



European Mineral Resources RTD Council

## The importance of RTD for the extractive industry in Europe

The European extractive industry represents a major industrial sector within the European Union, which underpins the continued development of wealth creation and quality of life for almost every sector of society. Except for food, every single thing society consumes derives ultimately from a mine somewhere on Earth. The extractive industry contributes to base industries as well as to service and high-tech industries.

European consumption of metals depends to a large extent on mines operating outside Europe, with the European consumption/production ratio depending strongly on the specific metal concerned and the recycle efficiency. Industrial minerals are generally mined and consumed within the European Union, although again the ratio depends on the specific mineral concerned: for minerals such as titanium Europe depends completely on imports, while in other cases significant volumes are exported. The recycling of industrial minerals is generally considered impractical.

Nearly 30% of the total EU-energy generation is provided by coal in all its forms whereas the dependency of imported fuels will continue to rise according to the recent "Energy Outlook" of the EU Commission. In addition coal in particular has the greatest importance for covering the rising energy demand in the potential new member states in Central and Eastern Europe and in the developing and threshold countries. For the EU this gives rise to a major responsibility, but this also involves considerable export opportunities.

Furthermore the question of jobs is also a major issue of EU policy. Research in the direction of increased competitiveness in the extractive industries in the short to medium term, is an essential instrument for safeguarding half a million in coal mining (including lignite) and related industries and in creating new ones.

## Minerals in EU 25

The extractive industry's output will double. The employment figures will at least temporarily increase by about 4 times. In Central and Eastern Europe the extractive and related industries provide employment and living income for at least 1.5 million people. The investments required for innovation and rehabilitation and legislative compliance are considerable. The research and technical development required will increase in order to ensure competitiveness and environmental, health and safety protection. Education of future researchers and mining and mineral experts is a "must".

The EU enlargement process can be understood as additional access to human capital, new mineral resources, new financial resources, new markets, BAT and new industrial solutions, better and safer environment and workplaces and access to new synergy opportunities.

When looking at mineral related research in the enlarged EU it is obvious that local research capacity needs to be reinforced. International networking is required in order to obtain optimal use of human and financial resources. The fact that a considerable number of mining and processing operations will be added with new geological and environmental conditions makes it obvious that more research is required, but also that more players will provide a larger "critical mass" which should lead to improved synergies and better solutions.

The extractive industry in Europe has undergone considerable change over the past decades and in order to remain competitive with its non-European competitors it has undertaken major investments and changes of technology. The difficult geological conditions in Europe have resulted in a leading position for European mining suppliers, who operate flexibly on the world-wide market with acknowledged quality products in the form of knowledge and equipment produced by small and medium enterprises (SMEs). The EU has built an enviable reputation for its technology, technologists and the application of new techniques and therefore still holds more than half of the huge and expanding world market for mining and processing equipment and technology.

To take advantage of this and in order to ensure that this remains so in the future it is necessary to maintain Europe's highly developed, leading position in the fields of extraction and haulage technology, mine safety or processing. This assumes appropriate research funding, which will favour not only employment in this sector but also the Community's balance of payments. Without this the objective set for FP 6, namely "safeguarding the international position of European research" will be unlikely to be achieved to any great extent.

## Benefits of RTD in the mineral industries

RTD in the extractive industries has led to numerous technical, economic and environmental benefits such as reduced wastes and emissions, increased productivity, reduction of unit cost and improved safety performance.

Moreover, RTD in the European mineral industry also results in substantial *spin-off benefits*. Examples range from the surveying of the environment using satellites through geo-technical computer simulations used in the construction industries, mineral-processing techniques to remediate metal-contaminated sites to non-destructive testing methods for cables such as those used for bridges. Safety-research in mining also often leads to spin offs in other industries. Hence substantial transsectorial benefits originate from innovations created by the European extractive industries.

In the final analysis European RTD funding for the mineral industries is therefore a "good investment" which is in the interests of the Community and its citizens. It not only serves the purposes of the mining industry, but it also has positive effects beyond this. This applies to the whole development chain from profitable winning of metals, energy and minerals to their environmentally friendly use.

## RTD in the extractive industry and the latest EU policies

Both EU Communications "On the sustainable development of the extractive industry" (2000) and "On the safe operation of mining and other extractive industries" (2000) have indicated that RTD is a major factor in ensuring the sustainable development of the sector that is supplying necessary minerals at acceptable environmental and social costs.

In the meantime the EU has come forward with more general policies, which are of relevance to the sector:

Increased Technology Transfer and Co-operation will be required in order to accomplish many of these tasks. Whether this will be achieved by linking with new technology developers such as the European Space Agency, with supply industries, such as the machinery industry, or customer industries, such as for example the automobile or the pharmaceutical industries, will depend on the issue to be resolved.



