**Global research and development**

In 1900, GE opened its first R&D laboratory in Schenectady, N.Y., because it believed scientific research conducted for its own sake would yield practical applications. GE remains committed to that belief and today operates five multidisciplinary Global Research Centers — located in Brazil, China, Germany, India and the United States — where teams create breakthrough technology every day. With 1,100 researchers and engineers alone, the newest center in Rio de Janeiro, Brazil, focuses on advancing technologies to solve the world’s toughest mining challenges.

With 2,300 employees devoted to research and 10,000 technologists worldwide, GE has received 22,000 patents in the last decade and is making a $6 billion R&D investment in 2012. Each Global Research Center is dedicated to developing products that build, cure, power and move the world.

---

**Recycled Paper**

Global research and development

**In 1900, GE opened its first R&D laboratory in Schenectady, N.Y., because it believed scientific research conducted for its own sake would yield practical applications. GE remains committed to that belief and today operates five multidisciplinary Global Research Centers — located in Brazil, China, Germany, India and the United States — where teams create breakthrough technology every day. With 1,100 researchers and engineers alone, the newest center in Rio de Janeiro, Brazil, focuses on advancing technologies to solve the world’s toughest mining challenges.**

**With 2,300 employees devoted to research and 10,000 technologists worldwide, GE has received 22,000 patents in the last decade and is making a $6 billion R&D investment in 2012. Each Global Research Center is dedicated to developing products that build, cure, power and move the world.**

---

**GE Mining by the numbers**

- 200 million hours
- 14,763 feet
- 900 water treatment systems
- 80% more copper
- 450 miles
- 11,600 electric drive systems

**Ecomagination**

Ecomagination is GE’s commitment to imagine and build innovative solutions to today’s environmental challenges while driving economic growth. GE is investing $10 billion in the next five years in ecomagination projects.

Mining poses some of the most pressing environmental challenges from emission, loss of biodiversity and soil and water contamination. These mining challenges present opportunities to create solutions that benefit our customers and society.

Each ecomagination product undergoes rigorous independent certification process to prove it helps customers’ performance and bottom lines while improving the environment. GE Mining products of ecomagination include:

- **LM6000 DLE Aeroderivative Gas Turbines** can reduce NOx emissions by nearly 370 metric tons over the course of a 3,000-hour peaking season versus a typical 60 Hz simple cycle gas turbine.
- **ABMet Metals Removal System** needs 80% less energy when operating at 225 gallons per minute compared with nanofiltration systems.
- **9,000 Quadramatic** Motor Systems consume approximately 4.5 million kWh less electricity per year than induction and gearless technologies.
- **North American Evolution** Series Locomotives use 6% less fuel per horsepower-hour — when operating at full utilization — than other Tier 2 locomotives.
GE’s technology leadership

GE is solving the world’s toughest mining challenges by delivering advanced technology for power generation, water treatment, and productivity.

GE is asking the world’s toughest mining challenges by developing advanced technology for power generation, water treatment, and productivity.

As the global mining industry works deeper and in more remote locations to supply the world with energy and raw materials, its challenges grow more complex and interdependent. GE is delivering solutions to those challenges to help mines achieve success.

GE’s industry-leading wind and turbines provide high-yield power, reliability, availability, and cost-effective operations in onshore and offshore applications.

The challenges:
• Generating safe and reliable power
• Maintaining reliability
• Overcoming remote locations and extreme conditions

From engineering to commissioning, GE’s turning substations offer complete and reliable power distribution. Coupled with the grid-synchronization PowerLink Advantage, a robust and scalable GDAE-UHV platform with real-time fault tracking and lane analysis, mine operators can optimize asset life and increase grid reliability. GE also offers a full range of additional products and services for balance of plant.

Power

Water

The challenges:
• Maintaining reliability
• Optimizing existing assets and processes

GE’s advanced products enable the industry to generate and distribute reliable electric power and deliver efficient, treatable water for desalination, filtration, and reuse. GE also offers a comprehensive portfolio of industrial pumps, including systems and components to improve crushing, grinding, conveying and processing processes; service expertise in contract mining systems; sophisticated software for monitoring and controlling remote operations; electric motor systems for mining vehicles; converters to increase efficiency and productivity; and underground mining equipment.

GE offers the widest range of alternative fuels. Duty gas turbines generate electricity within a small footprint and offer complete and reliable power distribution.

GE’s state-of-the-art DC motor systems have more than 65 million operating hours of experience. In fact, more than 11,600 systems have been delivered worldwide, mining haul trucks have been leading the industry since 1963. In addition, GE’s field-proven AC and DC electric drive systems for surface-mining haul trucks have been leading the industry since 1963. In fact, more than 11,600 systems have been delivered worldwide, representing 1.2 billion hours of operation and over 1,200 AC and DC motorized systems for mining trucks in 1998 and today, these systems have more than 95 million operating hours of experience.

Productivity

The challenges:
• Optimizing existing assets and processes
• Conserving valuable resources

Innovative solutions in water technology, such as FlexAero LM6000-PH aeroderivative turbine with DLE combustion technology, provide high-energy yields, improved efficiency and reliability. GE’s state-of-the-art DC motor systems have more than 65 million operating hours of experience. In fact, more than 11,600 systems have been delivered worldwide, mining haul trucks have been leading the industry since 1963. In addition, GE’s field-proven AC and DC electric drive systems for surface-mining haul trucks have been leading the industry since 1963. In fact, more than 11,600 systems have been delivered worldwide, representing 1.2 billion hours of operation and over 1,200 AC and DC motorized systems for mining trucks in 1998 and today, these systems have more than 95 million operating hours of experience.