

GREEN TECHNOLOGIES FROM POLAND



Ministry of Climate and Environment
Republic of Poland

GREENEV@
TECHNOLOGY ACCELERATOR



NATIONAL FUND
FOR ENVIRONMENTAL PROTECTION
AND WATER MANAGEMENT



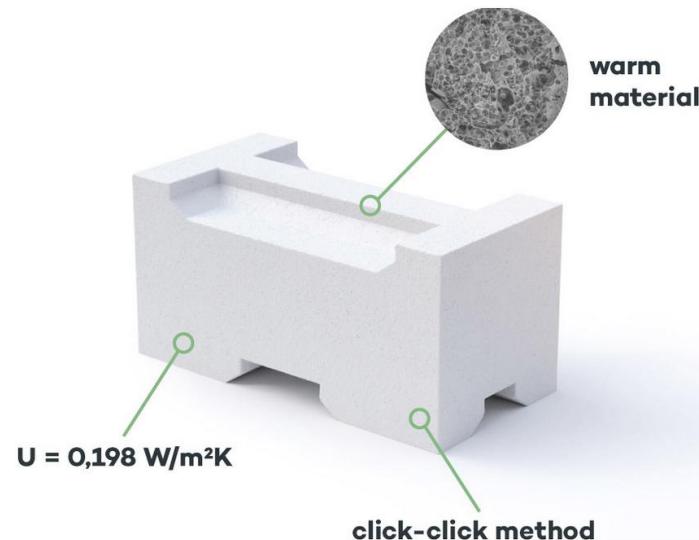
SYSTEM 3E[®]

SYSTEM 3E

SYSTEM 3E is a groundbreaking technology, based on 3E Elements made of natural raw material – perlite.

The innovative character of 3E technology is related to a unique recipe, shape and ease of application, making the technology applicable in all types of buildings with no use of mortar and insulation. A special angle is used at the horizontal joints of the elements to maximize friction, enabling the construction of walls without mortar. The adopted geometry of the Morse taper makes it possible to create a self-locking system where all degrees of freedom between the blocks are eliminated.

The finished partitions are characterized by above-average strength and safety, what is demonstrated by the highest possible fire classification and impact strength (REI-240+M).



ADVANTAGES OF THE SOLUTION

- ▶ SYSTEM 3E is the thinnest and warmest single-layer wall available on the market with a $U=0.198$ coefficient
- ▶ the 3E elements are made of natural perlite, a volcanic rock that is resistant to mould and fungus, which results in a healthy microclimate in the house
- ▶ no mortar or insulation speeds up construction work and helps to reduce materials expenditure
- ▶ 3E perlite elements minimize construction waste and can be recycled and reused, supporting sustainable resource use and a circular economy.

AREA



GREEN BUILDINGS



ENERGY SAVINGS



CIRCULAR ECONOMY



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TANK CONTROL – centralised risk management system for explosive and dangerous liquids

2AK Tank Control enables you to monitor the storage of liquid explosives. It is a convenient and reliable tool dedicated for Environment Protection Departments. The data readings from the control systems have been supplemented with their recordings and reporting. Its greatest advantage is a constant, remote and safe monitoring of tank tightness in order to prevent a potential leak of dangerous substances. It helps you to create environment safety management policy.

ADVANTAGES OF THE SOLUTION

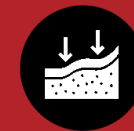
- ▶ Intuitive and simple reading of the amount of liquid inside the tank
- ▶ Cloud-based scalable solution
- ▶ Management of explosion-proof protection
- ▶ Reduction of dangerous, flammable and toxic liquids vapour emissions to the atmosphere



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SOIL



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AGATA



CELLUGUARD® - Dust Control

The Celluguard® technology is designed for use in coal-fired power stations, heat and power plants, mines, ports, smelters and facilities that face challenges with secondary dust emissions of airborne particulate substances at landfills (Tailings). The method involves the hydrodynamic application of a flexible, reinforced and liquid coating to dust-emitting surfaces. Compared to traditional methods, the company Agata offers a much cheaper, more durable, and fully environmentally friendly solution. This technology has been successfully implemented in numerous international enterprises.