## EU Thematic Strategy on the Sustainable Use of Natural Resources

### Topics

- Life cycle and material flows analysis;
- Resource efficiency and the diminished use of resources, de-coupling the link between economic growth and negative environmental impact;
- Promotion of extraction and production methods and techniques to encourage eco-efficiency and the sustainable use of raw materials, energy, water and other resources.

### RTD

- RTD into reduced environmental impact;
- Life cycle and mass flow data;
- RTD into better extraction technologies: Exploitation at low costs avoiding operational downtimes requires an **optimum knowledge of the deposit obtained by prior exploration**. New exploration methods are needed and should be developed using a multidisciplinary approach. In order to achieve further cost savings in the planning, development and operational control of deep and open cast mines, it is necessary to continue the **development of modern surveying systems, including satellite technology**;
- Process technology for higher resource yields: the safe and cost-effective development of deposits requires **more intelligent and flexible manufacturing systems**, such as novel road driving and winning methods with the application of robots, **advanced automation and artificial intelligence**. Spin-off effects regarding other industries are most probable;
- "Intelligent manufacturing" also requires the development of embedded systems for operation and maintenance in the mining industries. Diagnostic systems already developed for mining machinery use can often be adopted by other industries;
- Further reduced emissions and energy consumption: The costs of environmentally relevant actions and the question of public acceptance of mining in densely populated regions make environmental protection an important subject for future research. Any methodological progress achieved in these areas will have both considerable export potential and an enormous impact on other industries and is badly needed by society as a whole. The evaluation procedure currently being developed by the extractive industry is also of interest for other applications; for example, the simulation of high groundwater levels, the routing of railway lines and sites for service facilities. Further development here is presently aimed at largely automated evaluation of bulk data, given for instance in geographic information systems;
- **Small scale mining.**

## EU Thematic Strategy on Integrated Product Policy

### Topics

- Making life-cycle information and interpretative tools available;
- Product design obligations.

### RTD

- Life cycle data;
- In close co-operation with customer industries:
  - More product/service with less resource use
  - Better performing products
  - High quality control;
- Products intended for reuse and recycling;
- New materials for mining and the European industry. Materials having better resistance to high temperatures, lightweight materials for transport and construction or those offering better mechanical performance are needed to obtain further improvement in efficiencies and further reduction in operational costs.

## EU Thematic Strategy on Recycling and Waste Minimisation

### Topics

- Requires reprocessing of old and newly arising wastes;
- Encourages the identification of themes for RTD existing programs.

### RTD

- Development of better rehabilitation techniques to reduce the environmental footprint;
- Reduction of waste/tailings by development of process efficiency and by development of new and safe uses of tailings;
- Reprocessing technologies for old tailings;
- Safe disposal of tailings;
- To reduce the impact on the environment from processes and their effluents and to find optimal and cost-effective methods of rehabilitation for the land after the extractive process;
- To develop new products and product applications for metals and minerals including new designs which allow easy reuse or recycling of the materials;
- Re-utilisation of emissions, heat and wastes from production.

## EU Communication on the Work programme for health and safety

This Communication has identified the extractive industry as a risky workplace with a high accident rate. De facto accident rates are in some countries already below general industrial average. However, more efforts will have to be made:

### RTD

- Increased automation and transfer of robotics;
- Close co-operation with ESA and vehicle manufacturers;
- Improved personal protection equipment;
- To increase computer assisted process management in order to increase both efficiency and safety in the workplace.

## EU's New Chemicals Policy

The new EU's chemical policy has to be addressed by the extractive industry in two ways, first as a producer of a number of products, but also as a user. The RTD requirements for the metals and minerals mining industry at this stage can be generalised under the following headings:

- More data throughout the life-cycle of the industry's products;
- More data on substances and products used in the minerals industry, i.e. occupational exposure data.

## **EMiReC** The Extractive Industries Council for Research and Development

The European extractive industry has established a European Council for Mineral Resources. It represents academia and industry. It is the objective of this Council to establish the research priorities for the sector and to give guidance to researchers from industry, academia and other areas dealing with research and development. It is the task of the Council to encourage research in such a way that the long-term sustainable development of the sector can be guaranteed. The Council will bring together representatives and projects, as well as information from a large number of enterprises, institutions and universities from all over Europe, linked together over information and communication platforms, events, meetings, publication and intensive communication. It will strengthen and co-ordinate the proven networks between producers, equipment suppliers, researchers in the extractive industries and end users and should ultimately become the institution to which the Commission turns in this area.

