GREENEVO

Winners 2010-2013

MINISTRY OF THE ENVIRONMENT

Financed by National Fund for Environmental Protection and Water Management

GREENEVO TECHNOLOGY ACCELERATOR

printed on ecological paper

Ladies and gentlemen

GreenEvo - Green Technologies Accelerator is a project for entrepreneurs, initiated and managed by the Ministry of the Environment, which identifies the best Polish environmentally sound technologies and supports their international transfer. Every year, Polish firms submit new, innovative solutions to participate in this project. Subsequently, independent experts evaluate them and select the winners. Participation in the project and in the GreenEvo brand offers companies, among other things, training and consulting services as well as support in improving their offers to meet the expectations of foreign contractors.

Companies participating in GreenEvo demonstrate that you can make money from ecology and innovation. Technologies offered by the companies, conquer the markets worldwide, boldly competing against the biggest players. Solutions, introduced by Polish entrepreneurs, working within the GreenEvo project, are used, among other places, in the process of hazardous waste disposal in Armenia or making ecological fuel in Tanzania. Participants of GreenEvo prove that Poland has a substantial potential in the area of environmentally sound technologies. Thanks to this project, we can promote them as our green ambassadors on the global market.

Green technologies offered within the GreenEvo framework are usually the results of many years of Research and Development. Many of them are protected by international patents – granted among others in the United States and by the European Patent Office. This protection also confirms the global aspirations of GreenEvo participants, who see that their potential can be successfully realized all over the world, wherever the demand for green technologies arises.

Winners of GreenEvo owe their success to innovations and qualified personnel. Additionally, thanks to relatively low labour costs in our country, advanced technologies from Poland are more competitively priced than similar solutions from foreign suppliers. GreenEvo participants know how to use this to their advantage, and benefit from the fact that their products are of superior quality. In 2011 alone, their revenues increased by 31% on average, and their export revenues soared by 58%. The Ministry of the Environment ensures that more and more companies follow this slowly blazed trail leading towards a new quality of economic growth, which combines protection of natural resources with shaping of pro-ecological attitudes. Please, help us bring about the green revolution!

Marcin Korolec
Minister of the Environment

GreenEvo and sustainable development

POLAND IS ONE OF THE EUROPEAN UNION'S LARGEST MEMBER STATES, WHICH OVER THE LAST 20 YEARS HAS UNDERGONE A SUCCESSFUL TRANSFORMATION TO BECOME A GREEN ECONOMY, BASED ON KNOWLEDGE AND INNOVATIONS.

Green means important

Environmental technologies are a subject of substantial public and private investments in most countries of the world. The scale of these investments exceeds even the expenditures on Information and Communication Technologies. While media readers and internet users get excited over the news concerning social networking sites, new models of mobile phones or updated versions of popular computer software, far more funds are invested in green technologies all over the world. Thanks to them, we can prevent environmental disasters, clean the natural environment, reduce pollution and create so-called 'green' jobs. More importantly, investments in green technologies are crucial, no matter how wealthy the individual countries are. The challenges related to the protection of the environment cross national borders, and are a subject of international agreements, as well as an important topic of the developmental assistance projects.

Setting a good example

Since 1989, Poland has gone through a political and economic transformation, which helped it catch up with the most developed countries, owing to investments in environmental protection, stimulation of the development of green technologies and establishment of the institutional framework supporting the green economy. Nowadays, Poland wants to support other countries by sharing the experiences and know-how. An expression of these aspirations is GreenEvo, a project supporting international transfer of environmentally friendly technologies. Capitalizing on experiences from the period of transformation, we want to show other countries, how to establish local technological competence and co-operate with private sector organizations.

Technologies for sustainable development

By supporting sustainable development, we refer back to the historical sources of the concept, promoted by the United Nations Conference on Sustainable Development. Apart from actions to protect our climate, which are very popular in many countries, we also remember about other, important technological domains within the GreenEvo framework: providing support for biodiversity and protection of soil, water and vegetation. I hope that thanks to GreenEvo, you will be able to benefit from the potential of Polish green technologies, which help protect natural ecosystems, clean water resources, transform waste, remediate soil and exploit renewable energy sources. The winners of GreenEvo are visionaries, whose innovative solutions let us preserve our natural environment for future generations.

Beata Jaczewska

Undersecretary of State, Ministry of the Environment

The market for environmental technologies in Poland

Poland is synonymous with stability, dynamic economic development, innovation and ecology. Country has about 38 million well-educated residents and is one of the largest economies in the European Union. Every ninth student in the European Union is a Pole. The effectiveness of green innovation is among the highest in Europe. Polish companies invest in the field of environmental protection more than companies of the largest economies. So whom it is best to ask for help in solving the challenges of environmental protection, if not the most innovative Polish providers of green technology?

A string of successes.

Several years ago Thomas Friedman penned "The World is Flat", showing how computerization and access to the Internet have changed the global economy. Is it anything strange that the idea of creating a completely computerized installation for ozonation of drinking water came from a Polish company? This unique technology makes it possible to remotely control the process of treating water from Poland, without the foreign client needing to locally hire a team of specialists. When you travel through Europe and see solar panels installed on the roofs of buildings, remember that they most likely come from one of the Polish market leaders.

After Poland entered the European Union, the media and politicians in some countries in Western Europe frightened their voters with the image of the „Polish plumber" who would take advantage of the lack of barriers in the labour market and use his skills to shine abroad, offering better service than the locals. One of the GreenEvo laureates went even further, embarrassing its international rivals with the capabilities of its technology that enables a radical increase in waste water treatment efficiency without needing to construct new facilities. This technology has been implemented in many European cities, as well as a massive facility in Beijing.

Next generation

Over the last years, winners of the three editions of GreenEvo have achieved measureable successes on the international markets. We are glad to present the next group of winners, some of which have already had spectacular achievements to their credit. The rewarded technologies cover solutions supporting climate protection through: renewable energy sources, more efficient use of resources, energy-efficiency and waste disposal and re-use. GreenEvo includes 49 technologies, which may satisfy most of the needs related to environmental protection.

GreenEvo 2010-2013 winners

BIOGRADEX® Holding Sp. z o.o.
CHEMADEX S.A.
CTE CARBOTECH ENGINEERING
ekotop dr inż. Roman Sobczyk
ppeko
REDOR
WOFIL OZONE TECHNOLOGY
APANET GREEN SYSTEM
eco
izodem 2000 polska
LARS
lediko® leding the way
MAKROTERM
NMG Network Media Group
PROMAR®
WSK KRAKÓW SP. Z O.O.
Dagas
ENERGOINSTAL constructing tomorrow
APS energia
ASKET®
fu-wi Sp. z o.o.
HEWALEX
hydro ERGIA
neon
Zespół Innowacyjny PROMIS Sp. z o. o.
sunex®
URSUS
watt® tworzymy technologie solarne
ATON high technology
ECOTECH POLSKA Omnia subiecta sunt naturae
EKOTECH INŻYNIERIA POFIOŁÓW
JAKUSZ
marbet® WIL
MULTICHEM EKO
petroster®
QENERGY
T-TECHNOLOGY
POLIMAT
PROCOM SYSTEM
PROTE
energo natura
Frapol®
SYSTEM m3
far DATA
ensol
Nikol®
Vapor chp by MieleciDieselGas

List of companies

Use of the BIOGRADEX® technology enables significantly more efficient waste treatment. It is an innovative solution that results in the exponential intensification of the active sediment waste treatment process. BIOGRADEX® vacuum technology is a new, world-class level of waste treatment of clear benefit for the natural environment.

BIOGRADEX® is an exceptional method of waste treatment using active sediment. It enables effective protection of water from pollution. The uniqueness of BIOGRADEX® technology consists in the application of an additional physical treatment during the waste treatment process – it uses a vacuum installation to degasify the mixture of active sediment before sending it to a secondary settling tank. This operation removes all gas bubbles from sediment and fluids before sending it to the secondary settling tank, which increases the sediment volume in the process to MLSS = 7 000 - 9 000 mg/l and enables effective sedimentation in the secondary tank. The active sediment stops floating, and does not „escape" from the settling tank in spite of its increased concentration.

BIOGRADEX® technology has been used by a major wastewater treatment plant in Beijing since 2004. It was designed and installed in cooperation with a Chinese partner. Last year, Biogradex – Holding began cooperation with the Swedish consulting firm SWECO and concluded a contract for a plan of application of BIOGRADEX® technology in one of Stockholm's largest wastewater plants. Use of the technology would enable an increase in the facility's capacity from 550 000 - 700 000 RLM without expansion. An offer has also been presented for use of the technology at a treatment plant in Greece. The Greek partner accepted both the technical and financial proposals of the offer.

After application of the BIOGRADEX® technology, the facility will increase its capacity by approx. 25% without needing to expand to a size of Q=52000 m^3/d. The client is presently waiting for a decision on financing.

In Poland, he BIOGRADEX® has been implemented at a wastewater treatment plant in Częstochowa, which has made a significant increase in its capacity and in the quality of the treated wastewater.

BIOGRADEX® Holding Sp. z o.o.

- The company holds the patents for the aforementioned technology. The patents held are not only Polish, but also European, American, Canadian, Australian, Brazilian, Russian and Japanese. BIOGRADEX® is an innovative solution that sets new standards in waste treatment.
- Compared to other technologies, Biogradex® increases the volume of active sediment in chambers by 80-100%, owing to which the effectiveness of the treatment process is significantly improved.
- Greater volumes of active sediment mean that the treatment process is very effective, while remaining energy-efficient.
- The technology is less expensive than many commonly-applied solutions around the world, as it makes it possible to reduce the size of new structures. As for modernizing existing structures, BIOGRADEX® makes it possible to improve the efficiency and effectiveness of such treatment plants.

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CHEMADEX S.A.

For facilities from the agro-food industry, pharmaceutical, paper and biofuels industries needing an effective means of treating highly-contaminated waste water products, we offer CHEMADEX technology based on methane fermentation processes. Unlike the alternative solutions, our method does not require an initial separation of suspensions, fats and greases in waste water and allows the creation of biogas that can be used for producing electrical and heat energy.

- No need to perform initial separation of suspensions and greases contained in raw waste water in settling tanks and degreasers.
- No need to construct additional installations for disposal of deposits and greases from raw waste water materials.
- Possibility to change suspensions, greases and toxic organic compounds – which are presently very problematic waste products – into valuable biogas.
- Reduction of waste water treatment facility operating costs.
- Resistance and large tolerance of the technology to high loads of pollutions.

The technology is used for treating highly-contaminated waste water products (COD in a range of 3000 to 150000 mgO_2/l) from the agro-food industry (sugar production, milk production, fruit and vegetable production, fats, distillation, brewing) and from the pharmaceutical, paper and biofuel industries. The waste water treatment technology is based on methane fermentation processes in oxygen-free conditions, which can be understood as a chain of multi-phase biochemical processes leading to a step-by-step transformation of complex organic compounds contained in waste water into methane, carbon dioxide and water. The biogas produced during this process has a high methane content (70 – 75%), and it can be used to produce electrical and heat energy. The waste water treated in the methane fermentation process can be deposited in municipal sewers or further processed by using unaerobic active sludge method.

CHEMADEX technology is applied in the construction of a waste treatment plant for Südzucker Polska S.A. in its „Cukrownia Strzyżów" Production Facility. The applied solution enabled a reduction in the volume of pollutants from 13,500 kg COD/d to 720 kg COD/d, with a COD load on the fermentor of 15 kg O_2/m^{3}d and allowed the yield of 5 000 Nm^3/d of biogas.
For „Pfeifer & Langen Polska" S.A., CHEMADEX designed two more waste water treatment plants, including one at „Cukrownia Środa" with a capacity of 1850 m^3/d, and for „Cukrownia Gostyń" with a capacity of 2 585 m^3/d. And last one, CHEMADEX has built a large fermentation chamber with an active volume of 3 400 m^3.

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CTE CARBOTECH ENGINEERING

For local government authorities, housing estates, social welfare homes, schools, hotels, and for all those who need an effective, user-friendly and low-cost waste treatment system, we offer the container-based EKO-WGB biological/mechanical sewage treatment system. Unlike other treatment solutions on the market, we offer a unique, patented, energy-saving and highly-efficient system that can quickly be installed in all ground conditions and adapted to the client's individual needs.

