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Renewable energy's future in mining shines bright

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([miningweekly.com](http://www.miningweekly.com)) – Renewable power is reliable, proven and continues to offer the mining industry an attractive means to obtain lower-cost energy at remote operations, Hatch director of renewable power Michel Carreau told an audience at a seminar hosted by the Canadian German Chamber of Industry and Commerce's Competence Centre for Mining and Mineral Resources on Friday.

The mining and renewable energy sectors must continue engaging with each other to develop joint solutions, he added.

“This is a meeting of two worlds that, until quite recently, hadn’t worked together.”

RATE OF RETURN

Before a mining company selects a renewable component – whether wind, solar or another option – it must consider the economic viability and rate of return against the estimated mine life. The longer a mine is operational, the greater benefits renewables can deliver.

“Levels are typically fixed. For example, 15 cents per kW an hour would be a good bargain across 25 years,” Carreau said. “And while fuel costs are lower right now, remember this is just a moment in time; it will go up [in price].”

The level of power penetration by a renewable component varies; most provide mine sites with between 10% and 20% of their energy when in use. The goal of both the industries is to push this to a much higher level over the next five to ten years.

Renewables also deliver supply stability; a wind farm or solar farm does not need consumable inputs such as diesel generator sets that require fuel to be transported, sometimes across vast distances. Further, renewables help companies reduce their carbon emissions, which is popular with the wider public.

The growth in renewables’ competitive edge will spark greater uptake in the future, Carreau predicted. “When fuel costs go back up, renewables will be a key to lowering costs. And if your competitors are already thinking about it [renewables], then you need to start thinking about it.”

NEXT STEPS

But even if the advantages of renewables are readily apparent, successful adoption depends on management being willing and keen participants.

Once a company is keen to progress, it must decide whether installation and operation will be under its own auspices or through a third-party provider of renewable technology under a power purchase agreement (PPA).

If a company decides on a PPA with a third party, it should still be prepared to share the risk. “If this was a \$30-million investment and the mine was suddenly closed, where would it [the investment] go?” Carreau asked, noting that it would have to be written off.

Company employees need to work hand-in-hand with those installing the renewable solution. This includes those working or expected to work at the operation on a day-to-day basis. “Employees should be engaged in the study period [before installation],” Carreau said. “Remember that each operation is different and there will be all kinds of effects that a renewable can have.”

On-site, hands-on training can be undertaken once the renewable component is place and brought on steam. This usually lasts for around seven months as the operators become familiar with the technology and its position in the mine's overall power generation.

WIND OF CHANGE

Carreau explored the successful installation of a 3 MW wind turbine at Glencore's Raglan nickel mine, in the far north of Quebec. The turbine came on stream in August and is integrated into a 16 MW grid.

The region has one of the fastest wind speeds in Canada, averaging about 9.5 m/s. This compares with the 7.3 m/s average wind speed recorded at the Diavik diamond mine, in the Northwest Territories, which also operates a wind-diesel hybrid power facility.

Mine life at Raglan is estimated at 25 years, which made a renewable component viable. The programme started with wind monitoring in 2009, allowing for greater precision in the planning.

Several years of monitoring to secure still greater precision is usually unnecessary for a smaller-scale renewable option, Carreau noted. "If you already have a business case, and know the returns are going to improve over time because of rising fuel costs, then you don't need to spend something like another three years [doing this]," he said.

Although winter conditions have been tough at Raglan – currently hovering around minus 40° Celsius or minus 60° Celsius if wind shear is included – performance has been good. Several icing events occurred across October and November but the turbine successfully de-iced itself.

Carreau reported one halt due to too much icing, although this was followed with a quick restart. Raglan's diesel generation system easily coped in the interim.

The mine's turbine is designed to "de-rate" itself between minus 30° Celsius and minus 40° Celsius, in order to protect the turbine blades in the cold, brittle atmosphere. It halts itself at minus 40° Celsius as a precaution.

FUTURE IS BRIGHT

The next phase at Raglan is to add energy storage capacity and to utilise excess wind energy to create further power opportunities. Part of the plan includes the installation of a second and third turbine.

"But we want to test the storage component in the Raglan environment so that, when we start adding more wind turbines, the appropriate storage will be acquired," Carreau noted.

More Raglan-style operations in the mining industry can be expected in the near future and

the central driving force will remain the industry's bid to reduce fuel costs, he predicted. "Because of this, renewable power will continue to play a major role in mining's future."

The lowering cost of renewables and storage, combined with increased efficiencies, will also be a catalyst and, beyond this, the industry can expect increases in the penetration of renewable power within mining grids beyond the 20% level.

"In the near future, a high-penetration system with energy storage – one that can lead to more than a 50% reduction in fuel consumption – will be there for us to reach out and grab," Carreau said. ■■

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