ADVANTAGES OF THE SOLUTION

- ▶ the highest protection efficiency due to eco-reinforcement
- ▶ three degrees of protection durability: 3, 6 or 12 months
- ▶ improvement of air quality in the vicinity of landfills, tailings
- ▶ elimination of unpleasant odors at landfills

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SEEDiA™

jCharge and incity.io technology for smart city – micromobility charging and management

The jCharge charging and parking station for small electromobility devices for modern and eco-friendly cities is designed to provide charging facilities in public spaces for electric scooters and bicycles with use of clean energy. Thanks to jCharge charging stations, charging such vehicles becomes friendly to city residents and at the same time reduces chaos in the city, developing in users the habit of putting the vehicle away after use at a designated place, where the vehicle will additionally be charged for subsequent users. The proprietary technology obtains and manages electricity from solar energy, making a positive contribution to the green image of cities and reducing the carbon footprint.



ADVANTAGES OF THE SOLUTION

- ▶ energy independence
- ▶ OOH Advertisement integrated
- ▶ remote management panel connected to a mobile application
- ▶ smart charger, recognizes the type of device that is plugged in. Charging is possible practically immediately after installation
- ▶ Open API with parking apps and building management systems integration
- ▶ compatible with off-grid systems
- ▶ modular design

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SMART
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Hybrid Sludge Dryers

An ecological sludge processing technology for wastewater treatment plants. Unlike traditional dryers, it utilizes low-cost, alternative energy sources. Using combined technologies sludge drying is possible regardless of weather conditions. Thanks to the low-temperature drying process the final product, in the form of granules/pellets, can be used agriculturally as a fertilizer and energetically as a fuel.

ADVANTAGES OF THE SOLUTION

- ▶ low operating costs
- ▶ independent of weather conditions
- ▶ over fourfold mass and volume reduction of the sludge
- ▶ a fully automated process that does not require constant supervision



DAGAS BIO

To facilities with various business profiles: public utility, chemical, oil refining, painting, cokery plants, printing and food facilities, etc. Dagas offers a biological wastewater treatment plant DAGAS BIO. That solution takes advantage of a so-called biological conveyor and is based on biocoenosis. DAGAS BIO is composed of a joint line of anaerobic, aerobic and anoxic bioreactors, equipped with adequate fibrous conveyors with large open surfaces, where biocoenosis proper takes place. The process of biological wastewater treatment DAGAS BIO is conducted continuously without the removal of activated sludge.

ADVANTAGES OF THE SOLUTION

- ▶ the technology significantly diminishes the amount of the excess activated sludge
- ▶ lack of activated sludge recirculation, one-direction constant process
- ▶ applicable to all types of sewage, including industrial and highly toxic such as sewage with dissolved organic substances, including xenobiotics



Fuel combustion activator Reduxco

The REDUXCO catalyst is a Polish innovative product, a chemical substance, reducing the energy of chemical reactions, which results in lower fuel consumption and harmful gas emissions.

Technology recipients:

Influences the improvement of the combustion efficiency of solid, liquid and gaseous fuels.

Our technology has been implemented in over 30 power plants and combined heat and power plants and over 10 cement plants.

ADVANTAGES OF THE SOLUTION

- ▶ intensification of combustion processes
- ▶ no need for other combustion stabilizers to be added to natural gas or fuel oil
- ▶ increase of boiler efficiency by more than 5%
- ▶ reduction of CO2 emissions by 4-5%
- ▶ savings in operating costs

IDEALBIN

Intelligent containers system for selective waste collection

Idealbin is an ecological solution in the form of smart waste containers connected with system and application. The devices facilitate the selective waste collection and are an effective tool for waste management. Innovative technology, using IoT, is a source of precise data on the weight and type of waste inside the container and the level of its filling. The indisputable advantage of Idealbin is the high compression of waste, which is ensured by the inside compactor. Access to the devices is possible using an RFID card or application. In addition, the innovative design of the waste inlet facilitates access for people with special needs, and the shape of the containers allows the use of energy from photovoltaic panels.

