MINERALS COUNCIL WEBINAR ON COAL INNOVATION AND TECHNOLOGY 2020

Keynote address by July Ndlovu, CEO of Anglo American Coal South Africa

Wednesday, 21 October 2020

The role of technology and innovation in creating a greener future

How innovation can help the coal industry lead the way

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Acknowledgements

Thank you for that warm introduction, Nikisi, and for the opportunity to present the keynote address at the second-ever webinar on the coal innovation and technology.

I'd like to acknowledge the Minerals Council team for their leadership, advocacy and guidance that you have provided to all the members as we advance towards recovery from the challenges that the COVID-19 pandemic has brought all of us, including our stakeholders.

Introductory comments

The past few months have undoubtedly been some of the challenging of my entire career, and I know that I am not alone when I say this. No one could have imagined just how severe the effect of COVID-19 would be on almost every aspect of our lives and economies.

The mining industry stands out in its continued response to the pandemic. We can all be proud of the enormous effort we've made as an industry to safeguard the lives and livelihoods of our people, and nowhere more so than in South Africa where technology and innovation become crucial for the recovery of the industry, and the country as a whole.

The importance of Coal – then and now

Allow me to give you a brief history lesson that informs why we are all here today.

We all know that without coal the industrial revolution of the late 18th and early 19th century could have been hard to come by because the steam engine assisted to power the Industrial Revolution.

The steam engines were initially used to remove water from the mines and enabled shafts to be made deeper which allowed for more coal to be extracted.

Before the industrial revolution, the most commonly used energy source was wood. It was two features that displaced wood as an important energy carrier.

It was the price and the fact that wood has a low calorific value compared to coal. After the price of wood sky-rocketed coal became the substitute.

In 1879, Benjamin Franklin discovered electricity and along with the discovery came new products such as synthetic abrasives, chlorine, aluminium, stainless steel, tungsten etc. These products led to further innovations such as high-speed grinders, chlorinated water, PVC, incandescent lamps and x-rays.

The effect of these technological innovations was a much longer human lifespan, improvement in welfare, and increased productivity. Since then, the relevance of coal in the evolving global energy mix has not waned.

Coal in the global environment

In our time coal continues to play a vital role in meeting global energy needs and is critical to building societies considering its importance in global steel, cement and concrete production. It is the second most important energy source in the world after crude oil.

Globally, 27% of primary energy needs are met by coal and 38% of electricity is generated from coal. In some countries such as South Africa, this number is even higher, at about 77%. We cannot deny that coal will continue to be an essential part of our society in the future.

In the same breath, is a well-known fact that coal use comes with unintended consequences in the form of greenhouse gas (GHG) emissions. At a multilateral level, governments have responded by developing an environmental compact to reduce the use of coal, which is responsible for approximately 69% of global carbon dioxide emissions according to International Energy Agency (IEA).

The Paris Agreement is the most notable compact which requires member countries to combat climate change and to accelerate and intensify the actions needed for a sustainable low carbon future. This has at times been interpreted to indicate a future with minimal coal usage, more especially for power generation.

However, it should also be noted that emission reduction beyond the mining industry could be one of the most effective, and yet it is still one of the most underexplored avenues

Coal in a post-COVID-19 world

The COVID-19 pandemic has changed the world as we know it. The IEA noted that across all regions of the world, energy demand during the lockdown “dropped to Sunday levels”. The

IEA further reported that there has been a major shift towards the use of renewable energy following COVID-19 lockdown measures. Will this trend continue?

There are three reasons this trend could be the norm.

- Firstly, renewables have low operating costs.
- Secondly, government policy and public sentiments are in favour of renewable energy technologies.
- And lastly, regulations across many jurisdictions globally give priority access to the grid to renewable energy. It is known that renewable energy does not currently offer baseload power because battery technology is still expensive and still under development. For countries that want to pursue an industrialisation strategy, would that mean that their aspirations will have to stop while battery technology is under development? COVID-19 has exacerbated the unemployment problem across the globe and without proper baseload power, the prospects of sustainable employment opportunities will remain slim.

This makes it imperative to develop clean coal technologies to alleviate an imminent social and economic catastrophe that will be brought about by the pandemic. At the same time, other new coal industries should be developed to assist in the alleviation of the social and economic catastrophe.

The COVID-19 pandemic has also required that we innovate beyond technology, but also through how we respond to the vulnerabilities of our host communities. Through the Anglo American WeCare programme launched at the very beginning of the lockdown, we were able to work closely with government to provide wide-ranging support to our host communities through food parcels, water supply, contributions of personal protective equipment to community clinics & schools, COVID-19 awareness and GBV support to shelters.

