy under President Reagan and Summit's CEO, Earl Gjelde, Hodel's former Under Secretary.

When the two companies decided on a high-efficiency, 2x1 combined-cycle power plant that would be run on syngas from gasified coal, they recognized that Siemens' "twin pack" of SFG-500 gasifiers would provide more clean, high-hydrogen, low-CO_2 syngas than was needed to operate the Siemens SGT6-5000F combustion turbine.

"TCEP ... will capture not only 90 percent of its CO_2, but also 99 percent of the sulfur, more than 95 percent of the mercury and will eliminate more than 90 percent of the nitrogen oxides produced by the process – making it overall the cleanest coal-based power project ever permitted in Texas."

What to do with the excess syngas? After reviewing market forecasts for various products – synthesized gasoline and diesel fuel, ammonia, methanol, synthetic natural gas – urea fertilizer was chosen for its low commodity risk and ability to displace imports. The U.S currently imports 70 percent of its urea. The TCEP will produce 710,000 tons of urea per year, all of which has been committed in a long-term contract to CHS Inc., a Fortune 100 company owned by farmers, ranchers and cooperative across the U.S.

The TCEP initially aimed to capture 65 percent of its CO_2. However, Summit – working with Selas Fluid Processing Corporation, a Linde Group subsidiary engaged for the



COURTESY OF SUMMIT POWER GROUP

3-D Rendering of TCEP Plant Power Block

project's Front End Engineering Design (FEED) study – increased the capture rate to 90 percent. This rate will yield 2.5 million tons per year of CO_2, which will be used by oil producers to bring to market up to 7 million barrels a year of Texas crude through enhanced oil recovery (EOR). TCEP has pre-sold all of its CO_2 to Whiting Petroleum Corp. and two other purchasers under long-term contracts for the next 30 years.

The result: a power plant became a polygen plant, and one revenue stream, electricity, became three major ones. Today, projected urea revenues are expected to account for a major portion of TCEP's total revenues; electricity and CO_2 sales revenues will comprise most of the remainder; and minor products like argon gas, sulfuric acid and non-leachable slag comprise less than 10 percent.

The U.S. DOE chose TCEP for a $450 million Clean Coal Power Initiative Award based in part on the polygen configuration. Many states have decided that the added cost of carbon capture should not be borne by ratepayers, but fortunately that is not an issue for TCEP. TCEP's electricity has been sold on the open market. The DOE award, which comprises less than 20 percent of the project's construction costs, has allowed TCEP to sell all of its products, including power, at market prices.

Thanks to the visionary leadership of the City of San Antonio, TCEP has entered into a 25-year take-or-pay power purchase agreement with CPS Energy, the largest city-owned gas and electric utility in the country. San Antonio Mayor, Julian Castro, and CPS Energy CEO, Doyle Beneby, are determined to make San Antonio a hub for energy-related economic development and a recognized leader in clean energy technology. TCEP was a good fit for that goal, since it will capture not only 90 percent of its CO_2, but also 99 percent of the sulfur, more than 95 percent of the mercury and will eliminate more than 90 percent of the nitrogen oxides produced by the process – making it overall the cleanest coal-based power project ever permitted in Texas.

TCEP's air permit was issued in December 2010, after a relatively short eight months and with no opposition. Summit is fortunate to have a long history of working closely with environmental groups. In fact, TCEP was born when Summit was invited to Texas in 2005 by environmental groups hoping to see low-emissions gasification projects with carbon capture built in the state.

TCEP has signed engineering, procurement and construction (EPC) contracts and a 15-year operations and maintenance (O&M) contract. The two firm-price, turnkey EPC contracts guarantee price, schedule and performance by the project's main EPC contractors and subcontractors, including Siemens Energy Inc., the Sinopec Engineering Group and a U.S. affiliate of Linde. The total value of the EPC contracts is approximately $2.2 billion.

Sinopec will supply a complete chemical block capable of producing syngas by gasifying 1.8 million tons per year of low-sulfur, sub-bituminous Powder River Basin coal. Sixty to 75 percent of the syngas produced by the gasifiers will fuel a Siemens power block and the balance will be used for the production of granulated urea. The chemical block captures 90 percent of the CO_2 from the syngas and compresses the CO_2 for sale to the mature EOR market

in west Texas. In the second EPC contract, Siemens will supply a nominally rated 400 MW combined-cycle power plant capable of operating on syngas and (when needed) natural gas.

