



CANADA'S ENERGY EFFICIENCY AND EMISSIONS REDUCTIONS FOR MINES

CANADIAN FIRMS ARE DRIVING ENERGY AND CARBON SAVINGS FOR GLOBAL MINING OPERATORS



Energy is one of the most significant expenses for the mining industry, constituting up to 30% of a mine's total operating costs. Canadian firms are helping mines address energy challenges, saving energy and money.

Canadian companies are helping decarbonize mining operations and implement carbon reduction goals. In 2019, Canada will be the first major mining jurisdiction to introduce a price on carbon with similar policies being piloted in other resource-rich countries including Mexico, South Africa and China. Canada's regulatory framework is helping to drive innovative and groundbreaking approaches to energy savings and carbon reduction for mines.

The mining industry is turning to Canadian companies including BBA, EELO Solutions and Maclean Engineering to make significant reductions in energy use and carbon emissions. Canadian firms are world leaders in energy efficiency and carbon mitigation for mines.

Canadian mining operators are leading mining's energy transformation to low-carbon operations by investing in battery-powered underground vehicles, which cut carbon emissions and create a healthier environment for workers. Glencore, Goldcorp, and Kirkland Lake Gold are using electric fleet technology, and Vale's Coleman nickel mine which is testing battery-powered load-haul-dumps (LHDs).

DRIVING CARBON AND ENERGY SAVINGS WITH ELECTRIFICATION

The world's fourth largest gold producer, Goldcorp has partnered with MacLean Engineering and Sandvik Mining to produce an all-electric, battery-powered underground fleet. These battery-powered vehicles are expected to eliminate all greenhouse gases (GHGs) associated with the movement of ore and waste rock. The mine's reduced reliance on diesel is expected to cut 50% of the total GHG emissions on site totalling around 5,000 tons of CO₂ per year. The project will also save the mine around 3 million litres of diesel fuel, 1 million litres of propane and 35,000-megawatt hours of electricity annually.

AWARD-WINNING ENERGY MANAGEMENT STRATEGIES

Canadian firm EELO Solutions is behind the energy management strategy for Barrick Gold's Hemlo mines in northern Ontario, a 10,000 tonnes throughput underground and open pit mine. Since 2012, the EELO Solutions have generated savings of over \$5.7M per year on capital and operational energy management projects (demand and consumption). This program won a national award for Integrated Energy Management Strategy from Natural Resources Canada's Canadian Industry Partnership in Energy Conservation (CIPEC).

CANADIAN COMPANIES SPECIALIZING IN ENERGY EFFICIENCY AND EMISSIONS REDUCTION FOR MINES

- > **BBA**
Engineering, automation, and environmental monitoring
- > **Blutip Power Technologies**
Fuel-management systems
- > **Clean Energy Compression**
Compressed Natural Gas (CNG) fueling systems
- > **EELO Solutions**
Energy and carbon management consultation
- > **Industrial Fabrication**
Mobile equipment solutions
- > **FVT Research**
Drop-in electric drives for commercial, industrial and off-road vehicles
- > **Maclean Engineering**
Mobile equipment solutions
- > **Prairie Machine and Parts**
Mining equipment and battery-operated electric vehicle supplier
- > **Rail-Veyor Technologies Global Inc**
Energy efficient material haulage solutions
- > **SysEne Consulting**
Carbon, energy and water management consultation
- > **TM4 Inc.**
Electric and hybrid powertrain systems
- > **Thermal Energy**
Energy efficiency technologies and consultation



CLEAN TECH MINING

CANADIAN COMPANIES WORKING GLOBALLY



BESTECH > www.bestech.com

Based in one of the world's largest mining regions, **BESTECH** is a trusted team of professionals delivering engineering, automation, software development and environmental monitoring services to the international mining sector. The company also offers innovative solutions which enable mining operations to increase efficiency, reduce energy costs and enhance worker safety. **BESTECH** are well-equipped to undertake a diverse range of projects, with a commitment to performing "On Time, On Budget and On Spec".



THERMAL ENERGY INTERNATIONAL > www.thermalenergy.com

Thermal Energy International (TEI) is an established global provider of industrial energy efficiency solutions. TEI's proprietary products capture up to 80% of wasted energy from boiler plant and steam operations, and recycle it back into your processes. Their customers include Fortune 500 and multinational companies across a range of industry sectors. TEI's products include: GEM™ steam traps, FLU-ACE® - direct contact condensing heat recovery, CoGeneration - combined heat and power solution, and DRY-REX - low-temperature biomass drying systems.



BBA > www.bba.ca

BBA is a Canada-wide consulting engineering firm that offers multidisciplinary consulting services in engineering, project management and environment. With cutting-edge expertise in the energy, mining and metals, biofuels, and oil and gas sectors, **BBA** is recognized for the excellence of its services, from pre-study to onsite commissioning support and detailed engineering. The firm relies on a team of over 750 professionals to carry out local, national and international mandates, helping its industrial clients implement the most reliable, profitable and eco-friendly solutions.



MACLEAN ENGINEERING > www.macleaneengineering.com

MacLean Engineering specializes in underground mobile equipment solutions based on hard rock mining experience, multi-discipline engineering capability, unit-of-one manufacturing expertise, and worldwide customer service and support. **MacLean** has been innovating for hard rock mining safety and productivity for almost 50 years, supporting customers worldwide with branches across Canada, in Mexico, Peru, South Africa and Australia. The latest chapter in the **MacLean** innovation story is the introduction of full-fleet electrification, integrating best-in-class battery and electric drive technology to deliver a safe, proven, low-maintenance and data-rich option for zero emissions operations in the underground mining environment.

ACCESS TO WORLD-CLASS TESTING FACILITIES

Canadian firms have access to world-class testing facilities through the Northern Center for Advanced Technology (NORCAT), the only non-profit innovation centre in North America with a fully operational mine onsite. Situated at the former Falconbridge Fecunis Adit Mine, NORCAT's Underground Center allows Canadian companies to design, test, and demonstrate cutting-edge emissions reduction technologies in a working mine environment.

SUPPORTING ENERGY EFFICIENCY AND EMISSIONS REDUCTIONS

Natural Resources Canada's (NRCAN), CanmetMINING is a recognized world leader in the field of diesel particulate matter mitigation, in the context of underground mining. As part of its Green Mining Initiative, CanmetMINING has formed partnerships between the mining industry, the Canadian Government, academic institutions and other key stakeholders to support innovation in mining including energy efficiency and carbon reduction initiatives.

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