

RECYCLED URBAN ARCHITECTURE

Bet on modernity and solutions promoting the circular economy

→ Arranging public and private space with our furniture

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Arranging public and private space with furniture made out of recycled materials has unlimited potential. Transformation towards zero-emission energy resources and waste reuse are strong global trends that have become a part of our lives for good. On this basis arose the idea of manufacturing small urban architecture structures derived from used wind turbine blades.



One of the most durable and environmentally friendly materials, used for this purpose, is a composite - found in construction, transport, sailing, military, as well as in wind power installations. Mechanically processed and reused composite is significantly cheaper than equivalent materials, and well designed transforms into visually attractive and functional forms.

GP RENEWABLES GROUP provides comprehensive services in European and global markets in the field of wind farm foundation design. We also participate in the implementation as well as maintenance and repair processes. We are a group of engineers with many years of industry experience, extensive technical knowledge and economic awareness. At the same time, we strongly believe in the advantages of circular economy.

We offer to our clients, institutional and individual partners a unique method of recycling the wind blades. Thus a new composite product range with a wide scope of use. This project is our contribution to making the sustainability of the industry in which we operate a reality. The industry at the foundation of which environmental protection has been from the very beginning. We conduct this project with partners, the Polish company Anmet specializing in the recycling of composite materials, and scientists from Polish technical universities.

→ Recycling of wind blades 02

Wind power plants are an internationally recognised method of generating energy from renewable resources, the use of which contributes to the energy sector transformation towards zero-emission one. At the same time, we all see a growing global problem of waste management, both municipal and industrial. A wind power plant is in operation for an average of 20-30 years. After this period it is necessary to replace the device with a new one. Efficient disposal of wind turbines and, more specifically, of components made of composites – in particular wind blades – lies heavy on our hearts. Many elements of wind power plants, such as a tower or a nacelle, consist mainly of metals for which the recycling process is already well known. The challenge for the market today is the recycling of composites, including glass fibre (GRP).



The methods of burying or grinding and then burning composites used so far are not the most economical and require a significant energy input. Many European countries have already introduced a ban on the

burying of used blades. As part of the activities of GP RENEWABLES GROUP, we provide our clients with a comprehensive service of cutting, transporting, utilizing and handling documentation related to the recycling of wind turbines.

According to the published in 2020 by three European organizations WindEurope (which we are a member), Cefic and EuCIA report: "Accelerating Wind Turbine Blade Circularity" now in the Word we use about 2.5 million tons of composite in wind farms.

By 2023, approximately 14,000 used turbines will need to be dismantled. This means that in the coming years, approx 60,000 tons of composite will be a matter for waste management. Recognizing this problem, we offer our clients comprehensive services related to the recycling of wind blades, including their dismantling, cutting, transport, disposal and full documentation of the process. At the same time, we recommend methods of mechanical processing of wind turbines, thanks to which they win the so-called „second life”.

Wind blades used in landscape architecture may decorate urban and private spaces for several decades to come. And at least 90% of the elements of our furniture are made of recycled products, and they are modern, functional and also cheaper.

→ Be eko choose the circular economy

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The wind blade is made of glass fibres, combined with epoxy resin. Together they form an extremely durable, weather-resistant and environmentally-friendly composite that does not react with the earth or the environment. Reuse of blades from wind farms gives great opportunities to promote an environmentally friendly image of the investor, by creating characteristic points of architecture.

Our products can be used in all public spaces (streets, parking lots, squares, parks). We provide solutions for the management of lentic and lotic water quays. Our clients include local governments, large corporations as well as private investors.

From recycled wind blades we can make all types of unique (made according to individual design) furniture adapted to urban, hotel or private space, and simultaneously resistant to changing weather conditions. The dimensions and colours of the furniture can be adjusted to the investor's needs, as well as their logo can be applied in a visible place.



These are massive, although very lightweight-looking and modern structures, which are difficult to destroy or move. Each product is provided with information on which wind farm the reused composite comes from and how much green energy the wind blade generated in its first life. This allows to arrange e.g. a square, a park or a garden in a unique style and make the idea of the "second life" of a turbine real. Our product portfolio currently includes: benches, loungers, seats, platforms, footbridges, sheds, geotechnical blocks and even changing tables for a parent and a child. We are currently working on a car crossing bridge and an observation tower, but in the diversity of projects we are only limited by... our and your imagination.

→ Stand out with a smart idea and interesting design

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We are the first in the world to have in this matter solutions that are already ready for application. Developed together with experts from the Department of Roads and Bridges of the Rzeszów University of Technology, the footbridge is a solution with media potential, modern, ecological and unique in the world. A recycled blade from a wind power plant is the load-bearing element of the footbridge. The solution is visually unique and can become a landmark of urban architecture and a tourist attraction. The footbridge has successfully passed the load tests and has all public use approvals..



The life span of the footbridge is estimated for at least 80 years. Its dimensions can be tailor-made to individual needs. The design of the footbridge provides for pedestrian or bicycle and pedestrian traffic, as well as observation seats for visitors.

Also an interesting solution are visually attractive piers, intended for stagnant waters. The pylons of the platform are up to 12 m high! What makes such a structure a landmark in the area. The wind blade, hidden under the deck boards, is also an element that gives the platform load capacity.



There is a possibility of making in the same technology a footbridge connecting two sides of the water reservoir. We can reach up to 25 meters in length without support points. Our platforms and footbridges are perfect solutions in the development of ponds and lakes, as well as terraces or viewpoints in the hotel and business buildings. For several years now, both environmental and health awareness have been growing in society.

