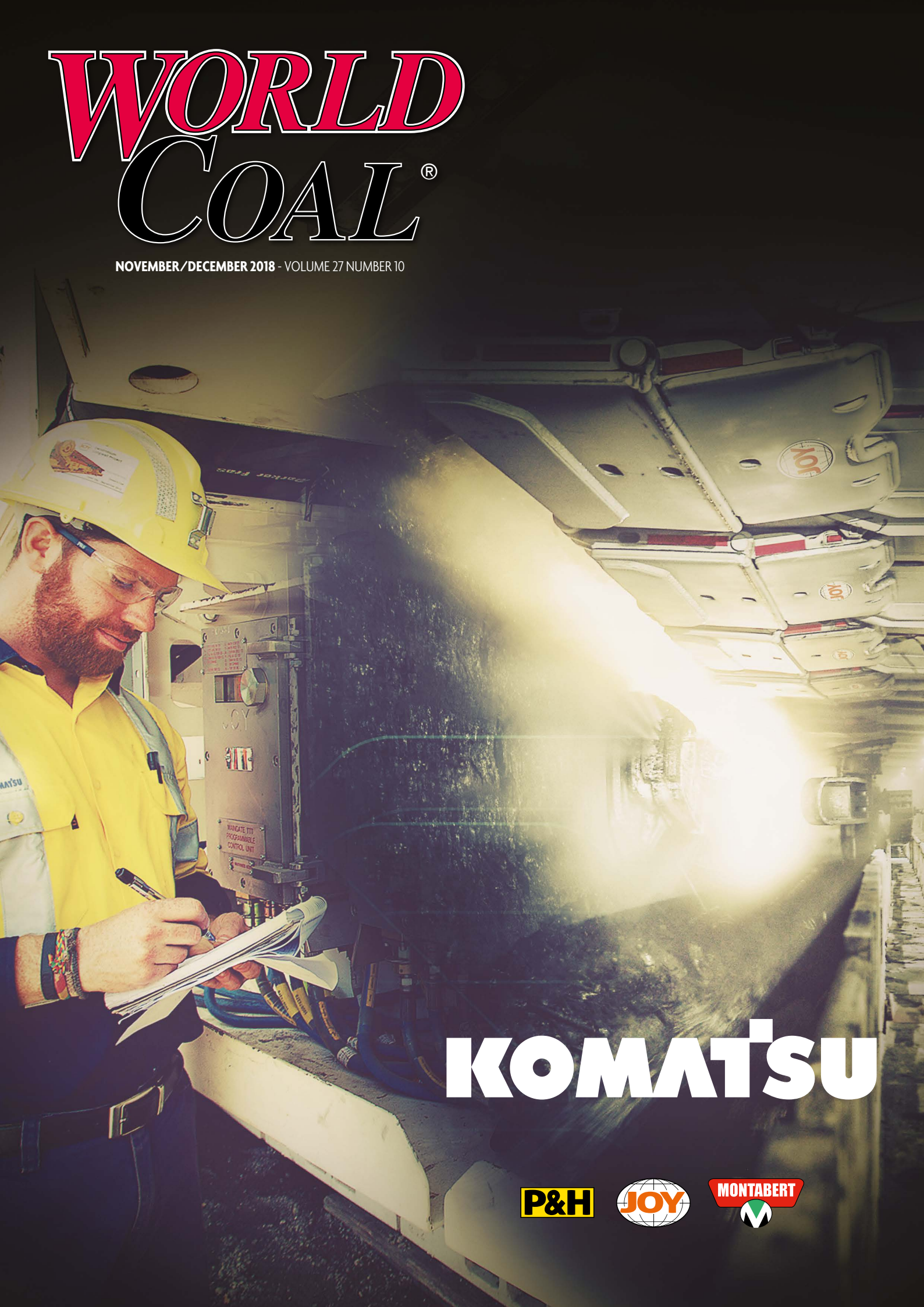
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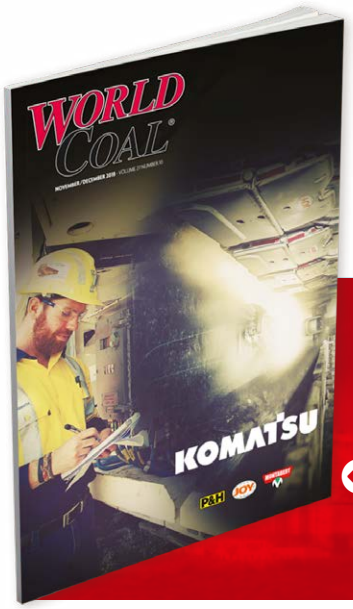
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"Joy complete longwall systems from Komatsu represent the ultimate solution for high production longwall mining, incorporating best-in-breed shearers, roof supports, face conveyors, stageloaders, crushers and mobile belt tail pieces."