- High level of wastes reduction – the treatment level selected is dependent upon the parameters of the raw waste and on the levels of pollutants acceptable in the processed waste.
- Possibility to adapt capacity to the client's needs.
- Low operating costs.
- Automation and monitoring of processes – lowering of operating costs, possibility to monitor and control the unit remotely from any location via the Internet.

Biological/mechanical sewage treatment takes place in an EKO-WGB treatment tank divided into chambers: an initial settling tank with sediment retainer, de-nitrification chamber, oxygen chamber and secondary settling tank. The structural and technological solutions are patent-protected. All elements of the sewage treatment unit are located inside the tank, and the unit functions fully automatically without the need for constant monitoring. Designed individually according to the needs of each client, the technological process based on a low-impact active sediment modern ensures a significant reduction in wastes. The sewage treatment unit completely eliminates unpleasant odours and has a low-impact on its surroundings. The device is made of long-lasting materials ensuring years of stable and trouble-free operation accompanied by low operating costs.

The EKO – WGB technology can be used for processing communal waste, as well as every place where a large reduction in polluting compounds is desired. The sewage treatment unit can be used not only for housing estates or entire municipalities, but also for treating sewage from schools, hospitals, social assistance homes (Juchnowiec Kościelny), at border crossings (Hrebenne and Budomierz), by military installations (Westerplatte, Celestynów), and everywhere that a highly reliable and efficient technology is required. The technical and technological solutions in EKO-WGB sewage treatment units are also used in waste treatment centres with capacities of as much as several cubic metres per day.

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ekotop
Roman Sobczyk PhD. Eng

For waste water treatment plants looking for waste management solution, we offer an ecological technology for drying sewage sludge in hybrid dryers, using renewable energy sources.

This technology allows for environmental-friendly processing of sewage sludge. Unlike the traditional dryers using fossil fuel, it is possible to dry sludge using low-cost alternative energy sources such as heat from biogas combustion, waste heat utilization from treated sewage, waste heat from cogenerator cooling and solar energy.

This allows for drying of the sludge regardless of weather conditions and increasing of process efficiency.

- Ecological technology allows for drying of the sludge regardless of weather conditions and traditional sources of energy – fossil fuel.
- The dryer could be an independent installation without providing conventional sources of energy.
- Cheap running costs and simple operation of the dryer.
- Full process automation, which does not require constant service.
- Over fourfold mass and volume reduction of dried sludge.

The hybrid sewage sludge drying installations consist of drying halls similar to green houses covered with polycarbonate or glasses plates. The main principles of drying operation is the solar effect and heating floor exploitation to water evaporation from sewage sludge. Inside the drying hall sludge is transported, aerated, granulated and moved to the end of drying hall by turning sludge device. The automatic ventilation system ensures and improves water evaporation and humidity removal outside the drying hall.

The drying technology causes wet sewage sludge to granulate during processing. After the solar and hybrid drying process the mass of sludge is significantly reduced.

This technology is one of the cheapest solutions for water evaporation. The evaporation of 1 tonne of water uses only 20-30 kWh electrical energy. The final product – dried sludge takes the form of a granulate and could be agriculturally or energetically used. The calorific value is similar to brown coal 12 kcal/ kg.

The hybrid sewage sludge drying technology using alternative energy sources is successfully used in Kłodzko (Poland), where it is applied in the Centralna Słoneczna Suszarnia Osadów. The process of drying is conducted in a drying hall using solar energy, and under-floor heating delivered by a hybrid heat generating using renewable energy, created by heating-pumps which recover energy from the treated sewage. The dryer enables an annual yield of 1300 t of sewage sludge processed into granules with an average dry substance content of 80%. Hybrid dryers also function at the waste water treatment plants in Iława and Myszków (Poland).

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The comprehensive reagent-based technology for water treatment and counteracting the effects of eutrophication is the solution for institutions managing water reservoirs and industrial plants using process water, which experience problems with biological and chemical (including oil) pollution.

In contrast to other, hazardous chemical methods with only narrow range of use, as well as expensive and logistically complex physical methods, we offer safe, quick and simple removal of pollutants and the ability to restore ecological balance.

The Ecobiosed substance is a simple and easy to use innovative technology based on surfactants. It is characterised by very high concentration of active ions of synthetic enzymes and high energy of activation in water even at 2°C.

The technology is efficient both in closed and open reservoirs, both at high and low pH and it is active already at 2°C. It can be applied independently without the use of additional devices or as an auxiliary substance to mechanical water treatment methods.

Ecobiosed technology helps to restore and maintain high water quality in lakes and rivers, coastal areas, lagoons and supports protection of their ecosystems by elimination of all pollutants entering them through groundwater, municipal and industrial wastewater

energo natura

- Highly efficient – it eliminates up to 99.99% of biological and up to 96% of chemical pol-lutants from water.
- It ensures high-level disinfection of waters and demineralisation of phosphorus, nitrogen, po-tassium and calcium compounds as well as hydrocarbons, including petroleum com-pounds transforming them into permanently bound bottom sediments.
- The substance is safe for human health and the natural environment, as it does not con-tain harmful components.
- Short response time – first effects are visible after 6 hours from the substance application.

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No emissions, no waste, no problems with clean water recovered from industrial waste products. In this one sentence you can describe the technology of ROVAPO™, which enables the production of very clean technological water. ROVAPO™ is a closed water circulation technology that minimizes energy consumption and resulting waste products. It is a technology as clean as the water it generates. ROVAPO™ also means a high level of water recycled for repeat use (up to 95%).

- It enables the recovery of water from waste products with an efficiency level above 98% (including recovery of high-quality water from waste subjected to biological filtering).
- It is based on original programming that steers the automated functioning of the installation, independently of varying quantities and compositions of waste from production, as well as ensuring a constant output level from the unit.
- It reduces to a minimal level the amount of waste output – the one waste product is a concentrated deposit from the chemical element and concentrated salt from an evaporator containing approx. 50% dry mass.

ROVAPO™ is an original solution from the Polish company PP-EKO, supported by a range of patents. It is part of the technology family named „zero liquid discharge" and enables full recovery of water from sewage.

Depending on the industry, the ROVAPO™ system enables the recovery of demineralised water of <10 ms, e.g. for galvanizing production, super-clean deionised water, e.g. in photovoltaics or pharmaceuticals, or water with parameters allowing its repeat use in production processes.

ROVAPO™ technology encompasses a range of treatment levels, allowing the achievement of the established goal: selection of streams and chemical treatment, membrane systems and evaporation systems. ROVAPO™ technology has been designed for waste products from galvanizing processes and high-tech industries. The basic configuration can be interchangeably supplemented with components for use on other waste products – initially treated chemically and biologically with an active sediment and ultra-filtration membrane (MBR AeroMem™ Reactors). In the newly-developed ROVAPO-HF configuration, it is possible to fully clean wastes from the extraction of shale gas.

The first investment using ROVAPO™ technology was designed and installed „ready to go" by PP-EKO Sp. z o.o. in 2006 at the aviation facilities of Augusta Westland PZL – Świdnik. It was Poland's first modern waste treatment plant with a fully closed water circulation from the new galvanizing plant. Instead of galvanization waste products in a classic treatment process being led to the municipal sewer system, high-quality demineralised water is produced from sewage with strictly defined and guaranteed parameters. It is returned to production processes in a modern galvanization plant servicing the production of aviation parts. In 2010-2011 a new ROVAPO™ installation was activated in the factory of Hispano Suiza Polska and Wojskowe Zakłady Lotnicze no. 2 in Bydgoszcz (service centre for F-16 fighter jets).

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REDOR

For wastewater treatment plants, water treatment plants and biogas works seeking effective, energy-efficient and modern solutions to prevent the settling of sediment in containers, we offer submersible agitators, pumping agitators and vertical agitators. Unlike the competition, our technology provides proper agitation, intensification of physical-chemical reactions and biological processes occurring in active sediment.

- High-class equipment at a very reasonable price.
- Agitators selected to ensure optimization of functioning and energy use, generating cost savings.
- Production using 90% Polish components produced in-house, using the ISO quality management system and testing facilities for both submergible and pumping agitators.
- Clear and favourable warranty and service policy as well as easy access to spare parts.
- Tested technology with 18 years of experience, confirmed by countless references.

Agitators from Redor are mechanical devices composed of a rotor, gears, an electronic motor and a steel structure. Submergible agitators are primarily applied in waste treatment plants. They can also be used in agriculture and in the chemical industry, the cellulose and paper industry, the food industry and the energy industries.They prevent the formation of sediment in reservoirs and are used in biochemical processes for removing organic carbon, nitrogen and phosphorous (de-nitrification, nitrification, phosphatization). They homogenize active sediment and assist its functioning. They are intended for introducing a liquid into circulation, unifying its composition, preventing sedimentation, setting its flow direction and overcoming barriers to the flow of a liquid circulating in open reservoirs, ditches and canals. They are applied for the enhancement of physical-chemical reactions and biological processes occurring in liquids.

Submersible agitators are primarily used in wastewater treatment plants. They can also be used in agriculture, the chemical industry, the cellulose and paper industry, the food industry and in the energy industry. Waste treatment: biological reactors – nitrification, de-nitrification, dephosphatization, balancing chambers, secondary settling tanks, retention tanks, rainwater retention tanks, waste pumping stations, separate fermentation chambers, sludge tanks, slurry tanks. Water treatment stations: settling tanks, rainwater retention tanks, accelerators. Biogas works: 1st and 2nd degree fermentation sediment reactors, separate fermentation chambers.

Redor Sp. z o.o. is continually delivering submersible, pumping and vertical agitators to the majority of treatment facilities in Poland. Over the last few years we have cooperated with over 350 partners in the purchase of agitators from our company. Since 2010, Redor has cooperated with a trade partner in South Korea who for the last two years has delivered a range of submersible and pumping agitators to the largest treatment plants in that country.

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Treating water for all branches of industry with the use of ozone and quartz filtration is a simple, ecological and safe way of obtaining the highest quality water possible.

Wofil installations are fully computerised and monitored over the Internet. This allows then to be installed anywhere on earth, as well as ensuring customer satisfaction and a rapid service response.

- For assembly of a WOFIL installation or modernization of an existing water treatment station, only a small area is needed.
- There is no need to employ a highly qualified technical crew to operate the system.
- Minimization of the risk of production outages and lowering of operating costs.
- The work of one or several ozone generators enables its output to be adjusted to meet current needs as well as reduces wear and tear.
- The technology and unit possess the appropriate permits, certificates and certifications.

WOFIL offers technologically advanced water treatment systems using ozone technology and free radicals, without the need to apply artificial chemical substances such as chlorine, coagulants or potassium permanganate.

The technology is completely safe, environmentally friendly, and based fully on processes occurring in nature. The only difference is that ozoning processes take place much faster and can be fully controlled. The universality of the technological solutions allows the technology to be used in many branches of industry, such as in drinking water production for municipal water systems, bottled water and beverages, as well as in producing water for cooling applications in the energy industry. The ozoning technology is also used in washing and disinfection of bottles and packaging, as well as in the washing and disinfection of fruits, vegetables and meats, and also in pools and spas.

WOFIL installations are fully computerised and monitored over the Internet, which allows them to be installed anywhere on earth as well as ensuring customer satisfaction and a rapid service response. By dividing the installation into modules of technological sequences, the producer guarantees the high reliability of the installation as well as uninterrupted operation during service inspections and repairs. Multi-block ozone generators used in the solution enable the alternating functioning of individual blocks, as well as the possibility of their expansion.

WOFIL installations are characterised by ease of use and years of flawless functioning. The design foresees the possibility of working at 50% over capacity during periods of increased demand for water. In special cases the system can be overloaded to twice its capacity. Installations are prepared to process water of extremely negative parameters.

In 12 years of operations the company has installed approx. 100 „ready to go" water treatment stations in Poland, as well as conducting activity on the Romanian and Ukrainian markets.