ADVANTAGES OF THE SOLUTION

- innovativeness - the use of IoT technology allows to obtain accurate data on the weight, type of waste and the level of filling the container
- efficiency - the compactor integrated with the container ensures automatic waste compression
- ergonomics - the innovative design of the automatic waste inlet increases the comfort of using the devices
- ecology - in line with the paperless trend, access using an RFID card and the possibility of implementing photovoltaics



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SMART CITY



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Climate garden - rain garden technology

The Climate Garden technology combines a **rain garden** and a **pocket park**. The innovation of the solution lies primarily in the fact that all elements of green and blue infrastructure essential for climate change adaptation and mitigation have been integrated within a single facility. These elements include: utilizing rainwater for irrigation of green spaces, small-scale retention and utilization of biodegradable waste at its source; enhancing biodiversity, increasing green space area, local air quality improvement, and promoting activities related to organic food production.



ADVANTAGES OF THE SOLUTION

- ▶ Storing and utilizing rainwater for irrigating green areas.
- ▶ Constructing a small retention system.
- ▶ Generating and utilizing biodegradable waste at its source.
- ▶ Expanding green space along with the development of local biodiversity.

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BIODIVERSITY



Hydrophyte Bioreactor - biological sewage treatment plant

An eco-innovative solution ensuring high efficiency in removing organic and biogenic compounds from wastewater. The designed arrangement of mineral and organic layers ensures proper hydraulic conductivity and uniform spatial distribution of treated wastewater into the soil. The technology is based on 5 patented inventions and is the result of our own research.



ADVANTAGES OF THE SOLUTION

- ▶ High efficiency - elimination of over 90% of organic pollutants.
- ▶ Low investment costs and operating expenses.
- ▶ The technology is in line with the mission of nature-based solutions and based on a circular economy. The technology is part of blue-green infrastructure.

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**POWER
MAIZE**



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Clean energy technology from biomass

An innovative energy system that includes a new fuel and mini power plant.

Our technology allows you to obtain ecological fuel from corn cob cores and convert it into energy in two forms:

1. common-use fuel: calorific agro pellets
2. through our own biomass gasification line - a small cogeneration power plant.

ADVANTAGES OF THE SOLUTION

- ▶ Energy independence
- ▶ Turning agricultural residues into clean energy
- ▶ Zero emissions
- ▶ Local sourcing of fuel
- ▶ High profitability



ROVAPO® – Zero Liquid Discharge

ROVAPO® is a technology of maximum recovery of water from wastewater (up to 98%), which minimizes the amount of energy needed and waste generated by the process. Depending on the application, ROVAPO® includes a number of treatment and recovery stages i.e:

- a) an integrated physico-chemical treatment system with a membrane water recovery system (RO/NF) and an evaporation stages or
- b) more efficient membrane systems (RO/NF)
- c) a combination of membrane techniques and efficient low temperature evaporators

ADVANTAGES OF THE SOLUTION

- ▶ the system ensures the maximum level of recovery of water from industrial wastewater (up to 98%) while delivering the required water quality and the minimum amount of waste left.
- ▶ safe solution thanks to the autonomous process control system. ROVAPO® automatically adapts to the changing composition of raw wastewater, ensuring constant set recovery efficiency and reclaimed water parameters. This allows to achieve the highest possible recovery efficiency.
- ▶ it effectively lowers the total cost of ownership (TCO) by minimizing the amount of waste, electricity consumption, reagents and the high water recovery level provided
- ▶ ROVAPO® allows you to achieve the goals of a net-zero economy

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AnoxyMem® - Anaerobic Membrane Bioreactor

AnoxyMem® the anaerobic membrane bioreactor (AnMBR) is the epitome of the circular economy. The most advanced technology of biogasification of wastewater and waste available on the market that allows to obtain up to 40% more biogas than classic AD systems. The best solution that treats high-strength wastewater, mixtures of wastewater and waste with high levels of COD (even more than 300,000 mg/l), or organic waste with a large amount of dry matter (dry matter even >10%). COD reductions can reach 99.7%, and dry matter reductions up to 90%.

ADVANTAGES OF THE SOLUTION

- ▶ high-performance methane fermentation coupled with membrane separation – to treat sewage, waste or production waste, which translates into an unprecedentedly high yield of biogas and biogasification level
- ▶ up to 40% more biogas or biomethane from AD process means a quick return on investment
- ▶ fully integrated digestate/wastewater separation system with very high COD and dry matter reduction – safe, economical and hermetic
- ▶ long life of the membrane system, which affects its economy
- ▶ modularity of the system: the possibility of expanding the
- ▶ membrane system without shutting down the fermentation reactor

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AnoxyBed™

AnoxyBed™ EGSB (Expand Granular Sludge Bed) is a compact, efficient anaerobic treatment process for industrial wastewater that uses anaerobic granular sludge. This solution allows producers of food, beverages and juices as well as other factories that generate biodegradable wastewater (eg. breweries, ethanol, paper mills, chemical) to obtain valuable biogas from polluted wastewater, while efficiently treating it.

