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Canada

CANADA'S RENEWABLE ENERGY FOR MINES

WORLD-CLASS EXPERIENCE AND CUSTOMIZED SOLUTIONS FOR MINES



Canadian companies are meeting the mining industry's energy demand with customized and flexible renewable energy solutions. Canadian firms are behind groundbreaking projects for mining operators, including Teck Resources, Barrick Gold, Glencore, and TMAC Resources, and are using this experience to export solutions to international mining centres around the world.

INTEGRATING RENEWABLE ENERGY FOR MINES IN REMOTE LOCATIONS

Canada's North is the ultimate test bed for renewable energy projects for mines in remote and harsh conditions looking to reduce costs and reliance on diesel. Glencore's Raglan Mine project, led-by TUGLIQ Energy and using cutting-edge Canadian renewable energy and storage providers Hatch, ElectroVaya and Hydrogenics, is the world's first wind project to integrate multiple energy storage technologies. Along with Raglan's wind-storage hybrid, Rio Tinto's Diavik Diamond Mine has been operating a 2.3 MW wind project in Canada's Northwest Territories since 2012. Working with Canadian specialist independent power producer TUGLIQ Energy, TMAC Resources is currently assessing wind and storage options for its Nunavut mine to save money, reduce diesel use and meet environmental objectives.

As Canada becomes the first major mining jurisdiction to implement a national carbon price, additional Canadian mines will move forward with projects to save money by driving diesel and carbon emission reductions.

CANADA SUPPORTS RENEWABLE ENERGY APPLICATIONS FOR MINES

The Government of Canada has committed \$2.3 billion to create a research and development (R&D) framework that solidifies Canada as a global leader in renewable energy solutions including specific funding initiatives to support renewable energy in the mining sector.

These programs enable new low-carbon and renewable energy solutions for mines to achieve commercialization and be exported to the global mining sector. They also focus on innovative diesel-reduction technologies for off-grid mining applications.

Collaboration with indigenous partners and surrounding communities is a core strength of Canadian companies and a key aspect of successful renewables and mining partnerships. Clean energy projects for mines that have a direct benefit to local communities help attract financing from development and multilateral banks. Many Canadian firms bring experience working with aboriginal and First Nations partners on projects which can add social license and financial benefits for renewable energy projects for mines.

CANADIAN RENEWABLE ENERGY DEVELOPERS, TECHNOLOGY SUPPLIERS AND CONSULTANTS WITH MINING APPLICATIONS

- > **3G Energy**
Renewable energy project developer
- > **BluEarth Renewables**
Wind, hydro and solar independent power producer
- > **Canadian Solar**
Solar developer and panel manufacturer
- > **CarbonFree Technology**
Solar development and financing
- > **Carmanah Technologies Corp.**
Solar lighting and power systems
- > **Grasshopper Solar**
Solar developer and panel supplier
- > **Golder Associates**
Engineering and consulting services
- > **Hatch**
Engineering, procurement and consultation for hybrid systems
- > **Heron Canada**
Developer and supplier of remote microgrids
- > **H.H. Angus & Associates Ltd.**
Engineering and consulting services
- > **Isla Power**
Renewable energy developer
- > **Innergex**
Hydro, wind and solar energy developer
- > **JCM Power**
Private equity for clean power projects
- > **Knight Pié sold**
Engineering and consulting services
- > **L&A Energy Consulting Ltd**
Engineering and consulting services
- > **Phoventus**
Engineering and consulting services
- > **Potentia Renewables**
Renewable energy developer
- > **Northland Power**
Thermal and renewable energy independent power producer
- > **S2E Technologies**
Renewable energy design and implementation advisory services
- > **TUGLIQ Energy**
Developer specializing in remote power systems
- > **Windiga Energy**
Renewable energy developer
- > **WSP**
Engineering and consulting services



CLEAN TECH
MINING

CANADIAN COMPANIES WORKING GLOBALLY

Canadian firms are world-leaders delivering reliable, affordable, and customized renewable energy technologies and projects for mines:



CANADIAN SOLAR > www.canadiansolar.com

Canadian Solar is one of the world's largest and foremost solar power companies. A leading manufacturer of solar photovoltaic modules and provider of solar energy solutions, Canadian Solar also has a geographically diversified pipeline of utility-scale power projects. Canadian Solar has successfully delivered over 26 GW of premium quality modules to over 100 countries and specializes in customized microgrid solutions for remote applications. Canadian Solar is one of the most bankable companies in the solar industry, publicly listed on NASDAQ since 2006.



ISLA POWER > www.islapower.com

Isla Power Inc. is focused on developing hybrid renewable energy generation and storage solutions - integrating solar, wind or storage with fossil fuel sources - for both on-grid and off-grid applications around the world. Isla Power designs, builds, and finances commercial and utility-scale projects under corporate power purchase agreements, and partners with local utilities and developers to connect high-quality renewable energy projects with global equity and debt financiers.



KNIGHT PIÉSOLD > www.knightpiesold.com

Knight Piésold is a consulting engineering firm specializing in the mining and power sectors. The company is a leader in identifying, designing and directing renewable energy projects worldwide, and works with mining companies to integrate renewable energy systems into existing mining operations. This is of particular interest to remote or off-grid operations faced with expensive logistical challenges and environmental hurdles, providing cost-effective and reliable power, extending the mine's life and leaving a legacy resource to the community.

NORTHLAND POWER > www.northlandpower.ca

Established in 1987, Toronto-Ontario, **Northland Power Inc.** (TSX:NPI.CA) was one of Canada's first independent power producers. The company is dedicated to developing, building, owning and operating clean and green power projects in Canada, Europe, Asia and other select jurisdictions. Its facilities produce electricity from clean-burning natural gas and renewable resources such as wind, solar and biomass. Northland has in-house engineering expertise and operating facilities that generate 2,029 MW of electricity, with an additional 252 MW of offshore wind generating capacity under construction.

MINING'S RISING ENERGY DEMAND

According to the Research Centre for Energy Resources and Consumption, energy demand by the global mining sector will increase significantly over the next 20 years from 8% of global primary energy in 2016 to 15-20% by 2035. Canadian renewable energy technologies and developers are expected to play a lead role in meeting mining's growing power demands with flexible, proven and low-carbon energy solutions.

KEY ATTRIBUTES OF CANADIAN RENEWABLE ENERGY TECHNOLOGY SUPPLIERS AND DEVELOPERS:

- ✓ Strong knowledge and understanding of the resource sector
- ✓ Project development and technology integration experience for mines
- ✓ Experience working in remote locations
- ✓ Customizable and "bankable PPA" development expertise
- ✓ A flexible and collaborative approach to partnership opportunities
- ✓ World-leading and proven technologies and renewable energy integration capabilities
- ✓ Experience working with aboriginal communities
- ✓ Multilingualism and multicultural

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