TECHNOLOGICAL TRANSFER AND INNOVATION PARTNERSHIP FOR THE REINFORCEMENT OF THE MINERAL RESOURCES ECONOMIC SECTOR IN SOUTH-EAST EUROPEAN COUNTRIES

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CIT-CENTIREM - brief presentation

The Technological Information Centre for Mineral Resources CIT CENTIREM is

- an autonomous entity without juridical personality, constituted inside the Research and Development National Institute for Metals and Radioactive Resources INCDMRRR Bucharest – Romania (since 2001) and
- a member of: The National Network for Innovation and Technological Transfer ReNITT, The Romanian Association for Technological Transfer ARoTT and World Trade Point Federation.

CIT CENTIREM acts for the sustainable economic and social development of the Romanian mineral resources sector by :

- creating and developing the innovative framework,
- introducing the total quality system and human resources development,
- providing the full access to the technological performance,
- providing technological services and facilities and
- promoting the competitivity increasing in the field.

CIT-CENTIREM-mission & activities

Our mission is to develop technological information activities for the economic agents, knowledge transfer and quality management in order to increase the competitivity of the enterprises working in our field.

Main activities carried out by CENTIREM:

- "Fundamentals of innovation and technology transfer in mineral resources"- a training course at the Faculty of Geology of the University from Bucharest.
- inquiring the research market in the national mineral resources sector.
- "Bulletin CENTIREM" - a magazine on innovation and competitivity in mineral resources field (since 2003).
- elaboration of the CEOFREM data bank - focused on the achievement of a virtual market for products, services and technologies in the field of mineral resources and conceived as an integrated „business to business" on-line platform.

Romanian mineral resources sector current state

- The ***mineral resources exploitation*** activity in post communist Romania has known a significant decreasing of its volume followed by the output diminution and unemployment increasing. The mining perimeters became poverty poles and were declared under-privileged zones.
- Despite the fact that the sub-branches divergently evolved, the extractive industry still remains among the stagnant branches of the national economy.
- Under this context the mineral resources industry owns a low internal competitivity and productivity, determined by the low reliability of some equipments and setups beside the non-correlation of their capacities within the flow sheet and the power-consuming feature of the activity.
- The negative evolution of mining sector is explained by the depletion of resources as well as the exploitation depth's increasing, which determines the low yield of the activity, including losses, which claim financial support form the state budget. The government also decided to close unprofitable operations, including state-owned enterprises such as coal-mining companies, and planned to cut subsidies to the mining sector. The so-called National Companies are enterprises that continue to be owned and operated by the state, but which are able to lease or sell some assets in order to increase profitability. The mining and mineral industries belong to this category.
- **Presently the main condition to increase the quality and efficiency of mineral resources industry is represented by the elimination of technological gaps as the material endowments and development of informational and technological transfer infrastructure concerns in order to develop the absorption capacity for the scientific and technological knowledge and of innovation capacity in the economic field.**

Dynamics of R&D activity on mineral resources in Romania

- The ***research and development activity in mineral resources field*** had a negative dynamics beginning with 1995. The low financial support on the state's behalf determined the migration of research scientists in other fields of activity and the RDI organizations technical endowment's lack. RDI activities in the mining sector and for mineral resources' capitalization are carried out only in some universities or commercial societies with private capital.
- Some relatively recent experiences from some mining exploitations point out that the existent resources still own a high exploitation potential in effective conditions by providing the access at new exploitation technologies and procedures, which may be stimulated by the development of some elements of industrial and RDI infrastructure elements.
- Drastic decreasing of the RDI's contribution to the modernization of the mineral resources industry determined among others the decreasing of: RDI results' dissemination, technological transfer weight, development of required infrastructures. As a consequence, only a few enterprises launched in production new technologies and products.
- **Now the main concerns of the RDI units are related on increase the quality and efficiency of the mineral resources industry, respectively to reduce the technological gaps and to develop the informational and technological transfer infrastructures in order to increase the absorption capacity for technical and scientific knowledge by economy as well as to enlarge the innovation potential in this field. The conservation, closure and ecological reconstruction of areas affected by mining activity are also important objectives for the RDI entities.**

Mineral resources representative sites

The mineral resources and the areas from which they are extracted are described as follows:

- **Copper** is mined mostly in two districts: the north-west and the south-west. The ore grade is generally low. Concentrates from these areas are smelted and refined at Baia Mare and Zlatna.
- **Lead** and **zinc** are produced from underground mines in the Baia Mare, Baia Borsa, Certej, and Rodna districts. They are low-grade ores with associated copper, antimony, bismuth, cadmium, gold and silver. The smelting and refining of lead and zinc from domestic and imported ores and concentrates are carried out at the Copsa Mica and Baia Mare.
- **Gold** resources are mainly concentrated in Transylvania's Golden Quadrilateral, a major gold-mining region comprising the cities of Baia de Aries, Brad, Sacarimb and Zlatna.
- **Coal** deposits are located in the Jiului valley. Parallel to the overall economic slump, coal production has experienced a sharp decline in recent years. Less than 10% of the coal produced in Romania is bituminous and the remainder is lignite coal.
- **Uranium** is exploited in Romania since the 1950s, in three major uranium mining areas: the Western Carpathians, the Banat Mountains and the Eastern Carpathians. All uranium-related exploitation activities are carried out by state-owned companies, under coordination of the Uranium National Company S.A.
- Romania also has an extensive output of **industrial minerals**. Barite, bentonite, diatomite, feldspar, graphite, gypsum, kaolin and limestone among others are mined in the Carpathian region.