A separate 15-year O&M contract was also signed for the complete turnkey operation and maintenance of the entire 600-acre facility, including day-to-day operation and short-term and long-term maintenance. The contract, signed by Linde's Gases Division, includes guarantees of performance and availability by the division for the full 15-year contract period.

Upon financial closing and groundbreaking expected later this year, TCEP plans to employ up to 2,000 workers at the peak of construction. When the project becomes operational in 2016, there will be 150 or more full-time, high-wage employees at the facility; 200 additional workers will be hired every two years during periods of major maintenance.

TCEP is not envisioned as a unique demonstration but rather the first plant in a new business sector that Summit intends to pursue. This is also the vision of the DOE. Based on the lessons and insights gained from TCEP, Summit's Captain Clean Energy Project, a follow-on project to TCEP that is planned for a location in Scotland, was also short-listed in late 2012 for the next phase of the UK's Department of Energy and Climate Change's £1 billion carbon capture and storage competition. The prize for the entire energy sector is potentially enormous and founded on the ability of gasification to convert coal into clean, high-hydrogen syngas with CO_2 capture and with the removal of sulfur, mercury and particulate-producing substances prior to any combustion. No coal is burned; the only thing burned is clean syngas from which almost all the carbon and other pollutants have first been removed. ◆

"Upon financial closing and groundbreaking expected later this year, TCEP plans to employ up to 2,000 workers at the peak of construction."

Ann Banks is the chief commercial officer at Summit Power Group (www.summitpower.com).

Restoring the American Chestnut

Restoration and reforestation on reclaimed mine lands

By Michael E. French, The American Chestnut Foundation

Standing on a reclaimed mine in eastern Kentucky, surveying the growing chestnut seedlings around me, I can envision what I hope this area will look like in 50 years. I see seedlings and saplings scattered across a forest floor which is covered in leaves, wildflowers and ferns with chestnuts, oaks and maples towering overhead, providing homes to squirrels, birds and raccoons. Future hunters and hikers might have a difficult time believing that just 50 years earlier, this area was piles of loose overburden. If the seedlings that we planted here and in hundreds of other locations throughout the trees' natural range are successful, then it will mark the return of chestnuts to the landscape after an absence of almost 100 years.

American chestnuts were once so dominant that they numbered in the billions and accounted for nearly one out of every four trees throughout much of the eastern United States. Chestnuts averaged four to five feet in diameter, could reach heights of more than 100 feet and produced wood that was valued for its beauty, workability and resistance to rot, even when in contact with soil, which made it useful for everything from fence posts to furniture. As a source of food for wildlife and people, chestnut was unrivalled. Unlike other nut producing trees such as beech, oaks and hickories which flower early, chestnuts flower in June and July, when the blooms are in no danger from frost, so every year the trees would bear an abundant crop of small, sweet nuts that were consumed by rodents, raccoons, bears, turkey, deer, livestock and people.

In 1904, a forester at the New York Zoological Park noticed that the chestnuts on the grounds were dying from a disease which was previously unknown to him. Research revealed that a fungus caused the disease that soon became known as the chestnut blight. Chestnut blight most likely came to America on infected Japanese chestnut seedlings and once established, it spread with the wind, leaving decimated forests in its wake. By the 1950s, the entire range had been affected, approximately 4 billion chestnuts had perished and we lost this valuable wildlife and timber tree. Many consider the loss of American chestnut to be the greatest ecological disaster of the 20th century.

Bringing back the chestnuts

Since 1983, employees and members of The American Chestnut Foundation (TACF) have been working to restore American chestnut throughout its native range. Fortunately, chestnuts sprout from the stump and the blight does not affect the root systems. By crossing surviving American chestnuts and sprouts that reach the flowering stage with blight-resistant Chinese chestnuts, TACF is creating a population of trees that will hopefully

PHOTO BY ANTHONY SHAW / PHOTOS.COM

Jack Wolfe, of Northern Swatara Creek Watershed Association, helps Cole Rumpf (sitting) and Jeff Rumpf (standing) direct seed chestnuts on a mine site in Schuylkill County, Pa.

PHOTO COURTESY OF M. FRENCH

A pure American chestnut that is 16' 4" tall and was planted as a part of Operation Springboard in Pike County, Ky.

PHOTO COURTESY OF ARRI

A researcher documents four-year old chestnuts growing on a research plot reclaimed using the Forestry Reclamation Approach in eastern Kentucky

PHOTO COURTESY OF M. FRENCH

fill the void in our forests that was created by the loss of American chestnut.