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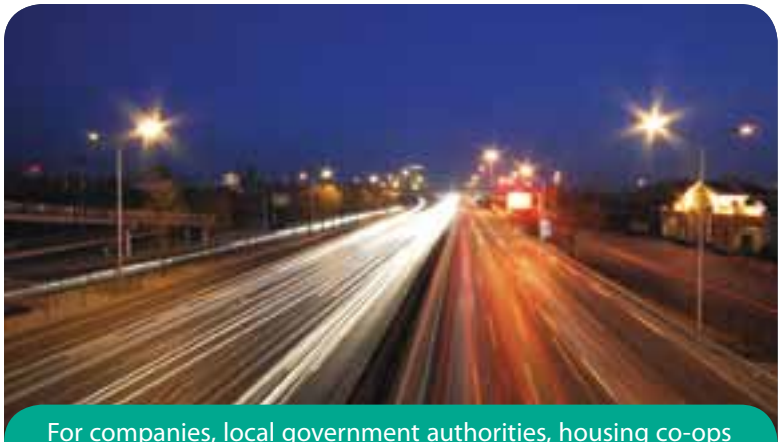

For companies, local government authorities, housing co-ops and all others searching for tried and tested solutions offering significant reductions in the costs of lighting streets, parks, car parks, etc. we offer a remote-controlled intelligent lighting control system. Unlike similar offers from the competition, we offer full remote control of every lamp via the Internet and an indication of its current active and passive energy use along with malfunction detectors tried and; thanks to the use of communication over an existing electricity network (the LonWorks PLC European standard) and simple installation, our systems make it possible to introduce significant cost savings with relatively low investment costs.

The intelligent street lighting control system enables the direction and control of individual lamps via the Internet. The operator has access to a simple system for turning on/off each individual lamp or reducing its output, either manually through a web page or automatically via a pre-programmed algorithm. The manner of control can be specified according to conditions and location, independently for different groups of lamps, or even for individual lamps in a given circuit. Communication between lamps takes place over the existing electricity network (the LonWorks PLC European standard), eliminating the need to set up additional communication lines. The system monitors the functioning of lamps in real time and the operator can be informed immediately of outages, opening of housings, etc. by such means as SMS.

Intelligent control technology using communication from LonWorks PLC is mainly applied for street lighting systems. With our GLC system it is possible to achieve significant savings in energy use as well as reductions in CO_2 emissions. It is also made easier to manage lighting networks, as the operator is informed on a continous basis of the condition of lighting and of malfunctions.

APANET
GREEN SYSTEM

- Control of individual street lanterns – manual or automatic turning on/off of lamps and reduction of their output.
- Grouping lamps based on needs and establishing different steering algorithms for different groups of lamps (e.g. different algorithms for pedestrian crossings and for other lamps).
- Monitoring of active and passive electrical energy use by individual lamps and groups of lamps, as well as of additional equipment powered by the same installation such as holiday season lights; constant metering of active and passive power, power and THD coefficients.
- Detection of proper lamp functioning; in case of a system outage, the operator and service crew can be notified of the need to intervene by such means as SMS.
- Detection of unauthorized opening of lamp casings with notification of the appropriate service providers.

Examples of such installations operating in Oslo and around Paris demonstrate that savings can reach as much as 70%, and reaction time to outages can be reduced to a few hours. Our products based on this technology also function in other installations. One example is that of systems in use for heating cars at car parks in Sweden, where the use of our solutions has contributed to rationalization of energy use and brought large-scale savings.

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For the producers of insulated glass units, who want to increase the safety of their employees and protect the natural environment, we offer eco pur B and eco pur C sealants.

In contrast to other sealants available on the market, eco pur C does not contain any substances hazardous to health and environment. Harmful phthalates, toxic mercury, or poly-BD, which is an expensive and scarce ingredient, have been replaced by alternative polymers. eco pur B, on the other hand, is the only sealant on the market which additionally does not contain isocyanides.

eco pur C is a two-component polyurethane sealant for insulated glass units. It protects the interior of glass units from moisture, contains the inert gas (argon) for as long as possible, and permanently connects the glass with spacer elements. Organometallic compounds used in the production process of eco pur C are not toxic to the environment and do not accumulate in living organisms. Additionally, the product doesn't contain harmful phthalates. eco pur C has all the necessary certificates, including IFT Rosenheim in Germany, IKATES in Czech Republic, CEKAL/CEBTP Solen in France TNO in Holland and GOST in Russia.

eco pur B is a completely organic sealant, which reduces risks during its production and use. It combines the advantages of polyurethanes, Thiokols and silicones. In its production process, we use hybrid polymers, and the whole process is compliant with the EN 1279-4 standard.

eco pur C:

- Continuity of supply - freedom from supply restrictions of the polymer poly-BD.
- Reduced costs of waste and finished product disposal - less hazardous components.
- Reducing the exposure of workers and users to hazardous substances.

eco pur B:

- The composition is neutral to the environment - not labelled as hazardous substance in the European Union.
- Neutral waste - no additional charges for storage of hazardous substances.
- High solubility of components A: B.

Both sealants are the result of cooperation between the eco's professional team of chemists, and research centers - Technical University of Radom, Glass and Ceramics Institute, Industrial Chemistry Research Institute, Institute for Engineering of Polymer Materials & Dyes, and Institute of Non-Ferrous Metals, among others. Both are successfully used in Commonwealth of Independent States countries, European Union, in Moldova, Belarus, Lithuania, Ukraine and Russia.

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The Onyx recuperator with an integrated control system is the solution for all owners of single-family houses, apartments and small public buildings, who value high air quality parameters in a room and convenient service system. Unlike conventional ventilation systems based on regenerators, the comprehensive solutions offered by FRAPOL enables easy and precise control of air parameters in a room, as well as control of all devices working with the air treatment system.

Frapol®
KLIMATYZACJA WENTYLACJA

- Universal systems of air parameters monitoring and control in a room.
- High efficiency of thermal energy recovery (>90%) and cool air recovery.
- Quiet operation and high comfort for the users.
- Possibility to control humidity in the room.
- System flexibility – it can cooperate with different devices, e.g. sensors, heat exchangers, heaters, air coolers, dampers, ventilators, filters, kitchen hoods.

The novel Onyx ventilation unit ensures air conditioning comfort to users and minimum primary energy consumption. The recuperator completed with an innovative control system developed by the R&D department of FRAPOL is an ingenious design characterised by the highest energy efficiency available on the market and unusually quiet running. It is the first available on the market smart ventilation system with synergy effect. The system controls all air distribution devices in the building. The current needs of the building are determined on the basis of readings of parameters from the sensors deployed in the building and algorithms hardcoded into the microprocessor. This enables to direct the required amount of air of optimum parameters to the appropriate area and, at the same time, to remove from there the air that does not meet the previously established climate comfort standards.

Over 1000 installations based on the novel system with Onyx unit supply with about half million of cubic meters of fresh air.

The FRAPOL solution is the most often chosen technology among designers of new energy efficient buildings. It was used e.g. in the complex of SKY TOWER buildings in Wroclaw and number of hotels, buildings of the Ministry of the Interior, as well as numerous residential buildings. The uniqueness of the system lies also in the fact that it may be installed in the existing buildings under thermal modernisation investments.

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For construction companies and developers constructing residential buildings, who want to include in their offer durable, inexpensive to maintain, passive houses and energy efficient buildings, we offer IZODOM, our comprehensive construction technology. IZODOM allows fast construction of high quality, durable, energy efficient buildings without the need to rent expensive construction equipment or hire additional specialists.

izodom 2000 polska

- Houses built using IZODOM technology are ten times cheaper in heating and air conditioning costs, they are both warm in the winter, and cool in the summer.
- Durability of buildings is estimated at more than 100 years.
- Homes are fit for seismic zones, up to 6 on the Richter scale.
- IZODOM allows local companies to build even five times faster, without additional investment in equipment or new professionals.

Residential buildings should be durable, aesthetically pleasing, comfortable and cheap to maintain. Comfort requires an appropriate microclimate - warm in the winter and cool in the summer. Is it true, that the costs of heating and cooling of such a building must be high? Does the construction have to be long, complicated and expensive?

The answer is IZODOM technology, giving local construction companies the ability to build single-family and multi-storey buildings, in which expenditure on heating and air conditioning can be even ten times lower than in conventional solutions.

Since 1991, IZODOM, present in 28 markets in Europe, Asia and Africa, has developed a set of materials for the construction of foundations, walls, ceilings and roof insulation, which is ideal wherever there are a lack of skilled workers and heavy construction equipment is hard to obtain. Large and lightweight components allow you to carry out construction work up to five times faster than using traditional technology, and training offered by IZODOM is sufficient to begin construction work.

More than17,000 buildings constructed in Germany, France, Scandinavia, Russia and Ukraine are our credentials. In the United Arab Emirates, 3,000 villas were built using our technology and in Morocco – the Palace of the Royal Family, measuring 10,000 m2 of usable space. The company has building permits and certificates required by the European Union, holds the ISO 9001:2008 certificate, and provides a rich collection of information materials for constructors.

We offer you free advice and valuations of your construction projects. We do not impose construction according to our designs, but we adapt our technology to local architecture and weather conditions. For sufficiently large projects, we can establish a local factory of IZODOM products.

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The LMS system allows utility providers, building managers, developers and owners of houses, apartments, commercial and public buildings to save energy. Thanks to wireless communication, it enables remote retrieval of data and thus reduces costs.

LMS opens a window to the world of intelligent and green automation. It uses miniature wireless controllers, which can be mounted in equipment responsible for controlling heating, lighting, alarm systems or fire alarm systems, as well as water meters, gas meters, etc. Devices with LMS controllers gain in functionality and energy efficiency through intelligent measurement and control. Transmitter modules have low power consumption, and a single lithium battery is enough for even 20 years of operation.

LMS may be used in many applications. The system provides remote control functionality not only to the building owners, but also to service providers such as gasworks, energy suppliers or waterworks. The added value of the system is the possibility of its continuous development. This involves constant refinement of software and development of new elements depending on the area of application and the needs of individual clients.

LMS is used, for example, to control heating devices – the system module reads the status of individual devices, such as window handles, and decides whether to turn on or turn off the heating, air conditioning, or temperature control.

- Reliability – openness, stability, long range, and encrypted data transmission.
- Innovation – intelligent controllers with continuously improving functionality and possible applications.
- Ecological – low energy consumption and up to 20 years of work on a single battery.

LARS operates since 1985. Thanks to its experience, industry knowledge, and willingness to continuously improve and meet customer requirements, it creates solutions, which make residential and commercial buildings more intelligent, comfortable and eco-friendly.

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We are conserving energy resources for future generations, without foregoing the comfort and safety ensured by the permanent lighting of streets, parks, businesses and offices. It is sufficient to use LED CLEVEO intelligent street lanterns, which generate additional savings owing to a digital controller and the innovative optic layout of lamps produced by LEDIKO Walendowski i Wilanowski Sp. j.

CLEVEO is an intelligent and efficient LED street light. It is characterized by universality of application and excellent technical parameters. By connecting a unique optic system with integrated digital control, we have made an innovative lamp of high effectiveness and unique functionality.

The source of light in CLEVEO lamps are LED diodes from the esteemed CREE company. They are a new source of light, highly reliable and offering maximum output over a long life cycle. With them it is possible to achieve optimal lighting while using a minimum of energy. The use of LED diodes is characterized by a high colour coefficient, which directly effects street level visibility. The heart of a CLEVEO lamp is the LED module with optical. The module's construction uses an innovative solution to ensure equal distribution of light onto the street, minimizing light loss. The optic system consists of LED diodes, each placed at a different angle. This allows the exceptional possibility of directing light to the precise location where it is needed. As a result, more light falls on the street, it is more even, and both comfort and safety for road users is improved.

lediko®
leding the way

- Energy savings of up to 40% compared to standard LED lamps thanks to the controller built into the housing.
- Power can be supplied by solar batteries or wind turbines.
- Low shining coefficient due to placement of light source deeper inside the housing increases safety.
- CLEVEO lamps are environmentally friendly, with low energy consumption and safe materials used in production.
- The built-in digital controller ensuring intelligent operation of the housing, gives it a unique functionality, uses less energy and has a much longer life span. The controller ensures that the lamp shines with a constant light stream regardless of surrounding conditions. It contains a function enabling automatic conservation of energy during late night hours and a thermal and age compensation function.

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This unique energy-saving construction technology is the solution for investors, developers and construction companies seeking high profits. Unlike other available technologies, our solution helps to achieve a passive housing standard (zero or plus energy) with costs similar to traditional construction. An average building takes only six to eight weeks to erect. Buildings can be erected on land with very low bearing capacity, and no heavy equipment or highly qualified employees are needed to do that.

The unique M3 SYSTEM technology enables low cost production in regards to construction and maintenance, residential buildings whose heating/cooling costs are approximately seventy percent lower than those of traditional buildings. The Expanded Polystyrene (EPS) in the form of prefabricated elements forms the supporting structure and, at the same time, thermal insulation of the building.

This technology allows for fast and efficient construction; a four-person team can erect a building in just four weeks. This technology provides the ability of establishing a low cost manufacturing facility for the Expanded Polystyrene (EPS) monoblocks.