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Comment



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Winter is coming. And no, I don't mean the final season of Game of Thrones. It's that time of year where we dust off the thermostat and whack up the heating, with the coal industry seeing more action than normal. So much so that, despite the UK's attempts at phasing out coal-fired power plants by 2025, it's on track to burn the fossil fuel this season as a means of keeping up with the higher demand.[1]

Elsewhere, Europe will also be reliant on coal power this winter following rising EU gas prices, with some regions seeing the 'coal-to-gas switch' starting to reverse.

In light of the global push towards reducing carbon emissions from coal plants, Germany will be implementing strategies to mitigate pollution. Swedish power company, Vattenfall, is reportedly providing its services to help reduce CO_2 emissions in coal plants across Germany. Many of which are combined heat and power (CHP) plants, whereby electricity and heat are generated in an environmentally-friendly, simultaneous process. Electricity is fed into the district grid; hot water is pumped via underground networks to individual customers.

During the 2017/18 winter, Beijing implemented a switch from coal to natural gas; coal was banned from heating boilers for household energy in many areas of the country. The reason? It was part of an anti-pollution campaign, which saw rural northern China switch to the cleaner alternative. This consequently sent gas prices soaring due to higher demand, and left thousands of households without heat. It didn't take long for the policy to be revoked.

Learning from this mistake, China's Hebei province guaranteed sufficient supplies of clean coal until winter 2020, to combat air pollution and avoid heating shortages.

The Beijing-Tianjin-Hebei region has the highest levels of air pollution in China. Last year, Beijing's PM2.5 concentrations averaged 121.96 $\mu g/m^3$ of air, in comparison to the 2016 average of 72.48. Note that the World Health Organisation's air quality guidelines stipulate that the PM2.5 limit doesn't exceed an annual mean of 10 $\mu g/m^3$.

Yet, in late October, a new report summarised that controlling formaldehyde emissions during China's wintertime could help improve the country's northeastern cities more than the reduction of sulfur dioxide (SO_2) from coal-fired power plants.

Jonathan M. Moch, first author of the report and graduate student at the Harvard John A. Paulson School of Engineering and Applied Sciences, explained: "We show that policies aimed at reducing formaldehyde emissions may be much more effective at reducing extreme wintertime haze than policies aimed at reducing only SO_2. Our research points towards ways that can more quickly clean up air pollution. It could help save millions of lives and guide billions of dollars of investment in air pollution reductions."

Prior to this finding, however, there have been various clean coal and emission reduction initiatives implemented throughout the country. For instance, The World Bank lent a hand with combatting air pollution in China's northeast by supporting the installation of two heat recovery units, plus a 21 km heat pipeline to Huairen. Now, instead of the waste heat being released into the atmosphere, it's captured to be reused in residential heating. Consequently, 10 small coal boilers have been decommissioned, thus reducing CO_2 emissions by 420 000 t and SO_2 by more than 13 100 tpy.

In the same vein, coal gasification is being used to provide cleaner energy and products.

In April, The University of Nottingham Ningbo China (UNNC) revealed it was helping develop technologies for gasifying coal, as a way of producing clean and efficient energy. UNNC's findings will assist in the construction of a coal gasification unit in Shandong, in eastern China. This will process the coal cleanly, and be able to convert up to 4000 tpd into syngas.