By conducting controlled pollinations through a series of crosses, backcrosses, and intercrosses, TACF is producing chestnuts that incorporate Chinese chestnut's blight resistance, while retaining the desirable timber and nut producing characteristics of the American chestnut. Each family line within a generation is selected for blight resistance by infecting the trees with the blight and only using those that show high levels of resistance during subsequent stages of crossing. In this manner, TACF is currently producing trees that are approximately 15/16 American chestnut and 1/16 Chinese chestnut, which they are calling "Restoration Chestnuts 1.0."

The forestry reclamation approach

Utilizing reclaimed surface mines for chestnut restoration gained attention through the efforts of the Appalachian Regional Reforestation Initiative (ARRI) and the Office of Surface Mining Reclamation and Enforcement (OSM). ARRI is a cooperative organization that

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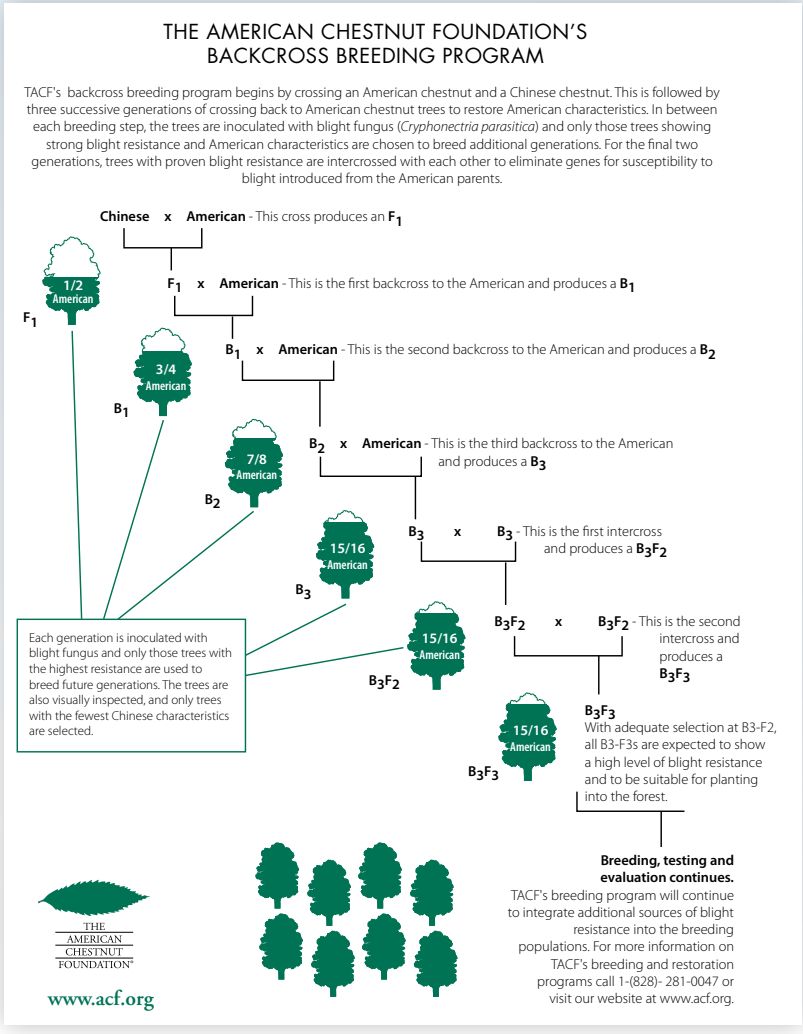

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was formed in 2004 between OSM, state regulatory agencies, researchers, mine operators, citizen's groups, landowners and other individuals and entities to promote reforestation of mined lands. ARRI encourages mine operators and reclamation contractors in the Appalachian region to implement practices known as the Forestry Reclamation Approach (FRA).

The FRA is a set of techniques that are intended to ensure that operators reclaim mined lands in way that fosters high seedling survival and growth and expedites the establishment of forest habitat through natural succession. The five steps of the FRA are:

1. Create a suitable rooting medium that is no less than four feet deep and comprised of topsoil, weathered sandstone and/or the best available material
2. Loosely grade the topsoil or topsoil substitutes placed on the surface to create a non-compacted growth medium
3. Seed ground covers that are compatible with trees
4. Plant two types of trees – early succession species for wildlife and soil stability and commercially valuable crop trees
5. Use proper tree planting techniques

The FRA, when implemented properly, shows increased survival and growth rates for planted seedlings when compared to traditional reclamation.