BASF is our Strategic Partner in implementing the technology worldwide; on local markets we work with EPS producers receiving BASF products. The contractor invests only in special line for cutting out elements from EPS blocks supplied by a local supplier.

SYSTEM m3

- This technology allows for building modern, functional, economical and energy efficient residential buildings.
- Due to the material's low weight, it is easy to transport, unload and install buildings.
- The inexpensive construction can be easily erected on any type of land, even land with low bearing capacity.
- This technology allows for a passive housing standard (zero or plus energy) with small additional costs.
- It enables for an innovative and portable plant manufacturing platform.

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For the owners of houses, Makroterm has developed an innovative system of heating and air conditioning, as well as domestic hot water supply, based on optimally combining renewable and conventional energy sources. It ensures a standardized, quick installation, low operating costs, and optimum performance of the entire system. Consolidation of distributed energy sources into one system allows households to save energy, improves home comfort and energy security through diversification of sources of heat.

- Heating and cooling in houses consolidated into one integrated system, and synergy of renewable energy sources.
- Large savings on the building's operating costs, and energy security of the household.
- Modular and standardized installation system, optimized and harmonious equipment operation.
- Possibility to disconnect individual devices while maintaining continuity of operation.
- Installation can be programmed according to individual user needs.
- Prevention of solar installation overheating.
- Easy service and maintenance of the installation.

In modern, single-family housing, reducing energy demand, while improving the comfort of daily life, has become a priority. Makroterm offers an integrated heating and cooling solution for your home. It uses solar collectors and biomass energy in conjunction with a heat pump or conventional boiler.

The heart of the system is the INTEGRATOR module which connects and distributes streams of energy and optimizes the working of various heat sources. Thanks to this, solar power can automatically be stored and used for space heating purposes. There is no problem with overheating of the solar installation. In turn, the biomass device can be used as the main source of heat for the building, providing space heating and domestic hot water in the absence of sunlight. The system is also adapted to work with another source of energy – a conventional boiler or heat pump. Using a heat pump in conjunction with fan coil units additionally allows active space cooling. The system works thanks to full synchronization of all those devices. A control device supplied with the system ensures automatic operation of the equipment and the effect of synergy. An important feature of the INTEGRATOR is the function enabling blocking of the operation of heating devices, in order to avoid duplication of energy sources, which allows for optimal use of system components.

The presented system is unique, as it allows the integration of several energy sources and innovative consolidation of heating and cooling systems. This increases comfort and reduces costs of operation. The positive effect on the environment brought about by the use of energy from renewable sources, is also significant.

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For all enterprises looking to lower and control their utilities costs (energy, heat, water, gas and others), we offer consultation services and comprehensive measurement and IT solutions assisting in lowering such costs. Unlike the competition, we are distinguished by our wealth of experience gained during the realization of over 100 projects, integration of metering equipment from different producers and different utilities, as well as advanced reporting and data analysis functionality.

ERCO.Net is an integrated system of registration and analysis designed to integrate with metering equipment for various utilities and of various sizes. It is an excellent tool for clients interested in systems that allow for monitoring and analysis of consumption of all energy utilities and primary physical values, as well as ensuring the proper functioning of the technological process. Created using modern metering and computer technologies, ERCO.Net enables the adaptation of particular functions to the client's individual needs. It can also be a robust tool adapted to new, market-based rules for settlements with individual suppliers, as well as for the flow analysis and balancing of all energy carriers between individual organizational units (external, departments, buildings). ERCO.Net is also equipped with options for analysis, forecasting, planning and simulations.

Network Media Group

- Multi-utility capacity – ERCO.Net assists in management of utilities (electrical energy, gas, water, heat, air and waste, and more), and can also track the functioning of the production process and monitor such parameters as temperature, pressure and humidity
- Modularity – ERCO.Net allows the client to decide which modules of the system will be used. The application can combine metering data acquisition with complex analytical, forecasting, planning and simulation functions.
- Flexibility – by allowing for the free definition of tariffs and contracts, ERCO. Net is an excellent tool for conducting settlements with both suppliers and receivers.
- Financial benefits – ERCO.Net enables reductions in energy utilities costs through comprehensive application of the aforementioned capabilities.

NMG Sp. z o.o. is a leader in Poland in the delivery of professional IT systems supporting rational energy management in enterprises. Some of the largest firms in Poland use our services, such as: Carrefour Polska Sp. z o.o.; Krajowa Spółka Cukrowa S.A.; Polfa Pabianice; Panasonic Energy Poland S.A.; TELE-FONIKA Kable Sp. z o.o.; Unilever; Grupa Saint-Gobain, Grupa Sokołów S.A., and also such smelters and mills as Huta Będzin S.A. We are also present on the foreign market with our installation in Panasonic Energy Belgium S.A. (Belgium), which meters production equipment for energy use as well as modernized the metering and settlement infrastructure.

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Let us take optimum care of rational use of energy utilities in the buildings we manage. This is the way to ensure real savings and clean environment. Thanks to the PROMAR technology, you can remotely, via the Internet, manage consumption of heat, electricity, water or gas located in any buildings. To operate the PROM@R MONITORING SYSTEM you just need a web browser and Internet access. What's more, the technology is compatible with devices from different manufacturers, and its implementation provides security of operation and reduction of energy consumption costs.

The solution concerns a comprehensive service based on an in-house developed solution. PROMAR combines experience, unique knowledge and information technology in the field of managing energy utilities.

This heat, electricity, gas or water is supplied by independent providers to all types of residential buildings, public buildings, industrial halls, warehouses, etc. The solution includes a system and Prom@r Monitoring Controller – specialized equipment with a dual role. It is both a device to control various actuators and at the same time controlling and measuring equipment for all types of sensors, meters measuring temperature, flow and other parameters related to control devices. It transmits and receives data needed to analyse the behaviour of buildings and premises and to control actuators using GSM technology and the Internet.

PROMAR®

- The systems has adequate functionalities for, inter alia, independent control of the facility and additional notification and reporting functions in case of failure.
- All data on each monitored facility are stored in a central database, and then made available through a web browser in the form of relevant reports.
- We offer comprehensive monitoring, operation and maintenance services.

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WSK KRAKÓW SP. Z O.O.

For individual clients and institutions seeking an efficient, ecological and self-operating system for, heating, air conditioning and hot water preparation, we offer VATRA geothermal heating pump. Unlike competing solutions, we deliver high performance units with power ranging from 6 to 320 kW and more, with zero direct emissions of harmful compounds into the atmosphere, along with a control system enabling the pump to be adapted to any kind of installation.

- High efficiency of the unit – low bills for heating/air conditioning/heating water.
- Hands-free operation – no need to spend time operating/fueling unit, easy and user-friendly control interface.
- Silent device operation.
- Zero local emissions of pollutants produced by the heat pump – beneficial for the natural environment, clean surroundings.
- Absence of waste from functioning of the unit, installation does not require a place for fuel storage.

The VATRA heating pump is a heating and cooling device that collects heat energy from the earth and transforms this energy into energy used for heating and cooling buildings, as well as heating water. Geothermal heating pumps are used as heating and cooling devices in homes, industrial facilities (greenhouses, cold stores, swimming pools) and for heating and cooling public facilities. VATRA heating pumps are characterised by very high efficiency (efficiency coefficient of 4.5), which results in a considerable reduction of heating/ cooling costs compared to traditional methods. VATRA technology does not create any substances harmful to the natural environment, operates quietly and is long-lasting.

WSK Kraków has already completed 20 installations of heating pumps for heating, and cooling, as well as hot water preparation, with total power of 1.5 MW. Users of the technology include industrial facilities, public institutions and individual clients. Heating pumps produced by WSK Kraków operate as independent, primary energy generators as well as cogeneration units in combined heat and power installations, where the heating pump works with other generators such as GCHP (gas combined heat and power) and solar. WSK Kraków heating pump installations use primary sources of energy such as ground resources, waste-generated heat, water reservoirs, wells, and also a bypass constructed on a water pipe. The technology has been implemented in such places as the Social Assistance House (Mariówka), Wiatrak Foundation (Bydgoszcz), MCD Electronics (Żywiec), the John Paul II Institute in Kraków and for individual clients.

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For power stations, co-generation plants, heat power production plants, and also for the transport industry (sea, land and air cargo) seeking a solution to help reduce fuel use, lower emissions of pollutants into the atmosphere and increased efficiency in the burning of all types of fuels, we offer the REDUXCO catalytic converter. Unlike the competition, our technology ensures that the internal heating surfaces of boilers remain in good technical condition and operate soundly and stably. It is the only product of its kind to offer such a range of functions.

- Reduction in fuel consumption.
- Reduction in emission of harmful gases: CO_2, CO, NO_x, SO_x.
- Cleaning of heating surfaces of boilers and maintaining their good technical condition.
- Easy dosing.
- Rrelatively low cost.

The REDUXCO catalytic converter is an innovative Polish product that improves the combustion efficiency of fossil fuels. It is a fluid chemical substance that lowers the energy of activation of a chemical reaction, which as a result increases the speed of oxidation of hydrocarbons, reduces fuel consumption and reduces the emissions harmful gases emitted such as CO, CO_2, NO_x and SO_x. It has been registered in accordance with the REACH Regulation under the number 01-2119406877-30-0000. The product is not classified as dangerous to human health or the environment. It has passed all necessary tests and possesses all required certificates. The REDUXCO offer includes a REDUXCO combustion catalyst, dosing installation, free installation, training concerning general operation of the installation and maintenance.

REDUXCO technology can be installed in every place where the energy and industrial sectors are characterized by high energy consumption and the necessity to limit the emission of pollution into the environment. Dagas is presently waiting for approval of the Ukrainian Ministry of Fuel and Energy for official installation of the REDUXCO catalytic converter. Installation and testing are conducted by the Coal Energy Institute and the PAN Academy in Kiev. In Russia, Dagas has concluded a letter of intent with Gazprom for a trial installation of the REDUXCO technology. The implementation project started during August-September 2011. In Bulgaria, implementation tests are ongoing at the coal-fired TEC „Maritsa Iztok-2" power station. This year Dagas is planning further tests in cooperation with an independent Bulgarian auditor.

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Now, each plant producing coke using the dry cooling method can effectively solve the problem of emissions of harmful dust and gases into the environment through the use of natural gas production waste for energy production. It is just enough to implement the technology of drawing, cleaning and combustion of gases in the steam boiler offered by Energoinstal S.A. to significantly reduce emissions. Using dust and gas for energy production purposes is clear profit. Let us not allow pollution to destroy the environment – let us change it into clean energy!

ENERGOINSTAL
constructing tomorrow

- The technology allows the use of energy from process gases, which will cover the current and future demand, without increasing the greenhouse effect. It allows to save non-renewable primary energy resources in the form of fossil fuels, while complying with the guidelines of the European Commission of 10 January 2007.
- It allows reduction of a number of gas and dust pollutants discharged into the atmosphere.
- Disposal of excess gas enables the achievement of additional energy benefits.

IThe essence of the technology offered by Energoinstal S.A. is the use of process waste gases for energy production purposes. This method effectively uses waste gases discharged into the atmosphere, polluting the environment, such as excess gases, and also uses process coke gas after low pressure cleaning to co-generate heat and electric energy. In the classic technology, excess gas is carried through the so-called „cold stack" or burned in a coke gas flare. The technology of Energoinstal S.A. reduces the emission of dust and gas and several other pollutants into the atmosphere.

The flagship implementation in this area is the construction of the Heat and Power Station at „Przyjaźń" Coke Plant completed in 2007. Energoinstal S.A. acted as the General Contractor of the investment. The excess gas management method used at „Przyjaźń" Coke Plant provides great energy and environmental benefits.

Thermal utilisation allowed to achieve the following strategic production objectives of the coke plant using the stream of collected fuel gas mixture: process steam, heating steam, heat for the district heating network, and ultimately generation of electric energy of 1921 MW.

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The automatic monitoring station is a solution for all those struggling with the problem of traffic noise.

Unlike other noise measurement systems, we deliver a solution for long-term monitoring with flexible expansion capabilities, saving time and resources.

- The station rapidly identifies cases of exceeded standards and correlates them with the so far collected data via a controller built-in the station.
- Internet service - saves time and full automation of measurements thereby replacing the former manual data collection techniques, such as counting vehicles.
- It is unnecessary to purchase and install additional software.
- The station can be powered by different sources, also connected with solar panels.
- Simple and intuitive station software handling.
- Compatibility with most of the measurement devices.