The coal economy in South Africa

Coming back home, Coal remains a vital pillar of both the South African mining industry and the economy. In 2019, coal sales totalled around R141 billion, from a total sales volume of 258 million tonnes. South Africa derives over 70% of its energy requirements (electricity and liquid fuels) from coal. The coal industry employed 94,297 people in 2019 - about 20% of total employment in the mining sector. If the upstream and downstream industries' employment is considered, employment levels rise to more than 230,000 people.

South Africa being a signatory of the Paris Agreement and the fact that coal use will continue has left a policy gap between what the country aspires to achieve in relation to a low carbon future and the reality that coal power is very much part of the country's energy mix.

The question becomes, "What will bridge the gap?" and "How will this gap be bridged?" The answers lie in technology and innovation as well as the regulations and policies which will allow the continued use of coal.

Bridging the gap with technology and innovation

There is a great demand for clean or cleaner coal technologies as cheap and plentiful coal remains the single largest source of energy to generate electricity worldwide. Clean or cleaner coal technologies have the potential to revolutionise the coal industry and upgrade billions of tonnes of low to high-rank coal around the world.

Economically viable technologies are the only solution to helping developing nations' use of coal efficiently in an environmentally responsible manner.

But how can we define clean or cleaner coal technologies?

Clean or cleaner coal technologies are a collection of technologies developed (or being developed) in an attempt to help lessen the environmental impact of coal energy generation and to mitigate worldwide climate change. They are designed to enhance both the efficiency and the environmental acceptability of coal extraction, preparation, and use.

Modern coal technologies, including high-efficiency low emission technologies (HELE) and carbon capture, utilisation and storage (CCUS), are commercially available and can contribute to eliminating CO2 emissions as well as the pollutants that cause air quality concerns.

Attempting to use coal without adding to atmospheric carbon dioxide levels is a major technological challenge. The greatest challenge, though, is bringing the cost of these technologies down sufficiently for 'clean or cleaner coal' to compete with nuclear power based on near-zero-emissions for base-load power. For example, world R&D on carbon capture and storage (CCS) exceeded $1 billion per year over 2009 to 2013, then fell sharply.

Fundamentally, when it comes to clean coal technologies, the technology works; the economics simply don't. Power plants with CCS cost about 75% more than regular coal plants, and the infrastructure required to transport, and store CO2 is enormous. In turn, the produced CO2 can be utilised to create new industries. This is where government should come in to create an enabling environment for the development of "clean or cleaner coal" technologies.

Second, by virtue of coal being in our lives for decades to come, government should be incentivising R&D directed at developing clean or cleaner coal technologies.

Among other proposals, South Africa should take steps towards incentivising R&D and Innovation in clean coal technologies. The reasons for that are both ethical and economical. Ethical in that the country relies heavily on coal and communities are impacted by the pollution that results from coal use. Economically because the country is abundantly endowed with the resource.

New technologies are continuously emerging which would enable coal mining companies to transition into alternate energy suppliers as mining ceases. An example of one such project is the Green Engine.

The Green Engine is an Anglo American Coal SA Lighthouse project which has the potential to address the SDG's and realise a responsible transition by integrating environmental and social requirements during the closure process of coal mines through collaboration and within the regional context.

The Green Engine was conceptualised to achieve sustainable mine closure by creating a circular economy whereby, in particular, mine rehabilitation and water management create opportunities for community development, economic empowerment of mining communities and long-term projects to drive the transformation agenda.

The utilisation of waste resources in the form of tyres, coal fines and production of biomass/biofibre and solar PV on rehab land all form part of the opportunity for alternate/ low carbon energy production and the development of alternate economies post-closure. Repurposing of existing mine infrastructure at closure into educational/training facilities for the reskilling or up-skilling of community members and mine employees will ensure skills are relevant and in alignment with opportunities developed to assure a sustainable transformation process.

The future of Coal

Coal has a bright future in South Africa, as the country – at current consumption levels - has more than 200 years of coal left in the ground. Renewable energy and coal technologies can live contemporaneously, without the need to create competition between the energy resources. Coal can also be cofired with biomass and waste materials. Renewable energy such as solar power can support the thermal aspects for steam raising in coal-fired power stations. For this to happen there is a need for collaboration between the coal industry, government, academia, and other stakeholders.

I hope that the deliberations that will take place here today will not just serve as an information and education platform; but that the insights of the experts in attendance will at the end inform policy formulation for a greener future for all of us.

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