Zhu Yuying, Vice General Manager of the Changzheng Engineering Co., Ltd., also vouches for this technology. She explained: "Because of our special technologies, the gas, liquid and solid emissions of the coal gasification can be properly treated and recycled, making the gasification process clean and environmentally-friendly."

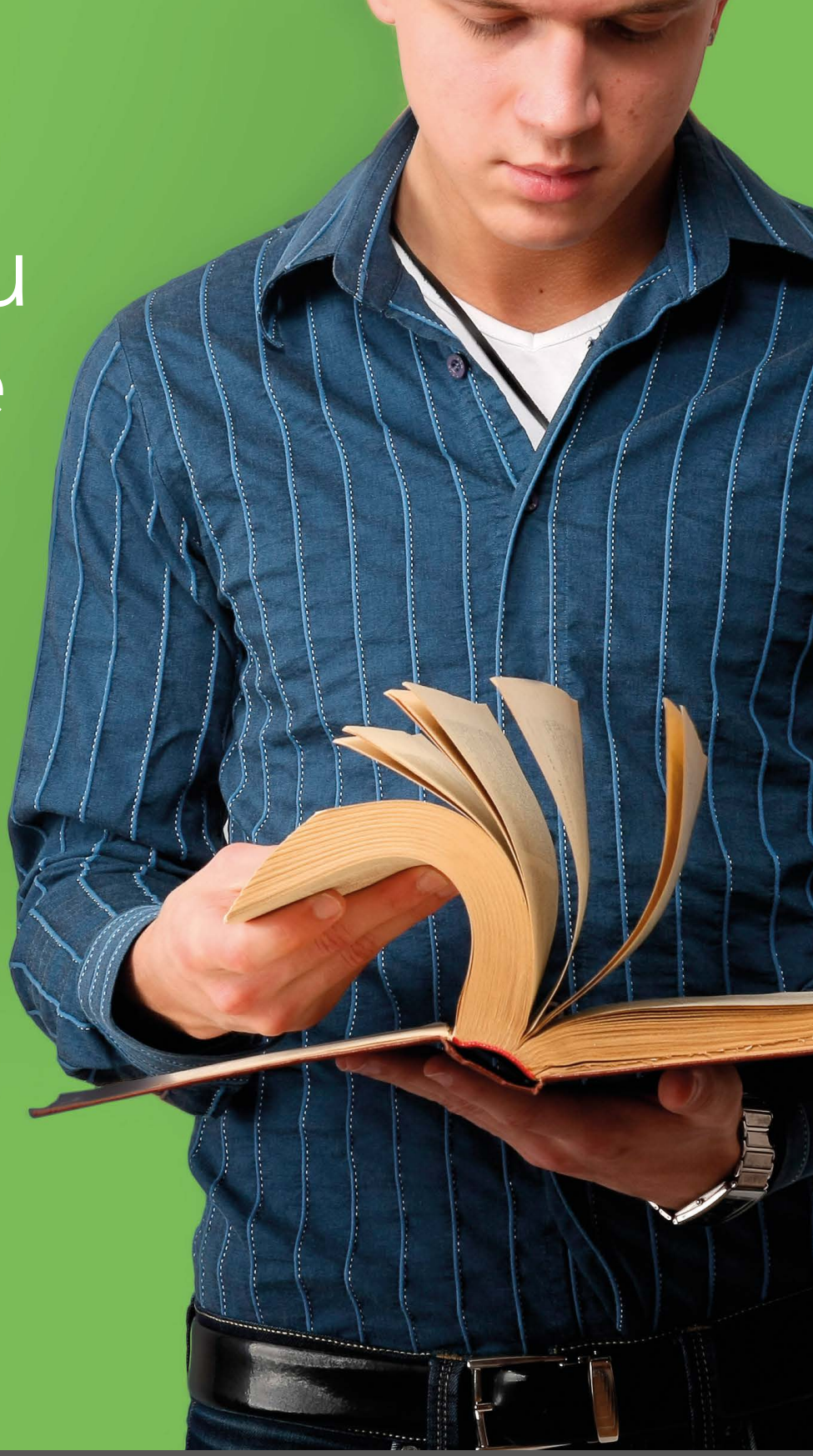
For other mitigation strategies, take a look at GE's Steam Power's article on p.43, where the company discusses its ultra-supercritical technology that helps coal-fired power plants (particularly in China) significantly reduce their carbon emissions. WC