The ENVIRO 151 station is intended for permanent and long-term recording of noise level, traffic intensity and environmental conditions: temperature, air humidity, atmospheric pressure, wind speed and direction and precipitation. It is also possible to install a measurement unit for air quality parameters. The station can be used as a mobile measurement system installed in a car/on a trailer. It is possible to control the station via all internet browsers. Measurement data can be downloaded directly from the station as well as from a server, which may be adjusted to automatic downloading, storage and distribution of data from several measurement stations constituting a monitoring network on a given area.

The ENVIRO 151 has received an award at the International Trade Fair of Municipal and Road Infrastructure in Warsaw and the POLEKO International Trade Fair of Environmental Protection in Poznań. The technology has been implemented e.g. in several big cities in Poland: Kielce, Wrocław, Gdańsk and under projects implemented in the Czech Republic e.g. smart traffic management at road reconstruction points.

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For industrial and production facilities, health care centres, transport, telecommunications, and IT sector which need an uninterruptible power supply system that generates electrical energy, we offer an emergency power supply system PULSTAR based on ecological fuel cells. Unlike competing conventional solutions with classic batteries having detrimental effect on the environment during production, exploitation, and utilisation, we offer ready-made power supply systems with fuel cell working on electrical grid and long-lasting individual receivers, ensuring the continuity of power supply in the event of an outage without any problems during exploitation.

- An innovative, ecological power source based on PEM-type fuel cell.
- Failure-proof system thanks to monitoring of the fuel cell's functioning, registering of the feeder's functioning and raising the alarm in case of an outage using the Automatic Management System (SAN 3) to control the functioning of the feeder.
- Safety is ensured by the use of redundant hydrogen anti-leaking safeguards and power surge protection, short circuit safeguards, etc. with the RS-232 interface.
- Modular construction.
- High stability of voltage and output current and low pulsation of output current.

The PULSTAR backup power system is based on an ecological energy source – fuel cells. By delivering hydrogen and air, we receive electric energy and clean water as a by-product. The cell functions silently and is very small in comparison to an aggregator/battery. It can be installed in any chosen space. A standard large bottle with hydrogen ensures the system will operate at a power of 1kW for 8 hours. The fuel cells directly convert energy contained in chemical reactions into direct current energy. This transformation is highly efficient and makes a very minor impact on the environment.

The PULSTAR power supply system has been implemented and is in use of 4 clients – the Gdańsk University of Technology, the Łódź University of Technology, the Warsaw University of Technology and the Silesian University of Technology. The delivered power supply systems are composed of the following elements: a fuel cell with a power of 1.2 kW, a DC/DC converter stabilising the tension from the cell, an inverter allowing for powering the system with alternating current receivers, and also cooperation of the system with a low-voltage distribution network. The system is equipped with a monitoring system that allows it to be controlled remotely and meters all of the system's operating parameters. PULSTAR systems offered to research and development enterprises are used for conducting research on both the fuel cells themselves and the system in its entirety. In addition, delivered technology enhances the didactic programme with the newest technologies in the area of electrical energy production. PULSTAR guaranteed power supply systems have been implemented in their entirety by clients. The first implementation took place already in 2003.

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BIOMASSER® mobile devices for the production of Golden Coal® from straw and hay can reach any place where the raw material is stored. From now on, straw and hay briquettes can be produced anywhere – directly at a stack in an open field, on a dirt road or in a barn. What's more, BIOMASSER® briquettes agro-biomass without the need for drying.

And all that at the lowest cost of purchase and operation of machinery.

ASKET®

- The machines are easy to use and require no special qualifications.
- You do not need to dry the raw material before briquetting, which eliminates the risk of fire hazard.
- Low costs of purchasing and maintenance of the dryer.
- Flexible capacity – can be easily adjusted by adding more machines to the existing ones.

The BIOMASSER® Technology includes briquetting of straw at a humidity rate of 15%-30% without the need for prior drying. BIOMASSER® briquettes natural raw materials without the addition of adhesives, binders and similar substances. The result is one hundred percent ecological heating fuel – straw briquettes called the „golden coal." Consumption of electricity in the whole production process is very low. Depending on the size of the system, on average, it amounts to 40÷70 kWh per 1 ton of briquette.

This technology is based on the principle of compression of crushed biomass delivered to the screw chamber of the briquetting machine, which is pushed outside in the form of briquettes.

The briquetting technology of damp agro-biomass BIOMASSER® is used in plants for the compaction of agricultural waste, mainly straw and grass, intended for energy purposes.

The latest solution offered by Asket Roman Długi is the BIOMASSER® MOBILE line. This is a complete set of equipment for briquetting built on a trailer wheel. BIOMASSER® MOBILE is designed for briquetting straw and grass in the field, directly at the stack. The production line consists of a feeding table for bales of straw, a chopper, chaff containers and a briquetting machine. The machines are powered from the electricity network or an engine-generator. The latest BIOMASSER® MOBILE line, manufactured for a customer from Sweden, is powered from an engine-generator mounted on a wheeled trailer. Its output is as much as 420 kg/h!

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For everybody who wants to significantly reduce growing cost of maintenance of house, production hall, or public building, we offer solar hybrid collectors Ensol E-PVT 2.0, which produce electric energy and provide domestic hot water heating.

Contrary to other solutions our collectors combine both functions, which lowers the costs of investment and allows to maximize the use from available surface of the roof.

- 2 in 1! One device for water heating and electricity production.
- Saving the roof and a significant reduction in installation costs.
- Multifunctional use, hybrid collector ENSOL E-PVT 2.0 is perfect for both domestic and industrial installations.
- Annual efficiency of electricity production increased by 15-20% as compared to standard photovoltaic modules.
- Maximal use from the available surface.
- Faster investment return .

The ENSOL E-PVT 2.0 hybrid solar collector combines a flat solar collector with a photovoltaic module. The collector converts solar radiation into thermal energy used for heating process water and central heating, whereas the photovoltaic modules transform solar energy into electric energy. The maximum power of the photovoltaic module is 300 W. The collector is framed in a special, patented aluminium profile.

Owing to the roll-bond heat exchanger, the heat reception by the solar agent of the absorber is better by 25% than in case of regular absorbers which follows from the greater surface of connection and roll-bond construction. Moreover, such a solution guarantees perfect cooling of the photovoltaic part thereby preventing a drop in electrical efficiency along with increase in the temperature of cells. The E-PVT 2.0 hybrid collector has been constructed in such a manner that the process of glycol reheating in the thermal part and heat reception from the cell reduce its temperature preventing a loss in energy efficiency.

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For owners of single-family homes, guesthouses, commercial objects and recreational object and other structures looking for economical solutions for heating and warm water, we offer an ecological devices fired by Pellet-type biomass granules. In contrast to the competing solutions, offered by us products is characterized by high efficiency (over 90%), automated system of functioning (automated lighting and feeding Pellets), the smallest dimensions and an innovative, protected by patent boiler furnace.

- High efficiency up to 92%.
- Technology in accordance with standard no PN-EN 303-5:2002, confirming the highest possible Class III rating for heat efficiency and CO emissions.
- Automated system of functioning .
- Small dimensions.
- Ceramic cover of the burner.

Central heating boiler furnace for pellets with a power of 9kW to 100kW is a device for burning granulated fuel – pellet type. A characteristic feature of this technology is the automated process of top-loading fuel with a help spiral feeder and automated lighting fuel in furnace. The modern and compact construction in a single small block allows installation of devices in small spaces. The device's functioning is automated, self-modulating the fuel feeding and ventilator strength by adjusting the power of the burner in a range from 30% to 100%. The multi-level system of boiler safeguards and fuel in the tank allows for effective operation in both open and closed heating systems. The technology has been verified by the Republic of Poland Patent Office and given the patent number 208898. In accordance with the norms PN-EN 303-5:2002 and EN 303-5:1999, the technology has received the highest possible Class 3 rating for heat efficiency and CO emissions.

The technology presented is used in single-family houses, guesthouses, commercial objects (Koperfan Sp. z o.o.) and recreational objects (Gospodarstwo Agroturystyczne Klimbergowice) as well as other buildings („Dąb" housing co-op in Suchy Dąb), both domestically and abroad, where our business partners offer our products in such countries as Denmark, Greece, Portugal, New Zealand and Germany. This technology is offered for all who need economic solution for heating and warm water. Offered technology has been implemented for over 1000 domestic and international customers as well as for institutional customers in the frame series with power ratings from 9 kW to 100 kW. The most important advantages of this technology are its efficiency, functionality, and most of all the long-term environmental effect from reductions of CO_2 emissions resulting from the use of eco-friendly fuel pellets.

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The all-aluminum construction HEWALEX Am series solar collector has been developed for individual clients, and for anyone needing a cost-efficient method of domestic hot water preparation, central heating or swimming pool heating. In contrast to collectors from other manufacturers, the KS2000 TLP Am model features a remarkable price to efficiency ratio, which has a direct impact on reducing the payback time on investment. It has high durability performance and a long warranty period, thus operating maintenance-free and providing peace of mind for its users for many years to come.

HEWALEX products are well known in more than 40 countries for their high quality, reasonable price and long warranty periods. The company's own Research & Development department and continuous pursuit of innovative and more effective solutions have made it possible to implement a number of improvements during over 20 years of company's market presence.

The heart of the collector is its absorber – a metal sheet with piping welded to it. The absorber is responsible for intercepting the solar radiation and transferring thermal energy acquired in such a way to water in a tank.

HEWALEX is the first company in Poland to have implemented ultrasonic welding, and more recently also laser welding technologies in the production of absorbers. Laser welding has allowed the introduction of flat plate collectors, with the absorber made of an aluminium sheet and aluminium piping. It guarantees the highest precision, durability and lack of deformations of the sheets, in all points of contact to the pipes.

HEWALEX

- The all-aluminium absorber eliminates the necessity of connecting different materials and offers high durability of construction, convenience of use and hassle-free recycling.
- High optical efficiency (81.7%) maximises the energy output per surface unit of the Am collector area.
- All-aluminium absorber weight is reduced by about 50%, and that of the entire collector by about 15-20%, compared to copper absorbers.
- Price of the collector reduced by 30-40% compared to standard flat collectors.
- Outstanding price-to-efficiency ratio.
- Complete set of dedicated components, neutral for aluminium, which guarantee long-lasting operation of the solar installation, confirmed by a 10 year warranty period on the collectors.

Contrary to the joints made by soldering, laser welding guarantees full thermal conductivity of the connected parts, especially when they are made of the same material. The secret of the successful application of the absorber's aluminium piping lies in designing dedicated components, made of materials which are inert to aluminium.

The final result of implementing this technology, is the possibility to offer solar installations of high operating effectiveness to individual customers at an affordable price.

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HYDROERGIA specializes in designing and creating customized solutions for every kind of Small Hydro Power project, thus allowing the most efficient use of any watercourse. Each turbine we manufacture has individually designed rotor blades, in order to achieve the highest production level of green energy.

- Individual analysis of a watercourse.
- Personalized design of turbine blades.
- High efficiency and ergonomic operation of turbine and power plant.
- Lower operating costs of power plant.
- Comprehensive services for your investment project.

Kaplan turbines are double-regulated by both rotor blade and directing blade angles. The turbine wheel is individually designed to match the parameters of a given hydrological location. Each turbine has a fully automated control panel, set to achieve the maximum instantaneous power as a function of flow. The range of operation is between 20 - 100% of the installed discharge of water - which makes the proposed structures very efficient in a wide range of flow.

We offer solutions with Kaplan's turbines in any configuration - fit for every Small Hydro Power facility.

HYDROERGIA is also involved in modernization of existing turbines in the following extent:

- replacement or refurbishment of the rotor, based on the analysis of turbine's hydraulics and the use of numerical methods for optimizing the shape of rotor blades
- refurbishment of the steering mechanism in order to increase the power output by refurbishing the directing blade' surfaces and installing automatic regulation of the directing blade angle
- replacement of a belt drive with a high-performance drive
- replacement of the generator and electrical system, to meet higher standards of performance and safety
- addition of a suction pipe, enabling the recovery of kinetic energy
- addition of a purpose designed automated control system, to increase the momentary power of the device, compensating for watercourse flow fluctuation

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The sun is a source of free energy for single- and multiple-family housing units, hospitals, sanatoria, recreational facilities, etc. Thanks to solar energy, we can be free from energy proce spikes energy, heat our buildings effectively, and most importantly – maintain a clean natural environment along with fuel reserves for future generations. We would like to present an energy-efficient heating installation – **the neosol 250 solar panel** together with a complete solar system.

neon

- High efficiency of the meandering exchanger in a Sunselect coating with an absorption coefficient of α > 95%.
- Four-millimetre-thick, highly-transparent and weather-resistant solar glass.
- **Neoglas** diffusion membrane protects the insulation from moisture.
- Life span of over 25 years without a loss in efficiency during the entire life span.

