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Glückauf – the traditional German greeting used in mining communities – is a great word with no exact English translation. Originating as early as the 16th Century (and thus before modern geological mapping), its meaning includes a combined wish for both success and safety during a miner’s shift, as well as carrying something of the camaraderie – the brotherhood – shared by those early miners who put their lives on the line daily.

It is a great word. And, at the start of what could be another turbulent year, it is a word that carries particular relevance to the global coal industry in 2017. Despite a ferocious recovery in coal prices last year, the industry outlook remains challenging. And much like the 16th Century miner, whose survival to the end of a shift was largely out of his control, the coal industry in 2017 will be shaped by events over which it has little say.

Take President Trump. He will surely be at least somewhat positive for the industry – certainly compared to his predecessor. But to what extent he will be able to fulfill his campaign promises to bring back jobs to the coalfields of the US is uncertain. Some regulatory relief should be expected – and welcomed by the industry – but in the long term, arresting the decline may be the best he can do.

It is in China, however, that coal’s fortunes will continue to be won and lost. To the extent the Chinese central government continues to enforce capacity cuts on its coal industry, coal imports should remain an attractive supply option for China’s coal users. But China’s government is a fickle beast, and this year it will be preoccupied with preparations for the 19th National Congress of the Chinese Communist Party, during which the governing Politburo and its powerful subcommittee, the Politburo Standing Committee, will be chosen. Resistance to Xi’s appointments – revealing divisions at the top of the Chinese government – would add significant risk to global economic growth, particularly given the existing structural imbalances and high indebtedness of the Chinese economy.

Meanwhile, although much progress has been made in mine safety since the 16th Century, the coal mine remains a hazardous place. The recent re-emergence of black lung in Queensland is a sobering reminder that safety should not be taken for granted even in advanced mining regimes. Glückauf’s twin wishes of success and safety should not be separated: safety is always the key indicator of a mining company’s success.

As always, technology will be the key to safety success. It has been fascinating to watch technology suppliers up their game over my tenure at World Coal. Increasingly operators are being taken away from the coalface: take the Longwall Mine of the Future project from Joy Global and Anglo American (see pp. 16 – 20) as an example. This saw operators being taken away from the coalface: take the Longwall Mine of the Future project from Joy Global and Anglo American (see pp. 16 – 20) as an example. This saw increasing productivity gains with an overall production improvement of 152% seen over a three years period. Safety and success: the spirit of Glückauf in practice.

Glückauf is then also a challenge to the coal industry. To be successful, to be safe, in the current environment will take determination and character. It is a challenge but one I hope to see the industry rise to, as it has done repeatedly over its long history.

It is with that thought that I depart on. It has been an interesting ride over the seven or so years I have occupied the Editor’s chair here at World Coal. But now is my turn to go (although not too far: I am taking up the reigns on World Coal’s sister publication, World Cement). Thank you to all those who have made me feel so welcome in this most remarkable of industries. And to all, Glückauf!
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USA Peabody files reorganisation plan to move forward with its Chapter 11 process

In April 2016, Peabody Energy, the US’s largest coal producer, filed for bankruptcy protection. Since then, the company has been working with its creditors on a plan for reemergence. In December, the mining giant filed its plan of reorganisation and disclosure statement with the US Bankruptcy Court for the Eastern District of Missouri.

The company indicated in a media release that the proposed plan provides for a new, sustainable capital structure that significantly reduces the pre-filing debt levels by more than US$5 billion, lowers fixed charges and recapitalises the company through a backstopped rights offering of US$750 million, a private placement of mandatory convertible preferred stock of US$750 million and the issuance of new common stock to satisfy certain creditor claims. The plan also anticipates that Peabody will emerge with substantial liquidity to satisfy near and long-term needs.

As part of the plan of reorganisation, the company anticipates emerging as a public company. The plan provides that current Peabody Energy equity securities will be cancelled and extinguished upon the effective date of a confirmed plan of reorganisation by the bankruptcy court, and holders would not receive any value for such equity interests.