1. https://www.spglobal.com/platts/en/market-insights/latest-news/coal/091118-uk-expected-to-use-coal-for-power-in-winter

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Coal News

USA NETL using microwaves for coal conversion applications

NETL researchers are unleashing the power of microwaves to convert fuels, such as coal, into marketable fuels, chemicals and products. In addition to providing higher yields with lower temperatures and less energy, this work is also advancing understanding of the science behind the reactions through state-of-the-art bench-scale facilities with an eye toward scalable and economically viable systems.

"Traditional fuel conversion processes rely on thermal heating, which works from the outside in," said Dushyant Shekhawat, Ph.D., who leads NETL's Reaction Engineering team. "However, microwaves operate on a molecular level, allowing rapid, selective heating. These microwave-specific effects are important to understand on a fundamental level because they can affect profound changes, even yielding completely different products than what is created during normal heating."

Researchers are still working out detailed reaction mechanisms, but it appears that a non-thermal effect also factors into the enhanced conversion and selectivity associated with microwave-assisted reactions. Once NETL researchers better understand how microwaves interact with materials, they can design optimal microwave systems for fuel conversion applications.

NETL's cutting-edge facilities are aiding in this development. In addition to employing fixed-frequency reactors, NETL has developed a one-of-a-kind variable frequency microwave reactor that can operate from 2 - 8 GHz.

"This unit will provide NETL with the most comprehensive look at the electromagnetic characterisation of a wide range of materials for a series of chemical reactions," said Shekhawat.

NETL has already achieved much success using microwaves for fuel conversion processes. A recent paper investigated microwave-assisted pyrolysis, which is a thermochemical pre-treatment step in any coal conversion process that devolatilises coal and reduces its sulfur and heavy tar content. The study looked at the pyrolysis of Mississippi coal and compared it to conventional pyrolysis. Results showed that microwaved pyrolysis of the coal produced higher gas yields at low temperatures, with less tars.

RUSSIA Construction begins at new SUEK Kuzbass mine

After obtaining the licence, SUEK Kuzbass prepared a plan for uncovering and developing the Sychevsky-I seam, together with design documents for rail and belt inclines, and the organisation also constructed a temporary fan installation and the collar and underground components of the rail and belt inclines.

The planned launch date for the first longwall is 2020. The Sychevsky-1 seam thickness is 4.5 m, the stope length is 360 m and the design capacity is 3.5 million tpy. In order to launch the first longwall, it is necessary to drill 13.7 km, including 4.7 km of capital and 9 km of preparatory development. The mine will be equipped with modular central drainage treatment facilities. Similar facilities are now used to treat water at the Rubana mine in Leninsk-Kuznetsky and at the Yalevskogo and Taldinskaya-Zapadnaya 1 mines in the Prokopyevsky district. The innovative equipment supplied by the German company EnviroChemie GmbH makes it possible to reuse more than half of the treated water for process needs of the companies. The rest of water discharged into natural water bodies meets all sanitary standards.

As Deputy Governor Andrey Panov noted during the official mine opening ceremony, the main focus of the coal industry development programme in Kuzbass is on underground mining, since there are new, up-to-date technologies and equipment available for safe and efficient underground coal mining.

SOUTH AFRICA Deputy Minister defends nation's use of coal

South Africa's Deputy Energy Minister Thembisile Majola has defended her nation's use of coal, just a month before the latest round of climate talks are due to take place at COP24 in Katowice (Poland). COP24 is intended to finalise the rules of the 2015 Paris climate deal.

Majola reportedly said: "With the Germans, they can say 'we're moving from driving a Corolla to a BMW', while we are still trying to get the bicycle. They're talking about different technologies; we're talking about access."

