

# Hot green air



## Electric mine heating with zero emissions

The Mining Sales Director in North America, outlined some key trends in an interview with IM for underground mine heating solutions with a focus on zero-emissions electric options. In terms of what is considered to be the “greenest” option for underground mine heating from a Scope 1 emissions perspective, he commented: “Indirect is typically used where there is no access to propane or natural gas. The usual option would be diesel, but it doesn’t burn as cleanly as gas. It is indirect as it heats a heat exchanger, with the warm air taken underground. But the diesel emissions are expelled into the environment. So that would be the least clean.”

The next option would be natural gas or propane – where there are emissions sent underground as the system is direct fired and is covered by air standards regulations, though NO<sub>2</sub> and NO<sub>x</sub> restrictions are becoming much tighter, which has led to Howden developing low NO<sub>2</sub> heaters in the form of Ultra Low Emission Heaters cold flame technology.

“But the cleanest of all in emissions terms and having the lowest carbon footprint are electric heaters, assuming the power has come from a green source. These can be electric only or form part of a hybrid solution with a propane/natural gas system – we installed a system like this at the Brucejack gold mine, for example. Electric heating is limited by what power sources are available at the mine location and the power costs. Many remote mines generate their power – but often use diesel generators, so they create emissions that way.”

Many of the mines in Canada looking at electric heating are in Western Canada or Quebec, with access to lower-cost hydropower. On electric heating options – it is the same overall design, but we select appropriate coils to facilitate ease of maintenance, plus maximizing efficiency and heat transfer. The systems are staged so that banks of elements can be brought on as needed.

Although heating systems of any kind are a relatively small emissions contributor compared with other mine sources, notably diesel mobile fleets, he added that Howden had seen an increase in inquiries for electric heating options. “But the main mine priorities currently on the Scope 1 front is looking at battery electric equipment underground. Plus, in doing that, the ventilation air volume requirements will be reduced, so by default, you then have to heat less air. After electrification of the mine and the mobile fleet, the next priority will be to optimise the heating solution there.”

Some natural thermal heat recovery is possible in a few mines – leveraging waste heat from geothermal sources underground to heat water that can be pumped and heat some of the mines. In very deep mines that are hot due to the thermal gradient – “you can pump some of that exhaust air up to a heat exchanger to partially heat the shaft and upper levels.

The issue is that it is not very hot air and is also dirty and wet, so it can’t be relied on to cover the mine needs. The other issue is that the supply and return air sources should be close to each other to be worthwhile. Other heat recovery options include using waste heat from other equipment such as generators, compressors, boilers, etc.”

This article was first published in International Mining Magazine.

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