Surface mines as a "springboard" for restoration

TACF and its partners began planting chestnuts on reclaimed mines in the early 2000s. Peabody Energy, TECO Coal and others supported this initiative and early experiments on surface mines in Kentucky and elsewhere showed that chestnuts could often thrive when planted in loose spoil.

In 2008, ARRI and TACF strengthened their partnership through "Operation Springboard," which included chestnuts in ARRI's mix of recommended hardwoods. This program was intended to increase the range and types of settings where chestnuts were being planted to help TACF determine the best sites for Restoration Chestnut 1.0 establishment and to raise awareness of the FRA. In anticipation of the development of Restoration Chestnuts 1.0, pure American chestnuts and excess TACF backcross seedlings were planted as proxies for Restoration Chestnuts 1.0, which are just now being produced in sufficient numbers for widespread testing. Through this program, chestnuts have now been planted on reclaimed mines in eight states from Pennsylvania to Alabama.

Numerous reasons exist for restoring chestnuts on fresh mine spoils. First, lands reclaimed using FRA techniques have shown high survival and growth rates for other native Appalachian hardwoods and many of these areas will likely be suitable for chestnut restoration. Second, many surface mines have light and soil chemical characteristics that are similar to higher elevation and ridge-top positions where chestnuts were formerly dominant. Third, loose mine spoils are initially devoid of vegetative competition, a hindrance to reforestation efforts. Fourth, the Appalachian coal region falls almost entirely within the American chestnut's natural range. Establishing founder populations of restoration chestnuts on reclaimed surface mines across the Appalachian coal region would aid TACF's goal of restoring the chestnut throughout its range.

"By the 1950s, the entire range had been affected, approximately 4 billion chestnuts had perished and we lost this valuable wildlife and timber tree. Many consider the loss of American chestnut to be the greatest ecological disaster of the 20th century."

The ARRI and TACF partnership has continued through a Conservation Innovation Grant that was awarded to TACF in 2011 by the USDA Natural Resources Conservation Service (NRCS).

"This project will be one of the largest plantings of potentially blight-resistant American chestnut trees in TACF's history and marks a milestone in the restoration effort," said TACF president and CEO, Bryan Burhans. This project will allow TACF to create 12 plantings across five states on reclaimed mined lands that have implemented the FRA. Each planting will be approximately 30 acres and will have Restoration Chestnuts 1.0 as a component of the mixed hardwood forest.

Because of TACF's reclamation and forest plantings, hopefully, 50 years from now, chestnuts roasting on an open fire will be commonplace once again. ◆

Michael French is a forester for The American Chestnut Foundation. For more information about The American Chestnut Foundation, please contact Paul Franklin at 828-713-9547 or visit www.acf.org. For more information about the Appalachian Regional Reforestation Initiative, please visit: http://arri.osmre.gov/ or contact Forester Scott D. Eggerud with the Office of Surface Mining Reclamation and Enforcement at 412-266-0726.

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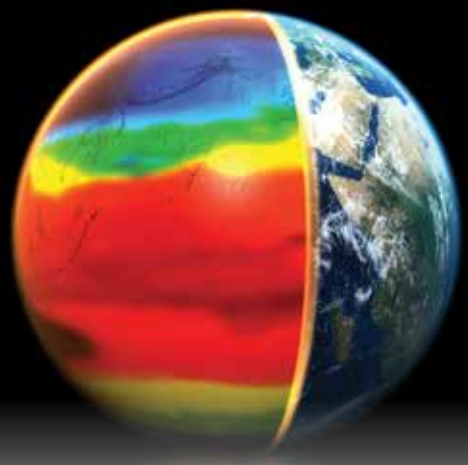