The plan also provides for a nine-member board of directors. The board will comprise the CEO, a director chosen by Peabody, appointments from three large creditor groups, and four directors chosen by a search process. Directors from the existing Peabody board will be considered as part of the search process.

According to Peabody’s President and CEO Glenn Kellow, “[t]he plan charts Peabody’s course forward and reflects an enormous amount of work by the company and multiple creditor groups to advance a proposal that has broad consensus, maximises the value of the enterprise and paves the way for a sustainable future. We look forward to moving toward confirmation of the plan.”

Kellow indicated that while there is still an “outstanding issue to resolve” before the emergence, the plan shows that the company “retains an unmatched asset base, leading US platform, substantial Australian thermal and metallurgical coal business, and a team of skilled employees with a fundamental commitment to lasting values.”

He concluded: “We’re pleased to reach this important step as we move to the next phase of Peabody’s Chapter 11 process. And we appreciate all of our employees’ actions in continuing to manage safe, low-cost operations and deliver the results that can best ensure our success.”

Given recent changes in the industry and company, Peabody also elected to provide updated projections for 2016 through 2021, incorporating changes to the company’s industry views and financial performance/outlook as of October 2016.

Revisions to the August 2016 business plan mostly impact early years based on changes in near-term pricing and currency, along with the planned sale of the Metropolitan mine targeted for 1Q17, subject to clearance by the Australian Competition and Consumer Commission. In addition, Peabody is preparing updated financial statements to reflect the impact of actual performance, and these will be filed as a supplement ahead of the disclosure statement hearing.

The company noted that it is possible that changes will continue to be made to the plan of reorganisation and disclosure statement before final creditor and court approval. Peabody is targeting emergence around the beginning of 2Q17.

Peabody currently expects to have a hearing on the disclosure statement on 26 January 2017. Following court approval, the US miner intends to send the plan and disclosure statement to creditors for approval.

USA 2016 safest year on record for US miners

Preliminary data released by the US Department of Labor’s Mine Safety and Health Administration (MSHA) indicates that 2016 recorded the lowest fatality and injury rates at US mines. A total of 26 miners died in work-related accidents at the nation’s mines – down from 29 in 2015. This represents the lowest number of mining deaths ever recorded and only the second year that mining deaths dropped below 30.

Nine of the 26 fatalities occurred in coal mines – four in West Virginia, two in Kentucky, and one each in Alabama, Illinois and Pennsylvania. The leading causes of death were powered haulage and machinery, which accounted for six of the deaths. In 2015, coal mining deaths fell to 12 – the previous historic low.

Joseph A. Main, Assistant Secretary of Labor for MSHA, credited the agency’s use of strategic enforcement tools, including targeted impact inspections that address problem mines quickly, the pattern of violations regulation reigning in chronic violators, special initiatives aimed at preventing deaths that occur commonly, compliance assistance, training and outreach – along with improved compliance by the mining industry.

“While these deaths show that more needs to be done to protect our nation’s miners, we have reached a new era in mine safety in the past few years,” added Main.
AUSTRALIA Record coal exports for Queensland in 2016

According to a recent announcement from the Queensland Resource Council (QRC), the resources sector continues to underpin the Queensland economy with record coal and LNG exports over the year to December 2016.

New data reveals that coal exports from Queensland in 2016 totalled 221 million t, eclipsing last year’s record by 1 million t and LNG exports more than tripled to 17.5 million t.

The export figures were achieved with strong numbers across all of Queensland’s ports, including Gladstone, Abbot Point, Dalrymple Bay – with Hay Point leading the way with a 10% annual increase in volumes to 49 million t. December’s coal exports reached 20.7 million t, which is the highest month on record.

The announcement noted that Queensland is in a prime position with its high-quality thermal and metallurgical coal to continue to be one of the main players in global coal exports and the sector contributed more than an AUS$1 billion windfall to the state’s coffers this financial year.

