

# Environmental science in Poland

*Research and practical applications of experience and expertise...*

**T**he Institute of Environmental Engineering of the Polish Academy of Sciences in Zabrze is the oldest scientific institution in Poland in which basic and applied research into environmental protection and environmental engineering is conducted in a comprehensive way.

Main areas of activities include:

### Research into air protection

- Physical and chemical content of primary and secondary aerosols in order to define their impact on health and environment;
- Impact of the air pollution on climate changes;
- Emission of pollution from industrial sources;
- Air quality management on a local and regional scale.

### Waste disposal

- Defining the impact of point source and non-point source pollution on the environment;
- Research into the physical and chemical characteristics of waste;
- Protecting the environment against the negative impact of waste;
- Research into the possibility of waste treatment and recycling including engineering works and reclamation;
- Using waste energy of discharge waters from electricity production processes and geothermal water in soil heating for plant production;
- Reclamation of post-industrial areas;
- Research into the forms of chemical binding of metals in environmental samples, with the use of chemical sequential extraction procedures.

### Research into water protection

- Wastewater and water treatment for industrial purposes;

- The recovery of biogenic substances from municipal sewage and industrial waste;
- The use of minerals (peat, lignite, clays, bentonites, diatomites) and mineral waste raw materials as low-cost, efficient adsorbents of heavy metals and organic pollutants in the remediation of soil, water and wastewater.

### Developing hi-tech analytical technologies for environmental research

Research into technogenic magnetism of soils by using magnetic susceptibility as an *in situ* indicator in contaminated areas for fast and precise 3D mapping of chemically degraded areas and location of abandoned industrial landfills.

In addition, the institute co-operates with companies, design offices and the institutions of the administration in research and implementation tasks within the scope of:

- Monitoring of the chosen pollutants in the air, calibration and inter-calibration of measuring instruments;
- Implementing new monitoring technologies of emissions and substances into the atmosphere;
- Research, measurements and evaluations for the investment processes and current activity of the industrial installations;
- Technologies of protection of environmental elements;
- Preparing specifications for environmental approvals for installations;
- Research on the condition of the particular environment components;
- Guidelines for waste disposal;
- Comprehensive environmental impact assessments;

- The impact of the limnic ecosystems reclamation on the quality of water resources.

The institute is involved with broad national and international co-operation, and participates in the co-ordination and realisation of many national and international research projects (such as MAGPROX, SOWA, E2SP, COST 633, SAFEMANMIN). It actively participates in international scientific networks such as ENVITECH-Net and AIRCLIM-NET. The institute is also a member of national networks: Friendly River, Environment and Health, Polish Technological Platform of Environment, Technological Innovation Platform for the Opole Region. It takes part in the organisation of many conferences, including such international conferences as Air protection in theory and applications, Ion chromatography, SECOTOX symposiums, and SoilSEDUMA.

The scientific periodicals of the institute include:

- Archives of Environmental Protection – a quarterly in which original scientific papers are published;
- Works and Studies – a periodical publishing professorial monographs.



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