A science-based look at the evolution of the global warming debate

By Chris Skates

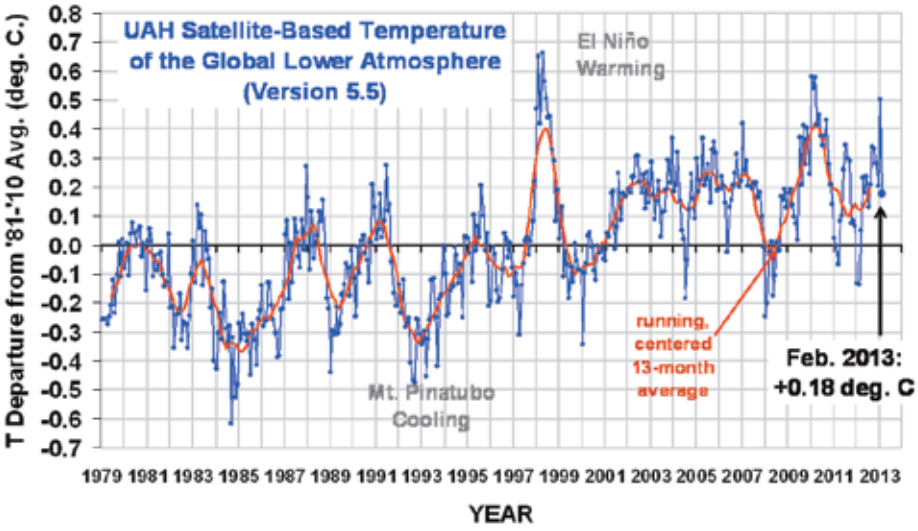
The brilliant physicist Stephen Hawking once said, "…you can disprove a theory by finding even a single observation that disagrees with the predictions of the theory."

The original theory of global warming can be summarized thusly:

- Fossil fuels (including coal) give off carbon dioxide (CO_2) when burned
- As the world's population increases, so does the burning of fossil fuels and thus the amount of CO_2 in the atmosphere
- Increased CO_2 in the atmosphere creates a "greenhouse effect" (a blanketing of the earth's upper atmosphere that stops the escape of heat from the surface of the earth to outer space)
- Therefore as population and CO_2 continue to increase, there will be a corresponding increase in the global average temperature (GAT) of the earth. (Those two words are key. Many in the media would have us go into a policy panic over temperature increases in the Midwestern United States last year. However, those temperatures are not relevant to the discussion of GLOBAL warming. The theory is called GLOBAL warming, not regional warming.)
- This temperature increase is then expected to result in the melting of polar ice, massive flooding and drought, famine and more violent storms, among other things

Skeptics did not define the theory of global warming; they merely tested it, which is what scientists should do. According to the scientific method, the presence or absence of warming in conjunction with CO_2 increase is where the rubber meets the road in the climate debate. However, when we utilize our most accurate instrument data, we discover that over the past 12 years, there has indeed been an increase in CO_2 in the atmosphere. However, there has been no corresponding increase in global average temperature as was theorized.

As the graph shows, the centered average for GAT shows no upward trend since 2002. In addition, there were natural causes for the minor



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temperature delta prior to the year 2000 (The y-axis is shown in tenths of a degree. Now, looking back to Hawking's comment above, we can ask, "Have we not found the single scientific observation he was speaking about?")

I am not skeptical that there has been warming in our century, particularly through the 90s; of course there has been *some* warming on *some* timescales. However, I am extremely skeptical that we have scientifically established causality. I do not believe that changes in climate are caused by man. Therefore, I do not believe the abandonment of fossil fuels is the solution to climate change. Those of us who believe that our God-given coal resource should remain a primary aspect of our energy policy should also be willing to drive the climate debate toward the causes of climate change. That tactic effectively inoculates us from articles and television programs that attempt to focus on warming, which occurs on narrow time scales.

It is precisely the lack of observed warming which led first to the sudden name change from "global warming" to "climate change," and now to "global climate disruption." Those concerned about human-caused climate change now attempt to blame every snowstorm, hurricane and drought that occurs on global warming/climate change because actual instrument data does not support their theory. This tactic is being employed despite the publication of peer-reviewed studies showing such claims are not at all credible. In fact, tornadoes, hurricanes and global tropical cyclone activity have all declined since the 1950s.

Despite all the data to the contrary, it is anticipated that two reports will be released this year. First, the U.S. Environmental Protection Agency will soon release their "climate change plan." Second, the Intergovernmental Panel on Climate Change (IPCC) will release its fifth assessment report (AR5) this summer. We must be on guard, particularly regarding the IPCC. It was their 2007 report that led to a plethora of hysterical articles, news reports and even feature films, all foretelling our impending doom. This group of researchers shared the 2007 Nobel Peace Prize with Al Gore.

At the time of publication, there is a great deal of debate on the Internet about a supposed "leak" from the forthcoming AR5. Supposedly even the IPCC will admit in the AR5 that natural causes play a much larger role in climate changes than their earlier reports stated.

