

Ontario Mineral **Exploration** Review

Spring 2011



Vale invests in better, newer and cleaner operations in Ontario

Green mining: The amazing shrinking footprint

Rio Tinto collaborates with CEMI on \$10 million centre

Diamond developments glow brightly at the 'Ring of Fire'

Shining Tree: An important part of Ontario's mining boom

Announcing the International Laboratory of Mining Geophysics

Vale and Xstrata commission energy management solution that can save mines millions in energy costs

The mining industry world-wide has more than its fair share of challenges today – from stringent environmental and regulatory pressures to an urgent need to improve operational costs, productivity *and* safety, all while having to mine deeper than ever before.

Aware of these challenges, BESTECH, one of Canada's leading providers of engineering, automation, software development and energy management services, has been developing a novel solution to address these challenges in mines for years. Their team of experts have perfected a multi-faceted solution called NRG1-ECO (Energy Consumption Optimization) that helps mining companies gain better control of their processes, energy usage, equipment, safety and energy costs. NRG1-ECO combines hardware and software to manage virtually every piece of automated equipment in a mine.

"It's a complete energy management system that can be applied to processes such as compressors, pumps and any other systems in a mine that could benefit from a reduction in energy consumption," says Trang Tran, BESTECH's manager, research and development.

This is especially true with respect to a mine's ventilation system that usually operates at peak capacity 100 per cent of the time. NRG1-ECO's VOD (Ventilation-On-Demand) module enables the mine to instantly control the ventilation system's air flow to when and where it is needed. This allows a mine to reduce its ventilation

costs by as much as 30 per cent – which represents significant savings, given that ventilation costs make up almost 50 per cent of a mine's energy costs.

COLLABORATION

When BESTECH was developing the technology, it formed a consortium of industry experts and organizations to establish best practices and standards of excellence. The consortium members include organizations such as the Centre for Mining Excellence (CEMI) as well as mining giants Vale and Xstrata Nickel. This year, the technology was installed at Vale's Coleman Mine and Xstrata Nickel's Fraser Mine, both in Sudbury, Ontario, Canada.

"We worked together with BESTECH on what was needed in the industry and they've completed the development of a Ventilation-On-Demand management tool for us," says Cheryl Allen, chief engineer – ventilation, Vale Mines Mill Technical Services, Canadian Operation. "BESTECH designed a system that can be tailored to suit the needs of each mine."

NRG1-ECO was developed with an open architecture so that it will work with technology already in use at any mine. Integration is at the core of NRG1-ECO and its ability to incorporate with new or existing mine infrastructure offers mines, old or new, the opportunity to realize significant savings as well.

NRG1-ECO® was developed with an open architecture so that it will work with technology already in use at any mine.



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In addition, the BESTECH team offers mines assistance with energy-efficiency grants and rebate applications for both the initial site assessments and commissioning of NRG1-ECO. "Energy grants and rebates help our customer's get on the fast track to energy savings, increasing productivity and employee engagement," says Dan Dumais, BESTECH's energy specialist. "We work with our clients to provide all the necessary system training for NRG1-ECO stakeholders at a mine. A comprehensive education and employee awareness system is also available to ensure the sustained use of NRG1-ECO in their mine."

CONTROL STRATEGIES OPTIMIZE ENERGY SAVINGS, VENTILATION AND AIRFLOW

NRG1-ECO includes five control strategies. "The programming parameters for the control systems are based on the needs of each mine site and designed according to their specifications," says Tran. "Each mine site has its own protocol, and our team customizes their system to reflect that and maximize energy savings for the client."

One of the first control strategies that mines utilize is the Time-Of-Day scheduling, where windows of opportunities exist between shift changes, holidays and other regular set times to control devices. Ventilation technicians preset the execution of batches, based on the mine's planned activities per day, week, or month. NRG1-ECO can control the devices by scheduling an automatic reduction that allows the system to reduce energy consumption.

"The second control strategy is the Real-Time control. This allows mine personnel to turn devices on and off in real time, either

The Intelligent Zone Controller™ (IZC) is the brains of the underground network and one of the components of the NRG1-ECO® system.

through a web-based user interface or through human-machine interface screens that sit in the control room," says Tran.