The reactor operates stably under changing inflows and concentrations of wastewater. It treats streams with different COD (from approx. 2,500 mg/l to 20,000 mg/l COD). The special design of the AnoxyBed™ separator reduces the risk of sludge escape, which ensures safety and process reliability.

Apart from the version with a settling tank in the reactor roof AnoxyBed™, can be delivered with an external separator, which allows for the modernization and improvement of the operation of existing installations without costly construction alterations.

The technology can be delivered together with the supply of granulated sludge necessary for start-up and other elements such as pumps, exchangers, process control and start-up.

ADVANTAGES OF THE SOLUTION

- ▶ high-efficiency settler - low risk of granular sludge escape
- ▶ easy access to the EGSB settling tank during system's operation
- ▶ low investment cost
- ▶ high installation efficiency
- ▶ possibility to improve or modernize existing anaerobic reactors

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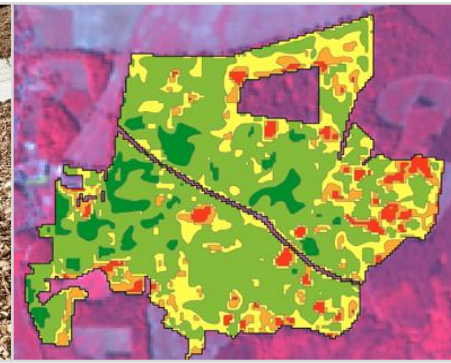
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SYENERGY – satellite data visualization platform

Biocontrol develops and validates the method of energy biomass source of origin authentication and monitoring plantations with the Sentinel 2 satellite data, according to the local and EU sustainability requirements (RED 2). The classification of energy crops plantations is performed by IGiK using the available satellite and in-situ/ancillary data as well as data possessed by Biocontrol Company. With the Syenergy platform tool you can measure trunk diameter at chest height (at 1.30 m), plant height before harvest, plant density on a plantation and obtain information on varieties of willow or poplar and plant density per ha, the cycle of biomass collection and the last harvest, the plant yield should be determined by cutting fresh mass of plants from one representative subject (plot), weighing it, and calculating the yield weight per 1 ha. The fresh biomass yield and its moisture content should be used to calculate the dry biomass yield.

ADVANTAGES OF THE SOLUTION

- ▶ Possibility to verify sustainability criteria for biomass fuels for energy purposes,
- ▶ in accordance with the RED II Directive
- ▶ Possibility of a remote verification of the cropland, without the need to cover the costs of on-site visits
- ▶ Possibility to verify origins of the imported crops thanks to an unlimited operation area (worldwide range)

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RENEWABLE BIODIVERSITY ENERGY





Fruit elicitation as a natural method of increasing fruit color and flavor

The technology implemented by FortiFruits consists in stimulating the berries with a factor designed to stimulate the activity of selected enzyme systems. This results in an increased production of bioactive compounds in fruits, especially low-molecular antioxidants. A properly carried out process increases the content of polyphenol, anthocyanins, antioxidants and vitamin C. The process does not generate any chemical residues and significantly increases the shelf life of the fruit. The technology is applied to organic fruit. Such fruits can be processed freely, but FortiFruits offers the product in the form of naturally enriched fruit extracts, powders made with the use of natural carriers. The new technology will revolutionise the production of processed fruit (juices, jams, chocolate, jellies), as it will allow the use of natural fruit without chemical additives for all consumers.

ADVANTAGES OF THE SOLUTION

- ▶ we improve color and flavor of berry and vegetable products > 60% (strawberry, raspberry, blueberry, cranberry, black currant, elderberry, tomato, broccoli).
- ▶ we lower cost of multifruit juices < 30%
- ▶ no waste from berry juice production but semi product
- ▶ fruit pomace is a new semi product > 120% more polyphenols

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Thank you for your attention



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