Each of us who believes in the merits of a robust energy policy with coal as its centerpiece, owe it to ourselves to stay informed. We must communicate the truth of the data in every media medium that we possibly can. I wrote a novel in the political thriller genre for precisely that reason. We must not cede either the cultural or scientific high ground to our opposition. Those of us who are skeptical of climate change theory are neither greedy nor blinded by loyalty to our own industry. Instead, we are informed by that which has informed responsible science for over 300 years – hard data. ◆

Chris Skates is the author of the novel, Going Green: For Some It Has Nothing To Do With The Environment. *Further information on his book, as well as his blog, can be found at www.chrisskates.com.*

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It Never Was About the Environment

COURTESY OF BRIDGE-LOGOS FOUNDATION

Review of
Going Green: For Some It Has Nothing To Do With The Environment

By Chris Skates, Bridge-Logos Foundation, 2011, 384 pages

Review by Jason Hayes, American Coal Council

It's not very often that I get to delve into gripping cloak and dagger-style international intrigue as part of my job. Policy papers, legislation and regulation, political editorials and committee minutes take up most of my reading time. Not that I'm complaining; as a policy wonk, I'd dig into policy papers and legislation even if it wasn't part of my job. But it is always fun to mix things up a bit, so when the review copy of Chris Skates' *Going Green* arrived in my mailbox, I was looking forward to reading something new.

I wasn't disappointed.

Skates has managed to blend a mix of political conspiracy, current energy policy, Machiavellian green industry agents and international terrorism into a page-turner of a novel.

Going Green is based around the character of Ashley Miller, a one-time environmental campaigner who faced up to real-life responsibilities after she graduated from college. She moved beyond simplistic attacks on industry and demands that work and production cease. Instead, she began to work with the industry that she had once reflexively opposed. She opened her mind and joined with energy producers as a means of providing essential services to the public, while also working to ensure that industry operated in a clean and efficient manner.

But as we move into the story, we find out that Ashley's past isn't willing to let her go, as a previous flame from her college activist days appears at

PHOTO BY OLEG ZABIELIN / PHOTOS.COM

"Skates has managed to blend a mix of political conspiracy, current energy policy, Machiavellian green industry agents and international terrorism into a page-turner of a novel."

her plant. The problem is that this time he isn't coming a-courting; he's charging her and her company with serious environmental infractions and threatening to start a legal and media firestorm.

How will Ashley prove to her employer that she hasn't had anything to do with this man and his protest group since her college days? How will she prove her innocence when he begins to tell her boss the specifics of her private email and then claims she has leaked damaging company secrets? How does he know so many intimate details about her life? As his attacks and threats mount, Ashley wonders how she will keep her job.

In a matter of days, Ashley's problems grow well beyond an ex-boyfriend and her job as she finds herself in a prestigious D.C. law firm, prepping to be the key witness in Congressional testimony that could make or break the utility industry. Then, after her first dinner in the D.C. area, she finds herself fleeing the clutches of a maniacal terrorist and murderer.

How does a small-town girl find herself so quickly caught up in the midst of an international terror plot and struggling to keep her industry from being shut down by wealthy environmental groups and powerful, unfriendly politicians?

Skates has managed to weave together a compelling tale that will keep readers turning the pages right to the end, when Ashley is forced to face the man who is trying to kill her.

Not only is *Going Green* an interesting story, it is equally intriguing for its ability to cut across established social norms and to think and operate outside of predictable boxes. In this postmodern world, where supporters of industry – especially the coal industry – are expected to stay silent and avoid any possibility of offense, Skates' open support of coal, the utility industry and Judeo-Christian values was a welcome – if somewhat surprising – change. It takes a little readjustment time to read a book that openly defends what is now regularly referred to in disparaging terms as "traditional beliefs" – right vs. wrong, hard work, honesty, personal responsibility, chivalry and integrity. Too many of those "traditions" have been erased from our conversation and conduct and it is high time we see them return to our stories and entertainment.

Going Green is an exciting and enjoyable read and I would recommend it as a valuable addition to any of our readers' libraries.

There's only one thing that I did not get clearly as I closed the final pages of *Going Green*; when will the sequel be published? I expect that with effort that went into developing the characters in *Going Green* there is fertile ground for the next installment in this exciting story.

We'll be waiting for Skates to inform us of the publishing dates. ◆

Jason Hayes is the communications director of the American Coal Council.