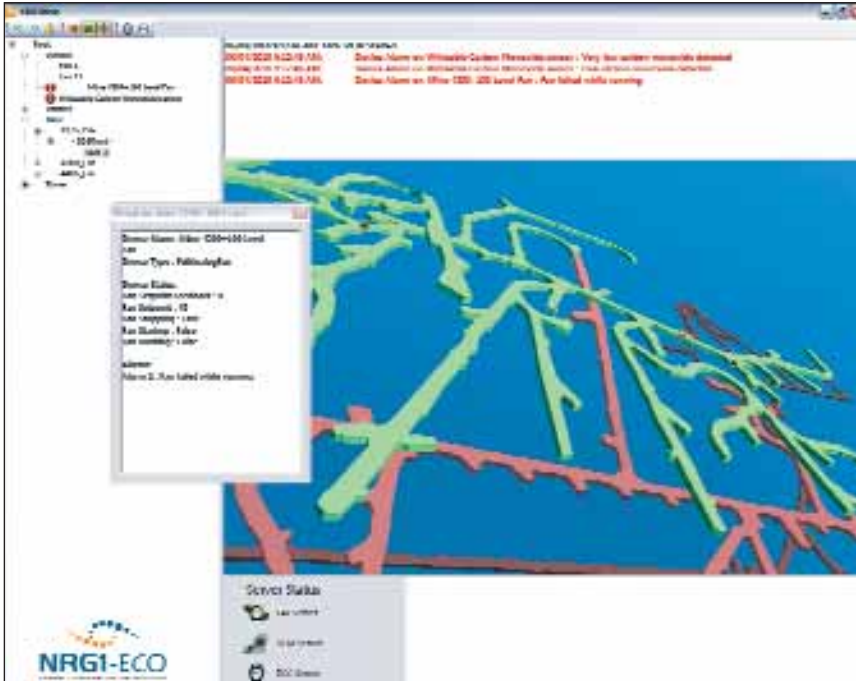
The third control strategy is the Event-Based control, allowing the site to configure the NRG1-ECO system to automatically react to events such as a fire or a high carbon monoxide level. When the system detects an event, it knows the actions that need to take place. Those events are often safety ones and can also include something such as a vent door being left open by mistake.

The fourth control strategy is Environmental Monitoring. NRG1-ECO includes instruments underground that measure different environmental parameters, such as high levels of carbon or nitrogen oxide and the temperature and airflow in a certain area. "Based on real-time data collected, the system can control or reissue air flow requirements for the current real-time environmental needs," says Tran.

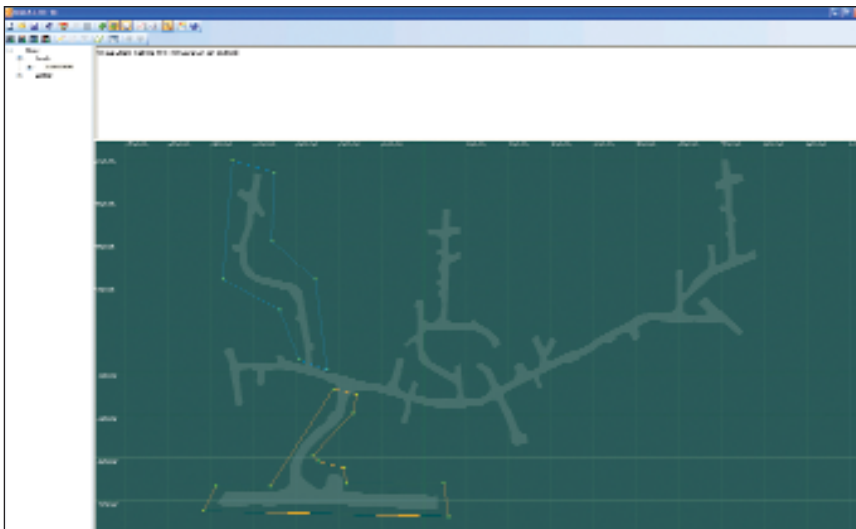
"The fifth control strategy is Tagging. NRG1-ECO integrates with industry tagging systems, monitors and adjusts air flow in

The image shows the NRG1-ECO Consortium logo at the top, followed by the BESTECH logo. Below these are three sections: Consortium Members (including CEMI and VALE INCO), Funding Contributors (including NRC Canada and Sustainable Development Technology Canada), and Key Participants (including Allen-Bradley, Canada, Mirarco, Schneider Electric, MVS, and Mine Site Technologies).