A key aspect of the 2015 Paris Agreement was the promise for the developed world to transfer US$100 billion/yr by 2020 to the developing world to aid them in transitioning their energy, industrial and agricultural systems.

"There can't be a transition that's one-size-fits-all, we need a transition that brings everyone along because there are different levels of pollution," Majola added.



Coal News

DIARY DATES

Webinar: 4 Steps to Implement Predictive Maintenance in Coal Mining and Cement
4 December 2018
Global
https://bit.ly/2O3jqAY

COAL-GEN 2018
4 - 6 December 2018
Orlando, USA
https://www.power-gen.com/index.html

18th Coaltrans India
18 - 20 February 2019
New Delhi, India
http://www.coaltrans.com/india/venue.html

Blockchain for Mining
20 - 21 February 2019
Perth, Australia
http://akragessuumits.com/ftpupload/CMK/IT27_BlockchainForMining_GMR.pdf

SME Annual Conference & Expo
24 - 27 February 2019
Denver, Colorado
http://www.smeannualconference.com/

2019 ELECTRIC POWER Conference & Exhibition
23 - 26 April 2019
Las Vegas, USA
http://2019.electricpowerexpo.com/

2019 Longwall USA Exhibition & Conference
20 - 22 May 2019
Pittsburgh, USA
https://www.longwallusa.com/

The 9th International Conference on Clean Coal Technologies – CCT2019
3 - 7 June 2019
Houston, Texas
https://www.cct-conferences.org/

PAKISTAN GE awarded TEL power plant contract

GE Power has won equipment and services deals worth more than US$60 million to power and provide critical maintenance services for a period of 12 years for the 330 MW Thar Energy Limited (TEL) power plant in Pakistan. The collaboration further demonstrates GE's advanced technologies and reinforces its leadership as a trusted partner throughout the lifecycle of a power plant.

Hubco CEO Khalid Mansoor said: "We are committed to supporting Pakistan in achieving power self-sufficiency and our focus on using our country's own resources is testament to this. In driving the TEL project, we are using proven world-class technology by GE, which has demonstrated its long-term efficiency and reliability using similar fuels internationally. The inclusion of a multi-year services agreement furthers GE and Hubco's co-operation, and not only marks a new milestone in our long-lasting relationship but also in Pakistan's ambitions for a secure energy future."

AUSTRALIA QRC comments on New Acland Stage 3 mine

The Queensland Resources Council (QRC) has welcomed the Land Court's decision on New Hope's New Acland Stage 3 coal mine expansion near Toowoomba.

The New Hope mine is one of the region's most significant employers and one of the most important economic contributors for the Darling Downs.

This is encouraging for New Hope and the 3000 workers who rely on the Acland mine for their living.

With the expansion, the mine will be able to produce 7.5 million tpy of coal for 12 years, providing more jobs, more economic opportunity and more revenue for every tier of Government. Construction of the mine would be over a three year period and the mine would operate until 2031.

The Queensland Government will now make its final decision on the approval of New Acland Stage 3.

INDIA Coal India relaxes mine-specific coal policy

Coal India has relaxed the norms of its mine-specific coal supply policy to improve the availability of coal to its smaller consumers.

Introduced in 2011, the mine-specific coal policy was created in order to enable the consumer to benefit from assured supply from a preferred source and a reduction in logistics costs.

The policy was initially only applicable to consumers who required a minimum of 1 million tpy of coal.

However, the Coal India board recently cleared a proposal to allow smaller consumers to benefit from this policy. The minimum amount of coal per annum requirement was downsized to a quarter of the original figure to 0.25 million tpy.

"The mine specific coal supply policy was conceived in 2011 to enable consumers benefit from assured supply from a preferred source and gain from reduction in logistic expenses. Now, with Coal India board clearing the decks, the policy norms have been relaxed considerably to accommodate greater number of consumers under the ambit of the policy," said a senior Coal India executive.