INTERNATIONAL Petra Nova construction completed

NRG Energy Inc. and JX Nippon Oil & Gas Exploration Corp. have completed construction of Petra Nova, the world’s largest post-combustion carbon capture system on a power plant.

The 240 MW facility, part of the W.A. Parish coal-fired power plant near Houston, Texas, US, is expected to capture 90% of the carbon dioxide from its exhaust gas and this will be used for enhanced oil recovery in depleted oilfields within the region. It first captured CO2 on 19 September 2016 and has delivered more than 100 000 t of captured CO2 to the West Ranch field through an 80 mile pipeline.

Mauricio Gutierrez, President and CEO of NRG Energy, called the completion an “important milestone” and believes it is a key step for the company towards reducing its carbon emissions and creating “a more sustainable energy future”. He added, “we are proud that this accomplishment was achieved on-budget and on-schedule in a competitive energy environment.”

The Global CCS Institute applauded and congratulated those involved in the commencement of Petra Nova. Jeff Erikson, General Manager for the Americas region of the Global CCS Institute, indicated it was a demonstration of how carbon capture is “a proven technology and can be commercially viable” and that it will provide “a model for others to follow, enabling ongoing use of our domestic energy resources.”

Benjamin Sporton, CEO of the World Coal Association, also showed support for the project, commenting: “Because coal will continue to be central to global energy, carbon capture and storage (CCS) is vital. The Petra Nova milestone is a big deal for a low emissions future. This is one huge step which we hope will lead to further support and deployment of the technology. It’s essential to recognise that accelerated CCS development and deployment is critical to meeting the 2 degrees climate target.”

Petra Nova is a 50/50 joint venture between NRG and JX Nippon, with the US Department of Energy providing up to US$190 million in grants as part of the Clean Coal Power Initiative Program.
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INTERNATIONAL Coal exploration and mine development

A round-up of news from coal development projects around the world.

**Australia**

Whitehaven Coal

Whitehaven Coal Ltd has revised its production guidance for its Narrabri longwall operation, but remains on track to achieve its group 2017 saleable production guidance of 21 – 22 million t, the company reported in a recent announcement to the Australian Stock Exchange (ASX).

New full-year ROM coal guidance for Narrabri is in the range of 7.5 – 7.8 million t. The revised guidance arises from production impacts associated with safely managing a discrete area of adverse geotechnical conditions at the mine. Mining in panel LW06 at Narrabri is expected to be completed in early March with production scheduled to commence in LW07 panel (the first 400 m wide panel) early in the June quarter.

**Canada**

Atrum Coal

ASX-listed anthracite developer, Atrum Coal, has raised AUS$13.5 million in a share placement to institutional and sophisticated investors, the company said in a recent release.

The fund raising – originally proposed at AUS$10 million but increased due to “strong demand” – will support development of the Groundhog anthracite project in British Columbia, the company said. Planned activities to be funded by the placement include the delivery of bulk samples to potential customers and the further development of mining studies and permitting.

Jameson Resources

Jameson Resources has retained Sedgman to work on the update to the prefeasibility study (PPS) on the Crown Mountain metallurgical coal project in British Columbia. Sedgman, an engineering company specialising in coal processing and infrastructure, will review coal quality and provide advice on potential improvements to the PPS’s processing strategy. It will also review the Crown Mountain infrastructure plans and work to identify potential savings.

**Mongolia**

Aspire Mining

Through its rail subsidiary, Northern Railways LLC, Aspire Mining has received the first stage feasibility study from China Railway First Survey and Design Institute Group Co. Ltd for the Erdenet to Ovoot Railway.

The study concluded that the Erdenet to Ovoot Railway is financially feasible and is consistent with Mongolia’s mineral resource development strategy to be supported by growth in rail infrastructure. The study also indicated that the railway will play a significant role in the promotion of regional and social development.

**Russia**

Tiger Realm Coal

First coal has been mined and trucked from Tigers Realm Coal’s (TIG) Project F to the coal stockpiles at the TIG-owned Beringovsky Port in Russia.

