BioMinE is aimed at "the production of tomorrow" and involves biotechnological research to provide "radical changes in the Basic Materials industry for cleaner, safer and more eco-efficient production". The objective of BioMinE is to develop sustainable solutions covering the whole life cycle of products and equipment.

Technological breakthroughs will allow the integration of innovative biotechnology-based processes for recovery and/or removal of metals from primary materials such as ores and concentrates, secondary materials such as mining wastes, metallurgical slags, metal bearing scrap and combustion/power plant ashes. Processes will be developed, which give consideration for eco-design, eco- and renewable materials and zero waste, with the aim of protecting people and the environment.

The biotechnologies to be investigated will include bioleaching, biooxidation, biosorption, bioreduction, bioaccumulation, bioprecipitation, bioflocculation, and biosensors, as well as microbiological research. The ultimate objective will be the establishment of environmentally friendly biotechnologies that are economic, particularly at a small scale. They will provide an alternative to current technologies such as roasting and smelting.

The anticipated breakthroughs under the RTD programme will be commercially evaluated through integrated piloting of the new processes together with preliminary economic assessments. This will provide a sound basis for decisions by industrial companies on whether to then proceed to commercial demonstration. The work will be enhanced by Training and Educational activities. BioMinE will adopt a multi-discipline approach involving universities and research organisations, mining companies, waste treatment facilitators and equipment and instrument suppliers.
Industrial Sustainability

Industrial sustainability will not be possible without creative innovations based on advanced science and technology and in this regard biotechnology plays an increasing role also in the minerals and mining industries. It is clear that any move towards industrial sustainability (i.e. lower consumption of energy and raw materials, and reduction or elimination of waste) affects all stages of process technology.

There are at least four main drivers for clean technology based on the use of biotechnology:

- economic competitiveness, with companies considering the benefits of clean processes in terms of cost advantages or expansion to using new resource materials;
- depletion of conventional resources provides additional incentive to the industry to seek innovative bioprocesses;
- government regulatory policies, which enforce or encourage changes in practice; and
- public pressure, which takes on strategic importance as companies seek to establish environmental legitimacy.

BioMinE Project Organisation

The work packages are subdivided as follows:
- WP0 - Management
- WP1 - Resources and Sustainability Assessment
- WP2 - Bioleaching
- WP3 - Biotreatment and Resource Recovery
- WP4 - Process Integration and Applications
- WP5 - Exploitation of Results
- WP6 - Training

BioMinE Impact

The introduction of biometallurgical processes will lead to substantial improvements for metal production by increased recovery, reduced costs, reduced energy demands, increased revenue, and new resources. Biometallurgy has the potential for a major technology breakthrough for the metals and minerals industry. This is underlined by the great interest shown by major international companies for this new technology. At present research and development is in progress for a number of metals such as copper, nickel, cobalt and zinc.

BioMinE will close these current gaps in our understanding on how to best apply biological processes for ore materials that are traditionally considered to be recalcitrant or economically not feasible to process. The project will bring together the leading European and South African experts in microbiological research relating to metals and the integration of this expertise will have a major impact on research in the EU in this field.