BESTECH has formed a consortium of industry experts and organizations that will support BESTECH in establishing the industry best practices and standards of excellence for NRG1-ECO. Consortium members include organizations such as the Centre for Mining Excellence (CEMI) and international mine site technology providers. Mining giants Vale and Xstrata Nickel are consortium members and have the NRG1-ECO technology installed in their Coleman and Fraser mines.



NRG1-ECO 3D Viewer — Zones within the NRG1-ECO System are displayed in the 3D Viewer using customizable colours. Devices are shown in their true geographical positions.



NRG1-ECO 3D Viewer Zone Designer – The 3D viewer offers the ability to intuitively design and edit mine models as well as NRG1-ECO Zone definitions.



*Left to right: Marc Boudreau, BESTECH president & CEO; Sarah Paajanen, BESTECH project manager; and Cheryl Allen, Vale chief ventilation engineer/project manager.
PHOTO PROVIDED BY VALE.*

real-time, and responds to incoming sensor data as well as the location of tagged mine personnel and equipment. It then adjusts ventilation to meet their needs,” says Tran.

The Intelligent Zone Controller™ (IZC) is the brains of the underground network and one of the components of the NRG1-ECO system. It increases the system responsiveness as data can be analyzed and processed internally, and does not have to be transmitted to surface for a decision making. In the case of an interruption in communication with the controls above ground, the IZC can execute commands to the devices to operate in fail-safe mode.

***BESTECH's
new technology
is attracting
world-wide
attention from
other mining
giants, including
North America's
fastest-growing
senior gold producer,
Goldcorp Inc.***

**BETTER INFORMATION,
BETTER DECISIONS**

NRG1-ECO also stores all the data it processes for its real-time monitoring. The system provides mine intelligence regarding device performance, adherence to established systems and processes and offers effective analysis of a mine's KPI. “If you are monitoring your processes then you can make informed decisions,” says Allen of Vale. “With the NRG1-ECO system, you have better monitoring and control and that allows you to make decisions, helps your management make better decisions, and

helps the people working day-to-day with the systems understand their environment. If you're continually measuring, you should also be able to be continually improving what you're doing."

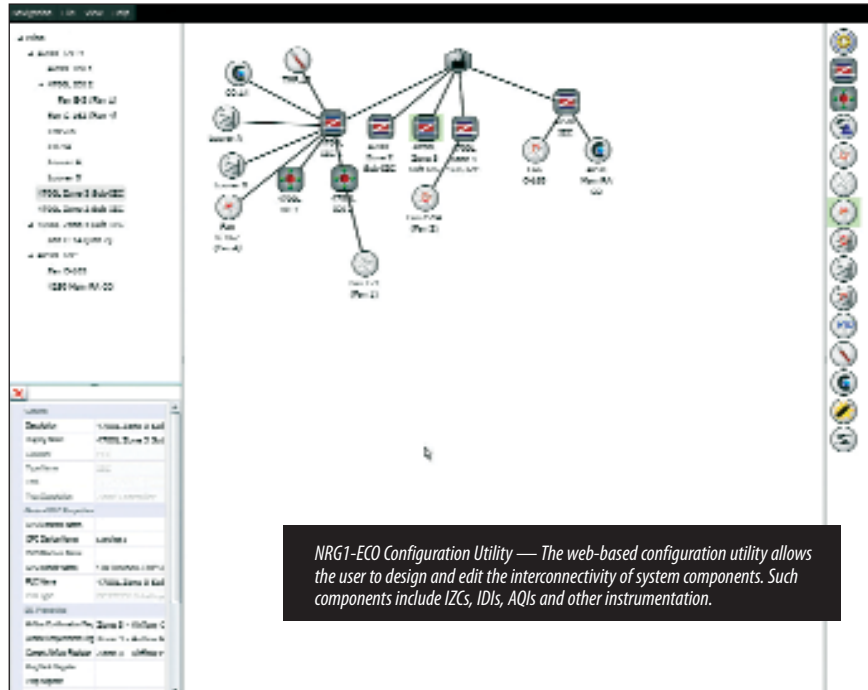
BESTECH's new technology is attracting world-wide attention from other mining giants, including North America's fastest-growing senior gold producer, Goldcorp Inc. "We looked at two different systems. It seemed BESTECH was offering a complete package from ground up," says Imola Götz, chief engineer, Hoyle Pond Mine, Goldcorp.