Coal mining commenced in a part of the mine where the waste to coal stripping ratio for the first 12 months of production is less than 2:1 (bcm wastetonne coal). TIG plans to mine and haul coal to Beringovsky port until early May.

**Tanzania**

Edenville Energy

Edenville Energy has received the second set of results from SGS Laboratories in relation to the recent bulk sampling programme carried out on the Mkomolo and Namwele deposits.

These results cover seam NM1 and follow the results of the sampling of seam MK2 announced on 15 November 2016 and MK1 on 5 December 2016.

Results from seam NM1 for the Namwele deposit confirm coal as suitable for the provision of power plant feed. It is considered no washing will be needed for the Namwele seam to be used as power plant feed. Namwele NM1 seam results have exceeded expectations with approximately 60% of the coal averaging an energy value of 20MJ/kg. The results from the sampling and wash tests of NM1 further support and validate the results from the Mkomolo MK1 and MK2 seams and the recently constructed financial model and Resource Technical Assessment.

**USA**

Paringa Resources

Paringa Resources has raised AUS$8 million in a recent share placement to institutional investors, the company said in an ASX announcement.

The Perth-based developer of the Poplar Grove mine in Kentucky placed 19 million shares at an issue price of AUS$0.42 per share.

The cash raised will be used to complete an updated bankable feasibility study for the potential two-seam coal mining operation at Poplar Grove mine, which is expected in early 2017. It will also provide funding to start development of the mine by mid-2017.
Coal processing remains at the core of our business. MMD have continually developed a range of innovative machines – from high capacity Sizers that reduce ROM to a conveyable size, through to segmented tooth machines designed for specific product sizes in the coal preparation plant. Manufactured in India, the latest MMD Twin Shaft MINERAL SIZER™ is a Light Duty 625 Series machine specifically optimised for coal processing.

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Gadi Sagar lake in Jaisalmer, Rajasthan, India.
India is one of the top five countries in terms of coal reserves, coming after the US, Russia, China and Australia, with proven coal reserves of 60.6 billion t at the end of 2015, accounting for 6.8% of global reserves. Anthracite and bituminous coal accounted for 92.5%, or 56.1 billion t, while the remaining 7.5% (4.5 billion t) was made up of sub-bituminous and lignite grades.

In terms of coal production, India was globally the third-largest producer with 667 million t in 2014, a growth of 8% from the 618 million t recorded in 2014. Chhattisgarh, Jharkhand, Odisha, Madhya Pradesh, Andhra Pradesh, Maharashtra and West Bengal are the country’s largest coal-producing states. The government’s decision to reallocate all 204 coal blocks, which were earlier declared illegal by the Supreme Court of India in December 2014, is projected to increase coal production to 1.0278 billion t in 2020. Coal is a major source of energy in the country and has the largest share as a raw material for energy production; an increase in population is expected to drive growth in demand for energy. The country’s main coal mining companies are the state-owned Coal India Ltd (CIL) and Singareni Colliery Coal Ltd (SCCL).

Indian coal consumption was 827 million t in 2014 – up by 7% from 780 million t in 2013. This rise was mainly driven by demand from the power sector, which is the single largest consumer, accounting for 73.2% of total coal consumed in 2015. This was followed by consumption in the industrial sector at 19.3% of the total and all other end-uses consuming the remaining 7.5%. Coal consumption is projected to record
a compound annual growth rate (CAGR) of 6% over the forecast period (2015 – 2020), to reach 1.1075 billion t in 2020. The increase will mainly be driven by rising demand for energy and upcoming coal-fired power plants in support of increased industrialisation and other economic activities.

Despite having one of the world’s major coal reserves, India still relies heavily on coal imports as demand exceeds supply. Coal imports increased from 195 million t in 2014 to 200 million t in 2015, with much of it coming from Indonesia, Australia and South Africa. Indian coal imports are expected to reach 267.6 million t in 2020, due to the availability of low-cost imports and the higher cost of transporting domestic coal within the country.