Compulsory actions

The main directions in Romanian mining industry where urgent action is compulsory:

- the renewal of existing production units to respond to energy, mineral raw material and environmental constraints;
- the adoption of non-polluting production processes and technologies at the national level;
- support for existing industries through the introduction of emission-reducing equipment and technologies;
- the establishment of a national integrated monitoring system for environmental quality.

Hot spots

Here are a few examples in order to point out the emergency of an effective action plan.

1. Many mining wastewater treatment plants are currently in a bad state, operating manually with obsolete and ineffective technologies. The Herja mine water treatment plant in Maramureş County, which belongs to REMIN S.A., illustrates this situation.
2. The main environmental issue in coal mining is the inefficient treatment of the huge volume of wastewaters due to outdated technology and equipment in the water treatment plants.
3. A surface of about 1,000 ha is contaminated with natural radioactive elements. Because of the improper environmental management of these sites (located in the Apuseni and Banat Mountains and Eastern Carpathians) a lot of environmental problems occur.
4. Other inventories of hot spots have been conducted by the International Commission for the Protection of the Danube River (ICPDR) for the entire Danube Basin and also for the Tisza river catchment area - the region in which the greatest impact of the mining industry is recorded. According to the ICPDR, there are 53 industrial and mining hot spots in the Romanian Danube river basin, 26 of them being classified as of high priority.

Romanian legislation

According to The Strategy for the Mining Industry for 2004 – 2010 (approved by GD 615/2004), the legislative framework comprises:

- Mining Law no. 85/2003
- Norms for applying the Mining Law no. 85/2003
- Petroleum Law no. 238/2004

The modern rules for the management of mineral resources are established through these laws. Obligations are provided regarding ecological reconstruction and the obtaining of environmental agreements/permits, and it is stipulated that such activities cannot be carried out in protected areas. The main obstacle/barrier to environmental friendly industry and energy activities is the fact that the concept of the sustainable management of mineral resources and related mechanisms are not yet well understood in Romania and are neglected by high-level decision makers. It is still assumed that only after economic development and stability have been achieved will it be possible to pay attention to environmental issues such as clean production and investments in environmental improvements.

Our proposal - TTI partnership in the Balkan mineral resources sector

This partnership aims to constitute an innovation and technological transfer organization/network focused on mineral resources sector in Balkan region.

Strengths	**Weaknesses**
- The only TTI entity in the field of mineral resources, national spread and integrated into a national network. - Optimal infrastructure conforming to European and international standards. - A rich experience in collaborating with specialists with international reputation in the field of mineral resources, working in national and international projects	- Weak marketing in the field on the international level - Insufficient promoting of the field of activity
Opportunities	**Threats**
- The possibility of accessing the European financing programs - The continuous process of European integration of the countries in the Balkan region - The European legislative integration - The encouraging of the enterprising / business development / the SMEs development in the Balkan region, which lead to a favourable environment for the development of the TTI activities	- The global economic crisis - The European and worldwide market competition - The different national visions regarding the long-term development of the mineral resources economic branch - The expensive investments could lead to a low degree of attractiveness for investors and enterprisers.

Objectives of TTI partnership in the Balkan mineral resources sector

The main objective of the proposed partnership is to cooperate in order to provide technological services aimed to support the sustainable economic development in the mineral resources field from South-Eastern Europe.

Thus the proposed partnership is focused on:

- technical assistance for industrial enterprise at the application of new technologires;
- stimulation of international cooperation, reimbursable and non-reimbursable funds attraction;
- assistance of RTD organizations in their efforts to fulfill the industrial beneficiaries' requirements in the area, for the reasearch results' transfer;
- support of RDI programmes by carring out studies and enquiries concerning science policy and the mineral resources development strategy;
- increasing the awarness and information degree concerning the innovation, quality, and technological transfer concepts by the development and implementation of educative pregrammes;
- dissemniation actions using ITC technologies and other specific manifestation.

CIT-CENTIREM expertise

a) Technological information services, technological audit, technological forecasting and awarness.
b) Consulting and assistance services concerning the intellectual property rights' exploitation.
c) Assistance and legal advice services on national, European and international legislation.
d) Assistance services to obtain funds under the framework of some national and international R&D programs.
e) Identify partners from the academic and research fields.
f) Providing access to specialized databases.
g) Information on the national, regional and local priorities.
h) Services for the organization of conferences, scientific events and specialized exhibitions.
i) Services for editing magazines and specialty papers.
j) Information services on intellectual property.

CIT-CENTIREM action directions

- increasing the science and technology information's dissemination potential
- development of informational partnership.
- increasing the technological documentation degree.
- increasing the technological absorption potential of economic agents
- refreshing courses for innovative human resources.
- increasing of the number of SMEs where new technologies are implemented.
- total quality management's introduction.
- development of innovative informational networks.
- introduction of innovation and technological transfer principles in education.
- increasing the public information on science and technology.

Conclusions

CENTIREM can contribute with:

a) information and technological awareness, elaboration of essays, reports, analyses and studies for the technological information of the SMEs.

b) documentation through the access to the data basis, elaboration of specialized reports to support the decisions.

c) selective or complete translation of works, documentations concerning new technologies or products, scientific papers, etc.

d) support for refreshing courses, organizing of training courses on intellectual property and methods of information.

e) editing of specialized publications, editing and printing of magazines, handbooks, books in the field of technological knowledge.

f) technological audit, achievement of expertise and technological audit studies for setting of performance and opportunities.

g) counseling and assistance for the elaboration of R&D projects, advice on specific methodologies and the technological level of the field.

h) advice on intellectual property, advice on the exploitation of intellectual property rights.

i) development of feasibility studies and business plans for investment in the SMEs.

Thank you very much for your attention!