"We're hoping to go ahead with NRG1-ECO in a two-stage approach. First, have the system up and running on two levels in the Hoyle Pond Mine in Timmins and if that proves to be satisfactory, then we will expand it to the rest of the mine."

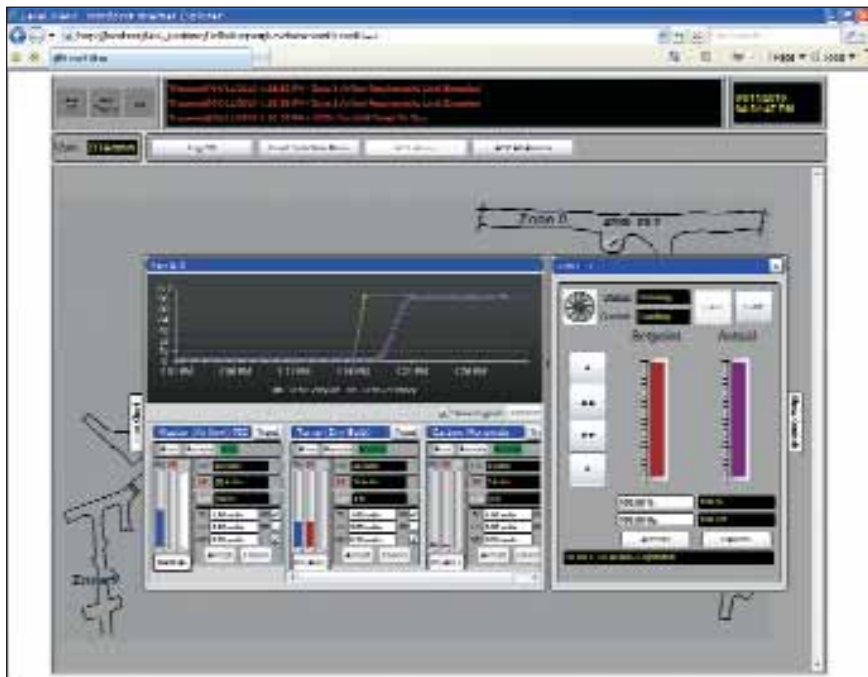
NRG1-ECO's ability to be customized to meet the needs of each of their mines seems to be the difference for Goldcorp. They can adapt NRG1-ECO's control strategies to leverage the highest return for each mine site.

Mines of the future will no doubt be going deeper, resulting in higher costs for infrastructure, ventilation and energy. How mines address these future challenges will separate them from the rest of the mining industry.

Founded in 1995, BESTECH was created to address the need for system integration and industrial automation. By developing a very specialized skill set, BESTECH quickly gained recognition as a leader in industrial automation, engineering, software development and environmental monitoring. With over a decade of sustainable growth, BESTECH developed its strong industry expertise, by responding and developing innovative technologies that help companies in mining, pulp and paper, forestry, oil and gas, manufacturing, municipal and commercial industries internationally enhance their productivity, profitability and safety. Follow BESTECH on Linked In. www.bestech.com.



NRG1-ECO Configuration Utility — The web-based configuration utility allows the user to design and edit the interconnectivity of system components. Such components include IZCs, IDIs, AQIs and other instrumentation.



NRG1-ECO Web Based HMI — The Web Based HMI allows remote access to standard process control HMI. Shown here is a VFD Fan under cascading closed loop PID control.



Guy Faubert, BESTECH electrician (left), and Paul Huffels, BESTECH safety supervisor, installing a rack-mounted IZC on the 4550 level at Vale's Coleman Mine. The Intelligent Zone Controller™ (IZC) is the brains of the underground network and one of the components of the NRG1-ECO system.

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