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Signal Peak Mine near Roundup, Mont. is the nation's longest longwall operation

American Energy is Underfoot in Montana

Unique qualities and abundance put the state's coal reserves at the top of the heap

By Dustin de Yong, Government of Montana

Montana is home to one of the largest coal reserves on the planet. There is approximately 120 billion tons of coal underfoot in the Treasure State. This comprises 28 percent of the nation's recoverable reserves and 8 percent of the world's recoverable reserves. This astonishing resource remains largely intact, however several attractive attributes of Montana's coal reserves are enticing coal developers to invest in the state.

Gold and silver brought prospectors and miners to Montana throughout the 19th century. The mineral resources were so plentiful that words describing some of them adorn the state's flag – in Latin, Oro y Plata; in English gold and silver. While miners of these precious metals had great success and garnered incredible wealth, it was not gold and silver that made Montana's economy shine like no other, it was copper. Due to the advent of electricity and the rapid creation and expansion of the electricity transmission system, Montana's abundant copper resource was in high demand in the early 20th century.

The thirst for Montana's mineral wealth is not simply focused on precious metals; the state has long benefited from its vast resources of coal. Montana holds the nation's greatest coal reserves, a gross estimate of nearly 120 billion tons. This comprises 28 percent of the nation's recoverable reserves and 8 percent of the world's recoverable reserves. This astonishing resource remains largely intact, but the United States, Europe, and developing markets in Asia are clamoring for a piece of Montana's vast supply of coal.

Electricity demand is on the rise as our reliance on technology becomes further engrained in our society. A number of the world's developing countries are in need of a far greater energy supply as their standard of living improves. China and India alone have a population of over 2.5 billion people, and both nations are modernizing at an incredible

Mine	2009 tons	2010 tons	2011 tons	2012 tons
Signal Peak Energy	866,772	4,388,851	5,135,571	5,707,623
East Decker	2,866,162	2,699,951	2,749,367	2,247,873
West Decker	1,720,374	228,006	295,575	484,570
Spring Creek	17,608,969	19,345,161	19,080,553	17,200,109
Savage	337,061	351,502	354,669	296,454
Absaloka	6,138,334	5,467,954	5,557,604	2,714,063
Rosebud	10,105,036	12,230,346	8,784,829	8,010,495
Montana Total Production	**39,642,708**	**44,711,771**	**41,958,168**	**36,661,187**

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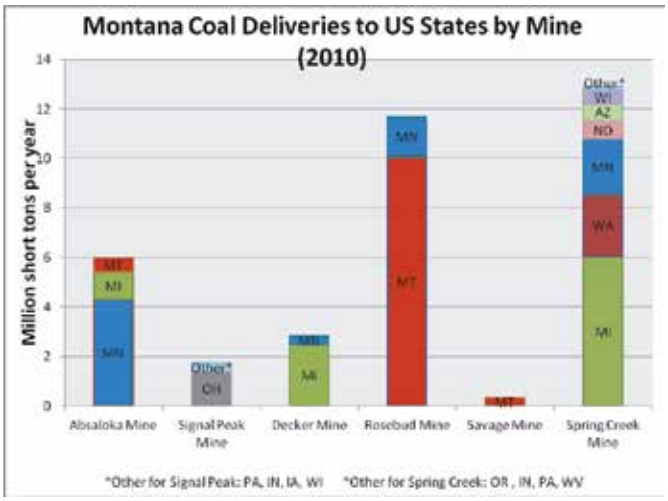
PHOTO COURTESY OF THE MONTANA DEPARTMENT OF COMMERCE



pace. Urban populations are on the rise in both countries, as families and individuals are moving to ever growing cities in search of employment opportunities. They are building new apartments, homes and even entire cities to meet residential housing demand and enjoying the comforts of modern society. This increase in electrical demand, both at home and abroad, means one thing: there is a growing need for abundant, affordable energy.

Montana holds an advantage when it comes to shipping coal to the world's largest market, Asia. Montana's reserves are the largest resource of coal that can be shipped over a long distance. Montana coal has the characteristics needed for transport from the interior west across the Pacific, while also enjoying the shortest distance by rail to Pacific ports. Thus, Montana is very well positioned to meet new market demands within the coal industry.

Coal has long been the staple source of energy for the United States and it is clear that we cannot meet our growing energy demands without our coal resource. However, coal-fueled plants in the U.S. have come under scrutiny in recent years due to their particulate and greenhouse gas (GHG) emissions. Cleaning up emissions from a coal-fueled plant comes at a price. Fortunately for Montana, much of our coal is high quality and contains low levels of sulfur. Therefore, many utilities look to Montana coal to help them meet increasingly stringent air quality regulations.

