Sławomir Graczyk

The demonstration geothermal installation in Bańska – Biały Dunajec

Cleaning Up Our Energy Act

EUGENIUSZ MOKRZYCKI, ROMAN NEY
Mineral and Energy Economy Research Institute, Kraków
Polish Academy of Sciences
www.min-pan.krakow.pl

Although very young, the Mineral and Energy Economy Research Institute has been working very intensively since its outset to ensure a clean future for Poland

The objective of creating a scientific unit that would engage in researching the management of mineral resources was first raised at the General Assembly of the Polish Academy of Sciences in 1983. The Academy's Presidium then set up a Mineral Resources Economic Policy Center in 1986, based upon which the Center for Fundamental Problems in Mineral Resources Management was subsequently established in 1988. This latter center, in turn, was transformed into the present Mineral and Energy Economy Research Institute in 1998.

The Institute is a scientific research establishment that deals with a wide scope of issues relating to the management of mineral and energy resources. This research, pursued by the Institute from basic research all the way through implementation stage, encompasses a broad range of scientific disciplines. The Institute specializes in geothermal energy, and is a pioneer in Poland in harnessing such energy in the heat engineering industry. Three installations have so far been designed and implemented, in Bańska - Biały Dunajec, Mszczonów and Słomniki, while project outlines have been prepared for several further installations.

The Institute's scientific profile is well harmonized with the needs of the national economy, and is closely tied to EU programmes. It encompasses the following avenues of research: the effective management of mineral resources, the energy economy (especially the regionalization of Polish energy policy in keeping with economic and ecological considerations), renewable energy as a factor in sustainable development, IT technologies for analyzing the development of mineral resource management systems, the sustainable development of regions, and the foundations of effective waste management.

The Institute's organizational structure is flexible, and conforms to the current research targets. This makes it possible to better utilize staff and for staff to circulate

among the research teams. The Institute employs a total of 98 individuals, including 51 scientific staff members (8 professors, 5 assistant professors, 32 lecturers, and 9 assistants).

The institute possesses two organizational units of a laboratory nature. The Environmental Research Laboratory is equipped with apparatus for studying the following: the chemical composition of rocks, soils, waters, and the atmosphere; the quality of drain waters and water management in the vicinity of waste storage sites; the leachability of contaminants that come from wastes; and the contamination of the land and water environment with mercury compounds and organic compounds. The Geothermal Laboratory in Bańska - Biały Dunajec, in turn, comprises a complete geothermal installation. This experimental site for researching geothermal energy also has an applied function, supplying the Bańska and Biały Dunajec communities with heat. The laboratory engages in a broad range of educational and promotional activities with respect to renewable energy, with a particular focus on geothermal energy. It also takes CO_2 measurements in order to analyze changes in air quality during the expansion of the geothermal heating network in the Podhale region.

A practical approach

The Institute can already boast extensive scientific achievements. It has developed geosynoptic maps of Poland, describing the location of perspective mineral resources. Its other achievements include: models for planning geological prospecting work and models for assessing prospecting projects under Polish conditions; the application of economic criteria in planning solid mineral deposit mining, mineral resource management balances in Poland and the world; the anthracite and bituminous coal pricing system in the transition from a centrally-controlled economy to a market economy; a methodology for estimating the resources of various elements that accompany copper ore deposits; studying the variability of silver mineralization in deposits and appraising the accuracy of silver concentration estimation in geological blocks and exploitable blocks; a system for balancing anthracite coal supplies with the long-term planned development of the electric power production subsystem; researching the efficiency of electric power generation with adjustable photovoltaic arrays; optimizing energy policy within the regional scope; modeling the development of "clean coal" technology; developing a pioneering method of adapting the Mszczonów IG-1 borehole for use as a heat production facility; the occurrence and breakdown of iodine in the Vistula River region biosphere and its impact on the natural environment; research into the adaptation of post-industrial areas; a strategy for the sustainable development (eco-development) in the Polish Carpathian Mountains; analyzing how the introduction of product and deposit fees will affect the expenses incurred by businesses and households and the inflation rate; and a conceptual model for the deep storage of radioactive wastes in saliferous and argillaceous rocks in Poland.

The Institute acts as organizer or co-organizer of a range of cyclical conferences under the following headings: "Issues of Energy Raw Materials and Energy in the National Economy," "School of Deep Mining," "Natural Dangers in Mining," and "Current Issues and Prospects in Mineral Resources Management." The Institute has also notably acted as the organizer of the 12th International Coal Preparation Congress in 1994 (in close cooperation of the State Agency for Restructuring the Hard-Coal Mining Sector), and as co-organizer of the international ENERGEX'2002 conference held in Kraków, under the auspices of the International Energy Foundation.

The Institute publishes three periodicals: *Gospodarka Surowcami Mineralnymi* (*Mineral Resource Management*, produced jointly with the Mineral Economy Committee of the Polish Academy of Sciences), the bimonthly *Technika Poszukiwań Geologicznych, Geosynoptyka i Geotermia* (*Exploration Technology, Geosynoptics and Geothermal Energy*) and the semiannual *Polityka Energetyczna* (*Energy Policy*). Larger monographs are published on a continuous basis, in the *Studia Rozprawy Monografie* series. Still larger publications are also produced, such as the multi-volume monograph *Surowce Mineralne Polski* (*Poland's Mineral Resources*), the annual *Bilans Gospodarki Surowcami Mineralnymi* (since 1994 simultaneously published in English as *Minerals Yearbook of Poland*), numerous conference materials, as well as handbooks and guidebooks addressing issues within the broad field of mineral resource management.

Science without borders

The Institute is involved in numerous projects under the EU programmes: LICYMIN (life cycle assessment of mining projects for waste minimization and long-term control of rehabilitated sites), CLENSYS (energy systems utilizing clean, renewable sources of energy, following the example of geothermal energy), LIFETIME (technical infrastructure life cycle assessment), EXTERNE-POL (external costs in the energy industry), CFF-OPET (promoting clean solid-fuel technologies), WETO H2 (the long-term energy outlook), CO2SINK (testing the geological storage of CO_2 at Ketzin in Germany) FIP-TREET (developing a program of training for the personnel of financial institutions about investment projects involving renewable energy and energy efficiency), I-GET (integrated geophysical exploration technologies for deep fractured geothermal systems), NEES (new research in the field of estimating external costs), and INTERREG III C East (waste management).

Over the years 1986-2004, Institute employees earned 27 doctorate degrees, 6 D.Sc. degrees (habilitation), and 6 professorship titles. ■