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Industry View

Reforming world bank policy can help drive zero emissions from coal

Liam McHugh, Policy Manager, World Coal Association, UK

Across the world today, over a billion people have no access to electricity. Many more in developing economies still face energy shortages or disruption with consequences for their economic potential and living standards. In many regions, coal-fuelled power is often the only accessible and affordable solution. Plants being built today in Egypt, Kenya, Bangladesh and across Southeast Asia will mean that coal will be part of the energy mix for decades to come.

Since the Paris Agreement in 2015, the World Coal Association (WCA) has encouraged and supported countries that identified a role for cleaner coal technology within their climate pledges.

24 countries, representing half of the world's emissions, submitted Nationally Determined Contributions that identified a role for efficient, low emission coal technology. As the format of these climate pledges are standardised at December's climate talks in Poland, this number may well rise.

For these countries, coal is a reliable and affordable fuel that can help provide the necessary energy to support economic development. These economies are industrialising and urbanising at a rapid rate, so affordable, reliable electricity is essential and, for many, coal is a natural choice.

According to the IEA's Energy Access Outlook 2017 report, nearly all of those who gained access to electricity worldwide in the last 16 years did so through new grid connections, mostly from fossil fuels – 45% of which came from coal. Coal is, therefore, critical to socio-economic development in these countries. It currently provides 37% of the world's electricity, and is essential in the production of 75% of the world's steel and 85% of cement.

For many developing countries, especially those in emerging and developing Asia, excluding coal from the energy mix is not an option because improved energy access drives economic development.

Rising coal use in Asia also highlights a need for greater focus on emissions reduction. This is why, as an organisation, the WCA works with stakeholders to promote the role that technology can play in helping coal-reliant countries to develop a pathway for zero emissions coal. This way, countries can balance economic priorities with climate objectives.

With this in mind, power producers need to raise project capital at the lowest cost possible in order to build energy infrastructure that will deliver reliable electricity at affordable prices and, at the same time, have the required environmental controls that will reduce emissions. In less developed economies, however, raising this finance can present significant challenges, as local capital markets may not support the type of long-term financing required for energy infrastructure investments.

A number of international financial institutions, such as multilateral development banks (MDBs), have been established to address these challenges and promote growth in emerging economies. Since 2013, however, the World Bank and several other similar bodies have adopted policies that concentrate lending on a narrow portfolio of technologies, while excluding others. Support for coal-fuelled power, for instance, may only be given in 'rare and exceptional circumstances'.

The introduction of such measures appears at odds with the role coal-fuelled power is expected to play in many developing and emerging countries. In 2018, there was 492 GW of coal capacity under construction or in development globally, complementing the 2 TW in operation. Rather than curtailing demand for coal, there is growing evidence that the approach followed by the World Bank has created a void filled by alternative funding partners that often may not apply the same stringent efficiency standards and environmental protections that MDBs have historically championed.

There is growing momentum towards reviewing international coal financing. The WCA would encourage any new approach to be based on two steps.

First, support the switch to the best available high efficiency, low emissions (HELE) technology: the construction of the most suitable HELE coal plant with modern emission control technologies where that facilitates the delivery of commitments made by a country within their NDC under the Paris Agreement. Wherever practical, the involvement of the World Bank or other MDBs in financing such projects should facilitate the inclusion of concepts of carbon capture, use and storage (CCUS) readiness in plant design.

Secondly, help drive the pathway to zero emissions from coal: engage with the relevant national government to support strategies for the development of CCUS technology as part of that country's long-term climate action plan under the Paris Agreement.

The WCA sees a critical role for the World Bank and other financial institutions in extending financing to encourage cleaner forms of power from coal. Coal will have a continuing role in the global energy mix for decades to come. Accordingly, we should work to ensure the best available technologies are deployed. Reforming World Bank policy also provides the opportunity to help drive zero emissions from coal by adopting long-term climate action plans that support the deployment of CCUS.