The primary product made by the company Neon is the neosol 250 solar panel. It is a technologically advanced construction, coupled with particularly high technical and functional parameters. It is differentiated by its meandering exchanger, allowing the panel to achieve higher performance than competing products. The construction is characterized by the heating element that extends a distance of 26 m through the panel. The high flow speed gives the stream a turbulent character, which in turn has greater capacity to absorb heat. The neosol 250 solar panel with a meandering exchanger is characterised by a minimal sedimentation and aeration zone, as well as exceptional self-bleeding capacity. The neosol 250 solar panel is also distinguished by excellent test results recorded by an independent and accredited laboratory, and a full quality test confirmed the unit's outstanding quality (e.g. stagnation temperature of 250°C). A complimentary element to the key product is the neosystem complete solar system – one of the best and most effective solar systems on the market. The neosystem solar system includes such elements as an assembly kit for all types of flat and sloped roofs, compensating connectors, connecting kits, bleeding kits, roof passages and the neounit pumping and regulation groups.

One of the most important customers for the neosol 250 technology is The Lord's Providence Sanctuary (pl. Świątynia Opatrzności Bożej) in Warsaw. The modern heating and energy network has been designed to meet heating and electrical energy needs. For conversion of solar radiation into heat, highly efficient neosol 250 solar panels have been applied along with a complete neosystem solar system. The solar installation with a surface area of over 100 m^2 was mounted on a special support construction on the roof of the parish and diocese headquarters. Since 2010 Neon has participated in the joint Poland-Ukraine project „Renewable energy sources – applying Polish experience in Ukraine", initiated by the Poltava State Agrarian Academy, where a Renewable Resources Laboratory has also been opened and equipped with a solar installation using neosol 250 solar panels.

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The NIKOL heat recovery ventilation unit is a solution for all those building or renovating buildings who want to significantly reduce the cost of heating or air conditioning and get rid of problems resulting from the absence or ill-functioning ventilation system. As opposed to natural or other simple ventilation systems, we offer a device that allows you to significantly reduce the cost of heating or air conditioning and ensure efficient and user-friendly ventilation.

- The use of spiral countercurrent heat exchanger with a very large active surface enables heat recovery at a level of up to 96%.
- High heat recovery efficiency - heat exchanger made entirely of aluminium.
- Low costs of heating and devices maintenance.
- Constant inflow of fresh air free of allergens and pollutants.
- Elimination of excess humidity and odours from the rooms.
- Elimination of draughts and street noise.

The NIKOL HRV is a patented solution enabling efficient ventilation of buildings and very high (up to 96%) heat recovery from extracted air. This is possible owing to the use of a spiral countercurrent heat exchanger that has at least several times greater heat exchange surface than other units on the market. As the first producer on the market we have introduced energy efficient and effective EC ventilators as a standard, as they significantly reduce the device maintenance costs. Each NIKOL unit is equipped with an automatic by-pass enabling to circumvent the exchanger in summer.

It is possible to control the ventilation unit via a mobile phone, laptop and from the level of a smart home with the use of MODBUS communication protocol.

A complementary part of the unit is an electronic controller with a weekly programme, which optimizes functioning of the device and reduces energy consumption. Moreover a device has two EU4 class filters cleaning the blown-in air from pollutants. The NIKOL ventilation unit does not use initial electric heaters thereby the costs of maintenance is significantly reduced.

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For sewage treatment plants, agricultural biogas installations, waste depots and other enterprises producing biogas wanting to use this gas in the production of heat and electrical energy while seeking an effective method of removing hydrogen sulphide (as well as dust and siloxane), we present BIOSULFEX®. Unlike competing solutions, it delivers an exceptionally effective technological process that removes hydrogen sulphides, leaving amounts as small as a few ppm.

Z. I. PROMIS

- Over 99 % efficiency in removal of hydrogen sulphide, to as little as a few ppm.
- BIOSULFEX® technology does not create wastes nor does it emit harmful substances into the atmosphere.
- Very small quantity of by-product (sulphur pulp) which is a much-sought-after raw material.
- Patent-protected technology.
- The unit is very cost-efficient.

Removal of hydrogen sulphides using BIOSULFEX®, prevents corrosion of pipelines and boiler elements, helping to eliminate outages of such equipment. The treatment process also eliminates the threat of poisoning by toxic hydrogen sulphide. BIOSULFEX® is tailor-made to the needs of each client. Its efficiency is in excess of 99 %. The only by-product of the process is sulphur pulp, which is also a very valuable raw material. BIOSULFEX® can also be equipped with elements for removing dust and siloxane. It is also possible to install a multi-gear version of the unit, allowing for more cost-efficient operation of the unit when it is used less intensively. The unit does not require constant hands-on operation, is compact, offers easy maintenance, and is also made from high-quality materials.

During 20 years of operations, Zespół Innowacyjny PROMIS has produced over 20 units. The primary recipients of the technology are sewage treatment plants. BIOSULFEX® units are in operation in places such as Warsaw, Szczecin, Kraków, Mińsk Mazowiecki, Puławy, Siedlice, Opole, Grudziądz and Raszków near Ostrów Wielkopolski. The volume of biogas produced by the units currently in operation ranges from 50 m^3/h to 2 250 m^3/h.

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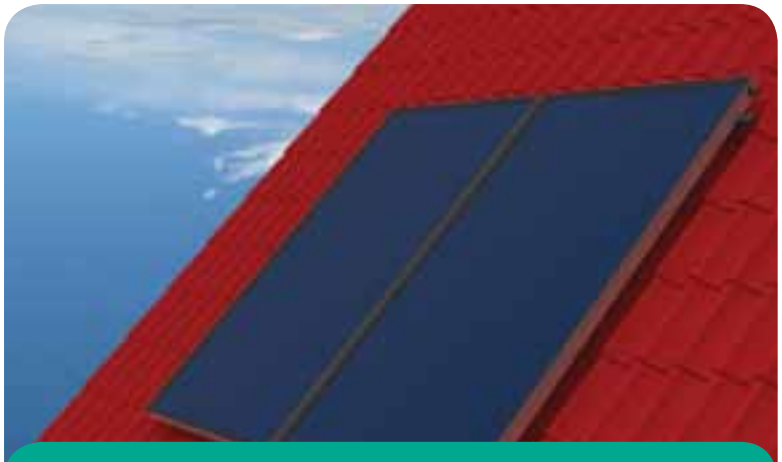

The use of clean energy does not necessarily involve sacrifices. A solar collector, which reduces energy costs related to heating and hot water, can also become an ornament of a house, a multi-family building or a public facility. SUNEX are advanced solar panels, which unlike many other European collectors are made from high quality stainless steel. This feature, combined with a well-thought-out design, ensures very high quality, aesthetic qualities and durability.

A flat collector with a stainless steel frame is an innovative solution on a global scale. As you know, solar panels are devices that are designed to operate for decades, and therefore the application of the sustainable housing is a strategic issue. For many years, SUNEX has been one of the European leaders in developing trends in the solar technology market – both in terms of innovative material and design solutions, as well as production lines for manufacturing of all elements of the solar system: solar panels, trays, solar power stations, heat storage media, mounting and connection kits, etc.

The company's long-standing experience has revealed that the most lasting solution for frame construction is stainless steel, and not the commonly used aluminium.

- The flexibility of the production technology allows production of the device according to individual needs and requirements of the customer.
- The product has excellent resistance parameters.
- The flat solar panel is resistant to even the most aggressive and humid environment.

However, material solution is not everything. To obtain a final product not only with excellent mechanical parameters, but also with performance and exposure properties, we need a modern and unprecedented production technology. SUNEX developed and implemented such technology.

The solar panel is manufactured in four different dimensions, i.e. 2.0 – 2.38 – 2.51 – 2.85 m^2, in horizontal or vertical versions, with an absorber in the form of meanders or a single or double harp section.

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URSUS

For all those with good access to straw and hay who also want to begin producing ecological fuel for power stations and co-generation plants, we offer the LTBS Technological Line. Unlike the competition, our technology enables production of both briquettes and pellets using the same units, and is characterized by greater production efficiency while reducing operational costs.

- High efficiency – confirmed by tests conducted on LTBS lines presently in use.
- Automation – LTBS is partially automated and adapted to continuous functioning.
- High quality components – LTBS components are sourced from world-class suppliers of motors and engines, gears, bearings, electronics, etc.
- Long-lasting work tools – highly abrasion-resistant steel.
- Universality of the unit – enables work with various forms of biomass and also makes it possible to adapt quickly to the requirements of the energy market.

The LTBS Line is composed of a series of machines and equipment comprising two modules: grinding and briquette forming. The process consists in the grinding of raw material in the form of pressed straw and its forming into briquettes. The raw material produced is then sold to the energy industry, as well as to individual customers. The line's capacity is from 1.2 to 1.8 t/h for grey straw without impurities and foreign bodies and with a moisture level of 14% to 20%. The final result of LTBS production is a briquette of 70mm diameter or a pellet of 22mm diameter, of variable length from an intake load of approx. 450 kg/m3. The total installed power in the LTBS units is approx. 250kW with energy requirements of approx. 175 kW.

URSUS S.A. conducts direct sales of the presented LTBS Technological Line for Straw Briquette Production. One of the main clients for this technology, apart from numerous individual customers, is Bioenergia Invest S.A., a subsidiary of URSUS S.A., which is presently using 9 LTBS lines alongside 12 lines with older technology. The basis of Bioenergia Invest S.A.'s activities is the purchase of LTBS technology, leasing of the units to potential clients, receipt of the briquettes produced and their delivery to power stations burning pure biomass or biomass alongside coal. The volume of briquettes produced by Bioenergia Invest S.A. is constantly rising, and network production capacities are adapted to current market needs. A condition of cooperation with the company is the desire to organize the production of briquettes and pellets, as well as ensuring the appropriate amount of material for production. At present, units comprising part of the LTBS line are use in such countries as the United Kingdom, Lithuania, Romania and Belarus, and the company is presently negotiating terms with a partner in Serbia.

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More energy and no bills for gas, heating oil and electricity. This message brightens up each day for all investors and owners of single-family houses who use WATT 4000S/SU solar panels. This product in many ways surpasses the alternative solutions: wind power stations, heat pumps and photovoltaic panels. It costs far less, allows considerable savings in the short term, does not require an installation permit and is highly effective.

The solar panel is provided with an anti-reflective CENTRROSOLAR glass, reducing light reflections from the glass surface to a minimum, while more UV rays reach the absorber.

Watt 4000 flat solar collector is available in two solutions, as the S and SU models, which differ in the number of connection ports. Watt 4000 S has four connection sockets, which allows you to connect more panels in large-size installations. Watt 4000 SU with two connecting pieces is used for smaller installations. The solar panel is produced entirely by Watt. Connecting tubes, through which the heating agent with the absorber flow, are a patented element of the technology. The absorber plate is properly profiled – we emboss a special groove for the tube for the heating agent, which increases the contact surface of the absorber plate with the tube. Moreover, the method does not damage the selective absorber coating and does not deteriorate its properties. The combination results in a more efficient transmission of heat to the heating agent, which is confirmed in the very good collector tests results.

watt®
tworzymy technologie solarne

- Very high performance coefficient (ETA 0 = 0.845).
- A unique, patented system for connecting flow pipes with the absorber, allowing faster and better exchange of heat.
- The anti-glare CENTRROSOLAR glass reduces light reflections from the glass surface to a minimum, while more UV rays reach the absorber, which increases its efficiency.
- Larger contact surface of the absorber with the flow tubes results in a higher exchange area.
- The box made of a single aluminium element is extremely robust, durable and resistant to moisture.

One of the most important systems developed using WATT 4000 S has been the installation of 320 solar panels on the roofs of the Independent Public Health Care Centres in Wlodawa.