While Wyoming has developed much of its reserves and been home to some of the world's largest coal mines for decades, Montana has quietly and slowly developed its much larger coal resource. On average, Montana produces approximately 40 million tons of coal per year. Roughly one fourth of that production is burned in state; the state has a nameplate capacity of 2,662 megawatts (MW) of coal-fueled facilities including co-gen facilities. The Colstrip plant accounts for the majority of this capacity at 2,094 MW and is fed by the mine mouth operation at the Rosebud mine.

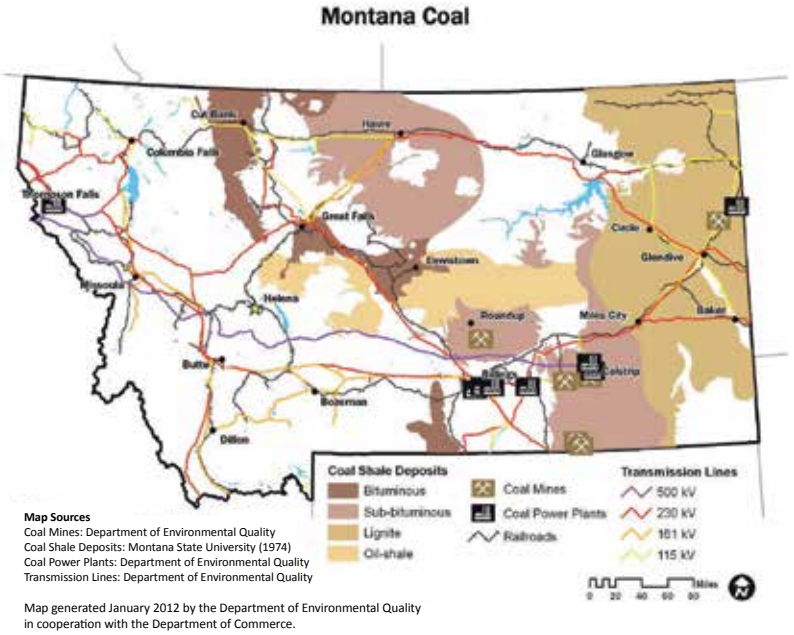
Montana's reserves are composed of lignite, sub-bituminous and bituminous coal containing a British thermal unit (BTU) value of up to 11,500. The state's recoverable lignite reserves make up 43.3 billion tons and are extracted for mine mouth coal-fueled generation facilities in eastern Montana. Recoverable sub-bituminous reserves comprise the lion's share of the state's reserves at 73.5 billion tons. This sub-bituminous coal is used in state for electrical generation and is also distributed to facilities in both U.S. and foreign markets. Finally, the state's bituminous reserves stand at 2.3 billion tons and are currently not under production. This region's coal reserves are often classified as Powder River Basin (PRB) reserves. While PRB coal does make up a large portion of Montana's reserves, basins outside of the PRB are also in abundance.

National media has recently reported on coal-fueled generation losing a substantial portion of the electric generation market to natural gas. Coal-fueled plants have closed or switched to natural gas throughout the country in the wake of more stringent GHG emission standards. However, many of these plants were decades old and investment levels needed to bring these plants up to 21st century standards

just didn't make economic sense. Coal producers in Montana know that coal-fueled generation will continue to provide at least one third of the nation's energy supply beyond the life of their current mining plans. If this were not the case, Montana would not be experiencing the level of development for new and expanded coal mining in the state.

The Montana Department of Environmental Quality, which handles the permitting and regulation of the state's coal mining operations, maintains that it has not been as busy as it is today in over 20 years. In March 2010, Arch Coal made a one-time bonus bid of $85.8 million for the lease of Otter Creek coal, located in southeast Montana. The coal lease gives Arch the right to mine approximately 8,300 acres of state-owned minerals; Arch now controls approximately 1.3 billion tons of coal in Montana's Otter Creek area.

Signal Peak Energy began operations of the state's only underground coal mine in 2007 and has since ramped up production from 137,300 tons to 5.7 million tons in 2012. Signal Peak has secured adjacent state and federal land leases to expand mining operations in order to attain their production goal of 1 million tons per month. Of the state's seven active coal mines, five have recently had expansions approved or are under permitting review. This constitutes 3,326 acres recently approved, 15,229 acres of expansion under review and 7,639 acres of new mine development under review. Montana's coal industry continues to be a significant contributor to the state's economy, providing high quality jobs and major tax revenues. ◆



Dustin de Yong is an energy development specialist with the Government of Montana.

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