Coal reserves by state, grade and formation
Coal deposits are mainly found in the Gondwana sediments in the Eastern and Central parts of India, and also in the northeast states of Sikkim, Assam and Arunachal Pradesh, while lignite deposits are found in the states of Tamil Nadu, Pondicherry, Gujarat, Rajasthan, Kerala, West Bengal and Jammu and Kashmir. Indian coal has high ash content in the range of 35 – 50%, moisture content in the range of 4 – 20%, low sulfur content of 0.2 – 0.7% and low calorific value between 2500 – 5000 kcal/kg.

Proximate analysis of coal
A proximate analysis indicates gross calorific value, the percentage by weight of the fixed carbon, volatiles, ash and moisture content in coal. Fixed carbon refers to carbon in its free state, not combined with other elements. Volatile matter refers to those combustible constituents of coal that vapourise when coal is heated. The ash content is important in the design of the furnace grate, combustion volume, pollution control equipment and ash handling systems of a furnace.

As stated earlier, Indian coal is generally poorer quality when compared to coal from the US, South Africa and Australia. It has a much lower calorific value and a very high ash content. Furthermore, India has little metallurgical coal, which means much of its steel industry relies on imports.

Production
India was the world’s third-largest coal producer in 2015 with production of 667 million t in 2015. The increase in production was supported by the start of operations at 24 brownfield and greenfield projects, such as the Tikak, Tipong and Tirap opencast projects with a combined capacity of 40 million tpy.

Although India’s coal production grew during the review period (2000 – 2014), the state-owned CIL, which accounted for approximately 80% of domestic coal production in 2014, has been unable to meet production targets since 2010. According to the Ministry of Coal, 20 coal projects owned by CIL, worth US$3 billion with capacities of 52 million tpy, were delayed in 2012 and 2013 due to difficulties in land acquisition and environmental clearances.
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In March 2015, the Indian Parliament passed the Coal Mines (Special Provisions) Bill to re-allocate coal blocks in a transparent manner after previous allocations were declared illegal by the Supreme Court of India in December 2014. The Act empowers the government to re-allocate all 204 coal blocks through online auctions to ensure continued operation and the optimum use of coal reserves. As of April 2015, the government had re-allocated 67 coal mines: 20 of which are in Jharkhand, 14 in Chhattisgarh, 11 in West Bengal, nine in Maharashtra, seven in Odisha, five in Madhya Pradesh, and one in Telangana. The Act also allows foreign firms to participate in the auction for coal mining operations in the future to increase domestic coal production.

CIL is preparing an expression of interest to allocate coal mines under long-term mining contracts to private mining companies to boost production. The company has already allowed private contractors under the mine developers and operator model, but it is now planning to award projects on a turnkey basis for 15 years.

Over the forecast period (2016 – 2020), Indian coal production is expected to reach 1.0278 billion t by 2020, this growth is not expected to be enough to meet rising demand over the forecast period and, as a result, India’s thermal coal imports are projected to reach 1.1075 billion t and 963,997.5 GWh respectively in 2020. To meet the rising electricity demand, the country plans to add coal-fired installed capacity of 70 GW during 2012 – 2017. In November 2014, the Minister for Power stated that: “India needs to invest US$250 billion over the next five years to tackle chronic energy shortages and provide power for all its 1.2 billion people.”

Although the government plans to set up five new UMPPs with a capacity of 4000 MW each with an investment of US$15.7 billion, the plants use supercritical technology and require coal with high calorific value and low sulfur and ash content. However, as discussed above, Indian domestic coal has a low to medium energy density at 2500 – 5000 kcal/kg, with a high ash content of over 35%. Therefore the development of these new UMPPs will likely rely on imported coal rather than domestic coal.