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ATON high technology

For industrial facilities, hospitals, companies in the water and sewer industry, and waste management facilities seeking an effective, safe and environmentally friendly solution for neutralising hazardous waste products, we offer equipment based on MTT (Microwave Thermal Treatment) technology. Differently from other technologies and methods used in transport equipment, our solution enables waste management at the location it is created (at the source), while needing a relatively low level of energy input, producing low emissions of pollution into the environment and offering the possibility of managing solid post-processing waste and the resulting heat which is generated.

- The application of highly-concentrated microwave energy for selective and „contact-free" heating of the entire volume of waste products, which in comparison to other methods offers a marked acceleration of the process of their neutralisation and improves effectiveness.
- „Zero emissions" as an effect of the absence of additional energy sources such as burners.
- Equipment is mobile and transported to the site where waste is generated, which makes it possible to eliminate transport of waste materials away from the location at which they arise.
- Processing of waste into environmentally safe substances, reduction in the mass and volume of waste and recovery of energy.
- Possibility of remote operation and controlling of the process as well as acceleration of maintenance by allowing observation of process parameters in the main office of ATON-HT S.A.

The MTT method neutralizes hazardous waste products and other materials, as well as recovering valuable elements. It is characterized by the contact-free microwave heating of whole wastes to very high temperatures (800-1200°C). The processes are conducted without using any additional source that would emit pollutants into the atmosphere (e.g. burners). Equipment from ATON-HT S.A. using the patented MTT method is portable, which makes it possible to manage waste at the source where it arises. This solution does not require any additional external media apart from a stable source of electrical energy. It is additionally possible to recover energy in the form of heat or another carrier. To perform MTT-method-based processes, a series of units have been developed: ATON BW for gasification of waste products in a stationary ceramic chamber, and ATON HR reactors, in which the processing is performed inside a rotating ceramic drum. Post-production gases are directed to the unique ATON MOS segment, in which they are cleansed of harmful substances in a ceramic chamber heated by microwaves to temperatures of 900-1200°C.

The MTT method has been implemented in Europe and the United States. In the United States, microwave technology is used for treating casting sands and for removing pollutants from the ground resulting from petroleum with an ATON HR-S unit. Many tests and trials on various types of waste products are also conducted in Poland. Here, the ATON BW-M unit is used for neutralizing medical waste and artificial materials, the HR-T unit is applied mainly in the gasification of tyres, and post-process systems of gases treatment is performed by the MOS system.

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Pyrolysis plants are the solution for all those looking for eco-friendly methods for rubber, plastic, municipal waste, and solid biomass treatment. Unlike competitive solutions, the use of Dagas technology enables to generate thermal power, which can be processed into electrical or thermal energy.

The pyrolysis process is thermal decomposition of substances with the use of high temperatures without contact with oxygen or other oxidising agents. The Dagas NT and WT pyrolysis installations use the low and high temperature pyrolysis processes together with the system of solid and liquid REDUXCO catalyst. This technology enables converting rubber waste (e.g. used tires), plastic waste (e.g. polyethylene, polypropylene, polystyrene) and solid biomass (forestry and agricultural waste, and some municipal and industrial waste) into gaseous hydrocarbons. Next, these substances can be transformed in peripheral devices into electrical and/or thermal energy.

- Simple construction - Dagas reactor does not have a chimney which is directly translated into lack of emissions of harmful gases (dioxins and furans).
- Mobility of the installation.
- High efficiency - the applied solutions help to achieve ca. 1 MW of electricity and 2-4 MWc of heat from 20-25 Mg of waste.
- Highly efficient incineration process - due to the use of an innovative solid and liquid REDUXCO catalyst.
- Low costs of raw materials, or in some cases even profit resulting from its acceptance for disposal, collection of the product fee.

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ECOTECH POLSKA
Omnia subiecta sunt naturae

It is a true breakthrough in the field of neutralisation of dangerous and toxic wastes. The innovative EnviroMix® technology does not require significant investment and ensures a limitless guarantee of safety for the natural environment. EnviroMix® is an effective and cost-efficient way to stabilize waste products.

- An extremely effective technology in such areas such as removal of heavy metals, pesticides, cyanides, WWA and benzopyrene.
- Due to the specifics of binding pollutants with magnesium compounds, the EnviroMix® technology is resistant to washing out of pollutants.
- The primary distinguishing feature of the technology is the extreme reduction in stabilizing material per mass unit of waste.

The stabilization process on which the EnviroMix® process is based is a technology recognized around the world. It gives excellent results in chemical binding and stabilization of dangerous waste products. This type of stabilization meets the requirements of many countries and is supported by independent scientific tests. The EnviroMix® process is used on an industrial scale to process thousands of tonnes of dirtied soil, sediments, mining waste and by-products of industrial processes. The process can be used to neutralize polluted soil, sludge and other solid wastes containing organic and inorganic compounds, as well as minerals.

The EnviroMix® process is recognized as the leader in processes for binding and stabilizing many types of dangerous waste products. It is a breakthrough in the field of neutralization. Stabilization of dangerous waste using EnviroMix® technology is many times more effective than widespread methods based on Portland cement.

Ecotech Polska is in cooperation with private companies (from Israel, Belgium, USA, Canada, China) and governments (in Vietnam – concerning dioxin, in Armenia – pesticides). This technology is also unusually interesting due to the increasingly restrictive requirements of the EU, regulating neutralization and storage of dangerous and industrial waste. European regulations require waste to be neutralized prior to storage, and – if possible – first subjected to recycling and reclamation.

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For energy companies having excess ash from coal combustion and for construction companies needing materials, we offer a technology for the production of adhesives, based on by-products of combustion,to be used as road binders and materials for injection. In comparison to materials based on cement and lime, our adhesives have a lower carbon footprint and lower prices.

EKOTECH INŻYNIERIA POPIOŁÓW

- Reducing the carbon footprint of geotechnical structures.
- Good technical performance.
- Reduced specific gravity.
- Successful replacement of lime and cement in a substantial part of earthworks.
- Matching the requirements of green public procurement.

Our adhesives based on by-products of coal combustion in the power industry, and their technology , are a future-proof solution for civil and road engineering. Those parts of buildings, only requiring moderate endurance performance, can be constructed using EKOTECH's adhesives, production and use of which generates only minor greenhouse gas emissions compared to the production of traditional construction adhesives.

The family of geotechnical adhesives offered under the trade name TEFRA (Greek for 'ash'), allow the for meeting of green public procurement objectives - to help protect the climate and lower costs In a significant number of geotechnical applications, our materials are competitively priced compared to solutions based on cement or lime.

TEFRA adhesives were created thanks to a profound knowledge of combustion processes, allowing for effective adaptation of this approach to the local conditions in which the energy companies generate a lot of coal ash, and currently treat it as an onerous problem.

From nearly two million tons of combustion by-products handled by EKOTECH in 2008-2012, more than half a million were used for adhesives, which were mostly used for construction of roads - local, expressways and motorways.

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JAKUSZ

For governments of countries struggling with the problem of old, obsolete munitions we offer our comprehensive demilitarization system: PLANETARIUM. We offer mobile solutions, thus significantly reducing costs and possible threats related to transportation of hazardous materials to disposal centers.

- Safety - all operations are conducted remotely in reinforced containers.
- Versatility and flexibility - modular design, fast installation and minimal requirements as regards the preparation of infrastructure. The system allows for disposal of different types of warfare agents with a wide range of calibers.
- Environmental protection – including recovery, recycling and reuse of secondary raw materials. The system is also equipped with installation for cleaning gases from disposal processes as well as for safe neutralization of heavy metals and white phosphorus.
- Efficiency – fast implementation and commencement of the disposal process in comparison with fixed installations.

PLANETARIUM technology, developed by JAKUSZ, is unique thanks to its innovative and comprehensive approach to the disposal of old and obsolete munitions -starting from the stage of technical evaluation, through the dismantling of ammunition, and ending with the production of civilian explosives based on recovered ammunition components.

PLANETARIUM system allows for disposal of more than 170 types of different calibers of ammunition, missiles, mines and ammunition containing white phosphorus. The most dangerous operations are conducted remotely inside armored containers to provide protection for the personnel and the environment. Additionally, in order to meet environmental requirements, the installations where detonation of explosive materials is performed are equipped with gas cleaning systems, which keep the content of toxic substances below the admissible limit. Explosive materials obtained in the processes of dismantling are recycled and reused in civilian applications, for example in extractive industry and mining.

Among other places, PLANETARIUM was implemented in Azerbaijan, where the system helps to mitigate the consequences of military decisions from the past.

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Effective waste disposal is much more than protection of the environment. Processing waste into useful products is a real art. The SULTECH® technology is a unique method for stabilising waste in polymer concrete.

In this way we keep a clean environment, while gaining an excellent thermoplastic material with unusual integrity and resistance to frost and very low absorption level.

- Very good mechanical properties (high compressive and bending strength), exceeding those of the corresponding Portland concrete.
- Resistance to aggressive media including acids, salts, sea water, as well as integrity and frost resistance.
- Very low water absorption.
- Waste-free production.
- Expansion coefficient comparable to concrete based on Portland cement.

PPUH MARBET-WIL Ltd offers original technical and technological patented solutions, allowing recovery of hazardous industrial waste containing heavy metals in solid form (powders, granules, etc.) by stabilisation using sulphur polymer in SULTECH® polymer concrete. This technology allows conversion of waste into useful products. The process of stabilisation and recovery of hazardous industrial waste for commercial use is particularly useful for stabilisation of waste containing heavy metals such as cadmium, chromium, barium salts, zinc, copper, calcium, iron, nickel, arsenic, manganese, lead, aluminium, magnesium, salts of other metals and ash from incinerating plants. Solidification of particularly hazardous waste containing heavy metals involves the use of polymer sulphur to create sulphides of these metals, which are insoluble in water.

The resulting SULTECH® polymer concrete containing waste is an inert and perfect thermoplastic material (which can be processed several times), which can be used to form a lot of very good products. Examples include drainage channels, NOE® flood boards, drainage chamber elements, pavement slabs, roads and motorway elements, railway system weights etc.

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Vapor chp
by MielecDieselGas

VAPOR CHP gas generator sets and cogeneration units to produce electricity and process heat from waste gas are a solution for companies extracting or processing crude oil, which consume significant quantities of energy or operate at a large distance from power grids. Unlike the gas flares and boilers or pump drives operating at oil fields so far, the VAPOR CHP technology effectively and economically uses waste gases for dispersed generation of electricity for own needs of company or for sale.

- Waste gas use - very low cost of electricity, thermal and cooling energy production.
- Autonomous dispersed production of electricity and process heat regardless of local infrastructure.
- Reduced emissions of CO_2 and pollutants (CO, NO_x, HC, PM) to the atmosphere.
- Durable design for reliable operation under all working conditions (rain, snow, humidity, seaside areas, desert areas, extreme temperatures – also in arctic or hot climate).

The VAPOR CHP technology enables the user to become independent from power grids. The generator meets the demand of the oil field for power (and/or heat) and the possible energy surplus is sold to the power grid. Moreover, a single VAPOR CHP unit with the power of 100 kWel / 150 kWth enables annual CO_2 emission reduction by ca. 650 Mg by way of replacing waste gas burning in the flare (or gas boiler) with the work of the genset and by ca. 105 Mg for the genset installation at sites not used so far for commercial purposes. The emission of pollutants is also extremely reduced as the waste gas is no longer free burnt but under a controlled process in the combustion chamber of a working generator set.

The technology has wide range of applications e.g. oil and natural gas wells/fields, refineries, compressor stations and pipelines, storage bases, and oil terminals. In 2011-2012 the technology has been implemented in many PGNiG oil fields (largest Polish oil and gas exploration and distribution company) - as of that time all devices work successfully.

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MULTICHEM EKO
w zgodzie z naturą

For food and meat processing facilities, slaughterhouses and waste treatment facilities seeking an effective waste management solution, we offer FuelCal technology designed to processes waste in the place it is produced, using OrCal® intelligent mineral-organic fertilizers. Unlike competitors' methods, our technologies truly eliminate waste in that the by-products are valuable raw materials used in the production of fertilizers that can then be sold for additional income.

- FuelCal processes waste products into the mineral-organic fertilizer OrCal, whose selling price is far higher than the cost of waste processing.
- Very high level of veterinary safety and minimal environmental impact.
- Eliminates waste transport costs, as processing is done at the place where waste is created and the processing line is an extension of the production line.
- FuelCal technology does not emit any dioxins. The product also cannot be introduced into the food cycle.