This topic can be further explored in the WCA's new report, 'Reducing emissions from coal: A role for the World Bank'. WC

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SEEKING A STABLE AND BENEFICIAL ENERGY MIX

Coal, like other sources of thermal generation, is part of the strength of Central and South America's energy matrix, explains **Claudia Cronenbold, Vice Chair, Latin America and Caribbean Region, World Energy Council.**

Coal is the most abundant of fossil fuels. Coal supplies about a third of energy used worldwide, and plays an important role in a variety of sectors, including power generation, iron and steel production, cement manufacturing and as a liquid fuel. The majority of coal is either used in power generation which utilises thermal coal or lignite, or in iron and steel production which uses metallurgical coal.

The following article explores South America's coal trade, and highlights how a diversified energy mix is important for Central America.

South America

South America is known for its proven recoverable reserves. At end-2017, Brazil's proven reserves were 6596 million t; reserves from Colombia (the world's fifth largest exporter of coal) totalled 4881 million t; and Venezuela's total reserves reached 731 million t. Also last year, Colombia's coal production totalled 61.4 million toe, while Brazil produced 3 million toe and Venezuela's production totalled 0.7 million toe.[1]

Colombia

Colombia's vast coal resources are located in the north and west of the country. Data on 'measured reserves', published in 2004 by the Instituto Colombiano de Geología y Minería (Ingeominas), Ministerio de Minas y Energía, indicated a total of 7064 million t, of which the Cerrejón Norte, Central and Sur fields in the department of La Guajira accounted for 56% and fields in the department of Cesar for 29%. In this report,

the World Energy Council (WEC) Member Committee for Colombia noted proved recoverable reserves of 6508 million t based on the Ingeominas end-2003 measured reserves, adjusted for cumulative coal production in 2004 - 2011, inclusive. 'Indicated reserves' quoted by Ingeominas in the aforementioned publication were 4572 million t, whilst 'inferred' tonnages were 4237 million and 'hypothetical' resources 1120 million. The 'indicated' and 'inferred' levels were reported by the Member Committee under the headings of 'probable' and 'possible', respectively.

Development of Colombian coal for export has centred on the Cerrejón deposits, which are located in the Guajira Peninsula in the far north, about 100 km inland from the Caribbean coast. The coal is found in the northern portion of a basin formed by the Cesar and Rancheria rivers; the deposit has been divided by the Government into the North, Central and South Zones.

In 2017, Colombian coal exports totalled 89.44 million t; Cerrejón North remains one of the world's largest export mines.[2]

Colombia is the world's ninth largest producer of hard coals, based on 2016 data.[3] The country was also reported to be the fifth largest exporter of coal during 2017.[4]

The US Geological Survey previously stated that Colombia is the largest coal producer in South America and has the largest reserves in the region.

The majority of Colombia's coal exports are shipped to European markets due to shorter distances and lower freight costs, compared to the rapidly growing Asian markets. Colombia is considered to be a low cost producer with its coal highly sought after due to its low sulfur content.

In Colombia, the state owns all hydrocarbon reserves and private companies operate coal mines under concession contracts with the state.

Brazil

Brazil has considerable reserves of sub-bituminous coal, which are mostly located in the southern states of Rio Grande do Sul, Santa Catarina and Paraná.

The Brazilian WEC Member Committee previously reported that the remaining proved amount of sub-bituminous coal in place was 6640 million t. The same source assessed Brazil's proved recoverable reserves to be 6630 million t. This is higher than in the last report.

According to the WEC, the maximum depth of the deposits is 870 m, whilst the minimum seam thickness is 0.5 m. It is estimated that 21% of the stated level of proved recoverable reserves could be exploited through opencast mining.

The WEC Member Committee quoted additional discovered amounts of coal in place at lower levels of confidence as approximately 10.8 billion t, classified as 'probable' and more than 6.5 billion t as 'possible'. It had also estimated that a further amount of around 8.3 billion t of coal is recoverable from undiscovered resources.

Almost all of Brazil's current coal output is classified as thermal coal, of which more than 85% is used as power plant fuel and the remainder in industrial plants. Virtually all of Brazil's metallurgical coal is imported; approximately 70% is used as input for coke production.

In Brazil, coal's share in the energy mix is about 5%; only approximately 1.3% of this is used in electricity generation. The main uses of coal are in the steel industry and for power generation. Brazilian coal is considered to be low quality, with high ash content and low carbon content, which makes its use outside the coal deposit regions unviable.