Domestic production has been constrained by difficulties in land acquisition, geo-mining conditions, and environmental and forest-clearance issues. In addition, global oversupply due to sluggish Chinese demand and a price slump are forcing Indian power plants to rely more on imported coal from Indonesia and Australia. Although the government is planning to rapidly increase domestic coal production to 1 billion t by 2020, this growth is not expected to be enough to meet rising demand over the forecast period and, as a result, India’s thermal coal imports are projected to reach 267 million t in 2020.

Alongside efforts to increase electricity output through commissioning coal-fired power plants that are comparatively cheaper to build, the government is also pushing ahead with its plans to develop renewable energy and is committed to

Table 1. Global coal mining – proximate analysis of various coals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>US</th>
<th>Russia</th>
<th>Australia</th>
<th>India</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross calorific value (kcal/kg)</td>
<td>5.681 – 6.004</td>
<td>3.837 – 8.6000</td>
<td>6.509</td>
<td>4.000</td>
<td>6.000</td>
</tr>
<tr>
<td>Moisture</td>
<td>14.3 – 19.6</td>
<td>15 – 37.7</td>
<td>3</td>
<td>5.9</td>
<td>8.5</td>
</tr>
<tr>
<td>Ash content (air dried %)</td>
<td>6.4 – 8.4</td>
<td>4.5 – 34</td>
<td>12.1</td>
<td>38.6</td>
<td>17</td>
</tr>
<tr>
<td>Volatile matter (air dried %)</td>
<td>32.4 – 35.9</td>
<td>40 – 42</td>
<td>21.4</td>
<td>20.7</td>
<td>23.3</td>
</tr>
<tr>
<td>Fixed carbon</td>
<td>39.2 – 44.6</td>
<td>40 – 42</td>
<td>31.4</td>
<td>34.7</td>
<td>31.2</td>
</tr>
</tbody>
</table>

Source: GlobalData analysis, company reports

**Factors affecting demand for coal**

Coal is India’s main indigenous energy resource and its largest primary energy source for electricity generation. India’s coal-fired installed generation capacity and coal-fired electricity generation increased substantially during 2000 – 2014, going from 61 GW and 357 178 GWh respectively in 2000 to 154.2 GW and 699 786.6 GWh in 2014, due to strategic government measures.

The Electricity Act of 2003 reformed the State Electricity Boards, to the State Electricity Regulatory Commissions, and enabled access to transmission and distribution networks. The introduction of ultra mega power projects (UMPP) in 2005 – 2006 also increased the domestic power sector’s potential.

The use of coal is expected to increase continuously to meet domestic energy demands. In March 2015, coal-fired power plants accounted for 164.6 GW of the total installed capacity of 267.6 GW, followed by hydro with 41.2 GW, natural gas with 23 GW, nuclear with 5.7 GW, diesel with 1.2 GW, and other renewables with the remaining 31.7 GW. India’s coal consumption and coal-fired electricity generation are projected to increase at CAGRs of 6% and 5.5% over the forecast period, to
reduce its carbon intensity (carbon emissions per unit of GDP) by at least 20% from 2005 levels by 2020. There is a target to increase the renewable installed capacity from 65 GW in early 2015 to 175 GW in 2022, with solar energy comprising 100 GW, wind energy comprising 60 GW, biomass energy comprising 10 GW, and others comprising the remaining 5 GW. The government plans to attract US$100 billion to develop 16 – 18 GW of solar and wind capacity per year to achieve the target. However, this would not translate to any immediate curtailment of demand for coal in the country.

**The last major growth country**

It is very likely that India is the last major country that will witness significant growth in its coal industry. With electricity still not widely available domestically, the underlying domestic demand for baseload power is strong and growing. This should support the consumption of coal going forward, and much of the newly installed power plants will be coal-fired.

![Figure 3. Installed coal-fired generation capacities of Indian power plants, 2014. Note: UMPPs are under construction. Source: GlobalData.](image)

To a lesser extent, India will also grow its steel sector, which will also drive the consumption of coal – in this case metallurgical coal. These two themes are really the saviour for coal globally, with few other countries offering a similar potential for growth in the coal industry. 

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