The food and agricultural industries produce large volumes of waste products that require disposal at high costs. A special characteristic of these waste products is rapid microbiological degradation, which results in increased bacteriological danger and burdens for the environment, particularly in the form of odours. A solution to the problem is to immediately sterilize them and eliminate their odours. This is accomplished by FuelCal automated technology from Multichem Eko, capable of transforming waste where it is produced into the dry-surface, sterilized organic-mineral OrCal fertilizer. The product is highly sought after and revenue generated by its sale is significantly greater than cost of processing. The FuelCal technology completely eliminates the concept of waste, as by-products created are used as raw materials for creating new demand products, such as organic-mineral fertilizers and fuel components.

Multichem Eko has completed five projects in Poland. In 2011, an installation was completed for Brodnica Gelatine Plant. Other installations are in such locations as Poultry Slaughterhouse Wyrębski and Poultry Company Strzegom. The company is also currently conducting negotiations with several foreign investors.

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Anyone who deals with the storage of liquid fuels, knows the risks and potential losses arising from operation of tanks. Losses can be reduced to a minimum, while ensuring safe use of the installation. The solution is air-tight sealing and protective devices, and a measuring and control system offered by Petroster Sp. j., which provides two-way system protection and its individual components can be mounted in any position.

The result: greater security for us and the environment around us.

Secure Tank Package is a system for reducing emission of liquid fuel vapours. It provides the necessary basis for the adjustment of tanks to comply with the legislation included in the regulation on the technical conditions on petrol stations and fuel depots. The package includes: an original measuring and control system, anti-overfill valve, breathing valve and a flame and explosion arrester. The structure of the valves and arresters is an original element the patented technology.

Petroster received from the Polish Patent Office utility model protection certificates for the respiratory and anti-overfill valves.

- All elements have attestation and certificates required in Poland and the EU.
- The offered technology allows the reduction of losses resulting from a lack of air-tight sealing of fuel systems.

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We offer our technology for companies encountering problems with waste types which are difficult and expensive to dispose of, including tanning refuse, feathers, or wooden waste, as well as for companies which plan to produce renewable energy from biomass. In contrast to other companies recycling and storing waste, our technology allows us to dispense with the burdensome problem in the same place it arises, and to produce free energy.

- Reduction of toxic substances emission even by 99% - thanks to replacing old and worn-out coal boilers with our gasification system, a reduction in emission of NO_x (by 87%), SO_2 (by 99.99%), and dust (by 98%) took place.
- Utilization of waste in the place from which it originates – most feathers come from the production plant, where the installation was set up.
- Minimal quantity of ashes from utilization – they constitute around 1% of the handled waste in terms of weight.

In line with recommendations of the European Commission, wastes containing significant calorific values cannot be stored, and should be sent for thermal processing, which guarantees a drastic decrease of carbon content to a level not exceeding 3%. Gasification technology by Qenergy enables exactly this kind of waste processing.

An example showing an innovative implementation of gasification technology is the feather gasification plant operating, from 2009, in Indykpol S.A., which is one of the biggest poultry products manufacturers in Poland. The fuel for this installation is turkey feathers coming from Indykpol S.A. Feathers, as manufacturing refuse, are a serious problem for poultry processing plants, and their disposal using other methods is very costly and requires participation of third parties in transportation and processing.

Thanks to our gasification technology, the waste is processed in the place from which it originates, and the same installation enables power generation, successfully replacing coal boiler rooms, and thus contributing to the reduction of greenhouse gas emissions. From almost 12,000 tonnes of feathers, the plant produces 30,000 tonnes of process steam per annum. Introducing the gasification technology allowed us to reduce the costs of utilization, and attain additional economic benefits thanks to the heat produced.

Feathers are one of many feed materials which may undergo the process of gasification. Among others, Qenergy works on using the biomass gasification process for generating electricity in gas engines.

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T-Technology is a system for the production of liquid fuels from the waste plastic materials. It can process the majority of plastic waste types which are normally sent to landfills, and does not require their costly preparation. One tonne of waste inputs yield 550 litres of liquid fuel.

T-TECHNOLOGY
TOKARZ.PL

- Thanks to T-Technology, liquid fuels can be produced from commonly disposed waste, such as plastic bags, or foodstuffs packaging.
- The recycling process taking place in the T-Technology system consists of depolymerisation and is based on an innovative, patented technological solution
- The system is not an incineration plant, and the produced liquid fuel may be transported and put to use in other places.
- This is neither a pyrolysis technology nor a system for plastic regranulation.
- One tonne of waste inputs yield 550 litres of fuel.

T-Technology is an installation enabling recycling of the largest group of plastic waste, i.e. polyethylene (PE), polypropylene (PP), and polystyrene (PS), in the forms in which they appear in landfill sites. This innovative technology is protected by patents in both the European Union and the USA. It is an unusually ecological and economically attractive way to utilize plastic waste. It has been implemented in many countries, including India, Thailand, Slovakia, and Poland, and is also used by a large stock exchange-listed company in the USA.

Plastic waste can come directly from a landfill site or waste sorting plants. The system processes waste mixed in any proportions of PP, PE, and PS. The recycled waste may be wet or dirty, it may carry thermal-sprayed metallic or coloured imprints. The waste may be multicoloured, or have various structures and thickness.

The system has a modular construction, thanks to which the scale of an installation may be changed according to the needs, which allows for recycling any quantity of waste. As much as 75% of the energy needed for the process is obtained from the recycled waste.

Waste recycling using T-Technology significantly reduces landfill space. Plastic materials, which have not been used up until now, are transformed into liquid fuel.

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For private and public institutions owning or managing water reservoirs and needing to improve water quality, we offer a technology called an „artificial kidney for the environment" that brings together aerators with complimentary methods of water reservoir reclamation such as: dispensing chemical compounds, UV lighting, ultrasound and nanotechnology with titanium dioxide and silver. Unlike competing solutions, we offer a comprehensive technology that is energy-efficient, portable, and can be applied in various types of water reservoirs.

POLIMAT

- Multifunctionality – applies more then one method of reclamation simultaneously.
- Wide range of applications – adapts to the conditions and level of pollution of the basin.
- Selective operation – functions in the most polluted places.
- Easy application – portable unit.
- High cleaning efficiency – reconstruction of degraded ecosystems.

The „artificial kidney for the environment" is an aeration system combined with tested technologies for the reclamation of lakes. Depending on external conditions and reclamation methods, the technological solution can be applied in stationary, floating or mobile mode. The unit collects water from the deepest portions of the reservoir (up to 500 m), and then de-gases and aerates the deepest-level waters flowing into the artificial kidney. The unit also makes use of additional methods improving the functioning of the ecosystem, such as ultrasound disintegration, magnetic separation and inactivation of biogenic compounds using next-generation coagulants, and nanotechnology (titanium dioxide + UV).

This innovative device for the reclamation of lakes came about thanks to the involvement of specialists from POLIMAT EKO and scientists from the Koszalin University of Technology, the Warmińsko-Mazurski University and the Jagellonian University. A portable unit has been constructed that is characterised by a minimal level of interference to the natural environment, applying simultaneously several reclamation methods simultaneously in order to shorten the process of aquifer revitalization. Preliminary testing results demonstrate a constant trend of improvement in water quality and transformations in the composition of the biogenic load, primarily phosphorus, deposited in ground sediment in a biologically inert form. Results from the winter period, which was accompanied by a long period of deep freeze, are also encouraging. The artificial kidney for the environment is in operation at lakes in the provinces of Western Pomerania and Warmia-Masury. The company plans to expand the use of the technology both domestically and abroad.

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We offer the innovative NEPTUN electrical-electronic barrier, intended for all surface water intakes, which effectively protects artificial water installations from inflows of fish thus offering significant operational and cleaning cost reductions as well as protecting fish from being destroyed. Unlike the competition, NEPTUN is characterised by a high efficiency level (over 90%) irrespective of environmental conditions, and uses an extraordinarily small amount of energy in comparison.

PROCOM SYSTEM

- High efficiency – over 90%.
- Low energy use.
- Easy to assemble – in all conditions, both in new and old installations.
- Multiple applications – can be used not only to protect hydroelectric power stations from fish entering turbines and to protect surface water inflows, but also for protecting fish farms from predators and seaside swimming areas from shark attacks.
- Low maintenance costs – servicing consists of remote monitoring of the unit's functioning and regular service checkups.

The unit applies the method of creating an increasing non-linear electrified field in the water to direct the behaviour of fish. The parameters of the low-tension electrified field affect the muscular and central nervous system of the fish, causing them to swim in the opposite direction.

PROCOM SYSTEM S.A. has already installed several NEPTUN units in Poland, including:

- at the weir on the Bóbr river in Krzywaniec
- at the Mała Elektrownia Wodna – Szczerców, along the Widawa river
- at the Elektrownia Wodna in Rzeszów, along the Wisłok river
- at the Mała Elektrownia Wodna – Drzewica, along the Drzewicka

We have also begun working with the American company Fishways Global LLC, which will be our representative in North America.

As part of a contract with the Great Lakes Commission and in conjunction with our American partner, tests are currently being conducted on the use of NEPTUN for limiting access by the sea lamprey to spawning grounds. Furthermore, promotional activities have been undertaken regarding the use of the NEPTUN for protecting surface water inflows for industrial complexes in the United States and Canada.

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PROTE

For private and public institutions owning or managing water reservoirs having problems with high levels of water nutrients-related trophy, we offer the PROTE-fos comprehensive lake reclamation service, eliminating algae and blue-green algae blooming and improving water transparency. Unlike the radical and complicated reclamation methods usually applied, the PROTE-fos method consists in chemical binding of phosphorus, accumulated over dozens of years in lakes, directly in bottom sediments. Repeated algae blooms can only be prevented by eliminating the process of phosphorus releasing from bottom sediments.

- Innovation – the method is new, more effective and longer-lasting than other methods (e.g. sediment dredging, pumping or filtering the water).
- Comprehensiveness – the technology not only consists in binding phosphorus but first of all it facilitates reclamation of balance in the entire reservoir.
- Field-tested effectiveness – the method has been successfully applied to conduct reclamation project over two lakes in Gniezno, Poland.
- Scientifically-proven effectiveness – the technology uses the most up-to-date knowledge on water ecosystems.
- Guaranteed ecological effect – projects can be undertaken based on a final-effect contract.

The PROTE-fos technology is the core of our comprehensive lake reclamation process – the chemical method of binding phosphorous, as the element responsible for algae blooms in lakes, in bottom sediment. The key PROTE-fos innovation is the specially-constructed two-unit vessel PROTEUS (consisting of surface and underwater modules) that triggers controlled resuspension of bottom sediments, at the same time dosing chemical substances that permanently bind phosphorous. This makes the phosphorous inaccessible for algae, stopping their growth and reducing the intensity of blooms. Water thus becomes more transparent, and the ecosystem returns to a dynamic balance state. This comprehensive and individualized approach to each lake by means of the PROTE-fos method gives the opportunity to accelerate natural and desirable processes in lakes as well as the chance to improve the attractiveness of the land surrounding a given lake.

PROTE-fos technology has been implemented in two urban lakes – Winiary and Jelonek, in Gniezno, Poland. The reclamation project was performed in years 2009 – 2010 and resulted in positive ecological effects. Water transparency increased, as did the biodiversity of flora and fauna in the lakes. The lakes have become more attractive to residents as places for recreation.

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printed on ecological paper

DURING THE 14TH UN CONFERENCE FOR CHANGES IN CLIMATE WHICH TOOK PLACE IN POLAND IN 2008, THE MINISTRY OF THE ENVIRONMENT PREPARED THE GREENEVO – GREEN TECHNOLOGY ACCELERATOR PROJECT. IT CORRESPONDS TO THE IDEA OF THE POZNAN STRATEGY FOR THE TRANSFER OF TECHNOLOGIES, ADOPTED AT THE END OF THE SUMMIT. THE STRATEGY IS TO INCREASE THE EFFECTIVENESS OF TECHNOLOGY TRANSFER THROUGH PROPER RECOGNITION OF THE NEEDS IN COUNTRIES DEVELOPING IN THIS RESPECT. THROUGH THE IMPLEMENTATION OF THE PROJECT, THE MINISTRY OF THE ENVIRONMENT PUTS INTO PRACTICE THE RESOLUTIONS CONVEYED IN THE MOST IMPORTANT ENVIRONMENTAL DOCUMENT, THE ECOLOGICAL STRATEGY OF THE COUNTRY CONCERNING THE TRANSFER OF TECHNOLOGIES AND PRO-ENVIRONMENTAL ACTIONS.

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