In 2010, Brazil consumed around 20 million t of coal, of which 14.2 million t was imported. Of this 20 million t, 4.4 million t (22%) was used in electricity generation and the remainder was used in industry.

Argentina

The Argentinian WEC Member Committee previously reported proven amounts in place of 752 million t of sub-bituminous coal and 7350 million t of lignite, which are found in two main deposits: Río Coyle with some 5 billion t in place; and the middle course of the Río Santa Cruz, with 2.35 billion t. Both these deposits lie in the Río Leona formation. The only proved reserves reported are 500 million t of sub-bituminous. Undiscovered coal of this rank that are estimated to be in place amounts to 300 million t, of which 100 million is regarded as recoverable.

The Rio Turbio deposit reportedly concentrates 99% of the country's coal reserves.

The WEC has reported that coal output from the Río Turbio mine is approximately 300 000 tpy and is used for electricity generation.

A 240 MW coal-fired power plant was constructed adjacent to the mine and entered into service in 2015. It is Argentina's first plant to be powered purely by coal.

According to the Argentinian Member Committee, this development required a quadrupling of Rio Turbio's output.

Central America

Without exception, all the governments in the Central American region are struggling to seek a stable and beneficial energy mix in favour of economic growth, protecting the consumer and avoiding shortages or blackouts. Although it is a complex issue, it is becoming more important every day due to the increasing prices, new generation technologies, global trends for a green energy matrix and long-term solutions.

But how is the regional energy mix being transformed? Countries have set their sights on clean and renewable energies, but in order to guarantee the system's stability and reliability, a diversified energy mix is important and, for the moment, with the reliability of thermal energy, we can achieve it.

Panama

For example, in Panama, during the month of May 2018, when the gas had not yet come into operation, 62.8% of the electric energy produced came from hydroelectric generation, 31.4% from thermal, 2.1% from wind, 1.7% from solar and 2% self-generation and MER (Central America's regional electricity market) transactions. It is a diversified matrix, but

still faces the challenge of finding sufficient and competitive energy resources to support the annual energy demand growth of this Central American country.

With respect to the other fossil fuels and the growing trend of integrating renewable energy sources, in order to meet global demand there has been growing speculation about the future of power generation through coal. It is important to know that in 2011, the proven reserves of coal in the region were 13 800 million t, concentrated mainly (73%) in Colombia and Brazil, making it logistically accessible to supply the energy demand of the South and Central American countries.

Also, thinking about stability and a diversified matrix, is the region prepared for a new phenomenon of El Niño? A report dated 9 July 2018 by the National Oceanic and Atmospheric Administration indicated that the projection for April 2019 shows a 75% probability of the El Niño phenomenon being presented again. Columbia University estimates an 80% chance and the Australian Bureau of Meteorology indicates 70%. Meanwhile, Columbia University indicates that for the months of August, September and October of this year, "the probabilities of the phenomenon of 'El Niño' would increase from 54% to 60% and, in January - March 2019, 76%."

Faced with this reality, there is clearly a need (in several countries of the region) for a greater diversification of the energy matrix, especially to void the eventuality of energy shortages due to climate events as previously mentioned.

Thermal generation in the balanced energy mix gives robustness and guarantees the needed supply for the operation of the electrical systems and the markets' reliability, especially those based on renewable resources, whose energy production can be affected by climate change or that are inherently unstable, such as wind and solar.

Costa Rica

For example, Costa Rica – whose energy mix is based on the generation of renewable energy – has included a percentage of thermal plants that guarantee the energy supply to its customers in the face of a climate event, protecting its stability and energy access to the end user.

Different prospective analyses indicate that the region will face a growing demand for energy, driven by the increasing size of its economies under the impulse of factors such as global markets, industrialisation, population growth and, as a consequence, greater urban centres.

It is important for the security of the system to continue developing a generation mix where thermal energy serves as the system's backup, providing reliability and support; it is important as well to educate the population so that they can understand energy generation through these resources. *WC*

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