The promotion of an active lifestyle and spending free time outdoors is embedded in the strategies of many local government units, large corporations, as well as medium-sized companies. The care for residents, employees and stakeholders is manifested, among other things, through the creation of new cycling paths, walking and running paths, observation points or outdoor gyms.



This type of infrastructure has been included in public space development projects for years. In terms of these projects, we offer comprehensive land development with benches and loungers, windbreaks, furniture for consumption or recreation areas (benches and picnic tables or board game tables), but also directional boards and all other composite building elements created from recycled wind turbine blades. We implement complex arrangements of urban space. Around the pond or within the park there can be benches, tables, shelters and other furniture made of wind blades, as well as footbridges and platforms, or even modern and

comfortable stations for mothers to feed and change a baby.

The solution offered to you is modern, allows you to promote knowledge about renewable energy resources, is also visually attractive, affordable and easy to maintain. Each educational project is different, and we choose the content and media for it in cooperation with the client. The colour of our solutions is usually low-key, close to nature, but there is also a possibility to add some colours to the projects and create e.g. child-friendly products.

An interesting complement to the arrangement of the space may be the placement of educational boards about green energy and ecology at the passageways. The boards may contain information about the history of renewable energy, related myths, present selected curiosities, e.g. how many households can obtain energy from one wind power plant. Our products are an excellent "leitmotif" for image campaigns and sustainability projects. We add extra value to public utility infrastructure projects by filling them with eco content.



A changing table and a friendly feeding place for infants



A significant problem that has been noticed by the female part of our crew is a widespread lack of open-air baby changing tables or places for breast-feeding. Although the number of changing tables in the restaurant toilets has been increasing in recent years, some petrol stations are also equipped with them. Larger commercial and public buildings have started to provide rooms for a mother and her child, where they can feed the baby. However, this issue is completely undeveloped in places such as parks, squares, playgrounds, sports facilities and car parks. Meanwhile, a stroll with a pram is everyday life for young parents and they prefer green areas. In order to solve this social problem we have created a composite baby feeding and changing station, which protects the parent and the baby from wind, rain, but also from excessive exposure.



The piece of furniture we have created is very characteristic and therefore visible from a distance. A mom will spot it right away. In our opinion, it is a cheap and at the same time a necessary piece of equipment in every park and playground, and simultaneously an equally good investment in the image of the investor.

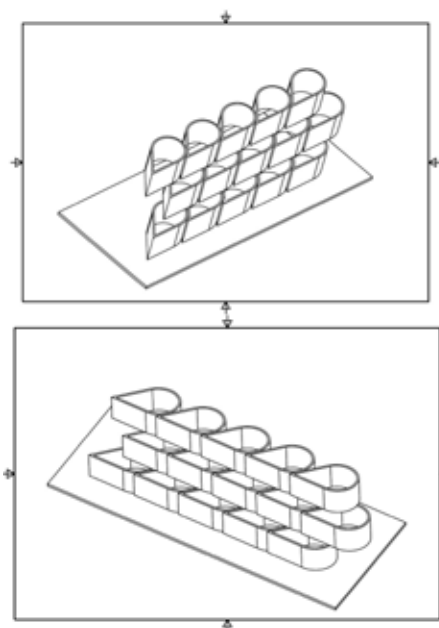
You can easily apply your logo and company colour scheme to our stations. A piece of furniture fits into any space, even as a stand-alone item.



Construction - use of recycled composite on a larger scale

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Yet another form of using the wind blades coming from the demolition of wind farms is forming them into geotechnical blocks. The product is durable, aesthetic, used both in water and on land. Structural elements have standard dimensions, but it is also possible to adjust them to a specific project. Even several meters long rigid elements are available. Recycled geotechnical blocks can be used as reinforcement of slopes, quays, entrances to ports (instead of gabions) as well as they can replace concrete and steel blocks, which are commonly used, especially in retaining structures, soil reinforcements, and road and railway track foundations.



This solution uses the synergy of very good material properties of the composite and favourable geometry of the block profile, which in geotechnical applications gives high rigidity and load-bearing capacity of the structure. Unlike gabions, which need to be filled with expensive, large rock fractions, composite blocks can be filled with almost any material - e.g. gravel or even rubble! This solution generates very large savings on each cubic meter. Other advantages are cheaper transport and the possibility of almost any painting of the composite, including any text or graphic sign. On request, we provide all technical data and an extract from the patent obtained.

→ Our solutions are cheaper than the ones you have ordered so far 07

A table with sample prices of our products

Product	Approximate weight	Sample dimensions	Price
Footbridge*	8 t	l. 25m / w. 4,5m	77 580 EUR
Platform*	2 t	l. 12m / w. 3m	22 165 EUR
Table with benches	220 - 300 kg	h. 60-80 cm, w. 70-100 cm, l. 220-240 cm	1 530 EUR
Baby changing and feeding station	140 kg	h. 200 cm, w. 100 cm, l. 60 cm	1 220 EUR
Lounger	150-170 kg	h. 160-180 cm, w. 70-80 cm, l. 250 cm	890 EUR
Geotechnical blocks	55 blocks: 7,5 t	h. 250 cm, w. 60 cm, l. 100 cm	56 EUR/m ³ (transport ap. 10 EURO CENTS/kg)

* Approximate price, final price depends on dimensions and conditions of location

As part of the cooperation we offer:

- Presentation of the product portfolio in a manner convenient for the customer
- Adapting solutions to the individual needs of the customer
- Support in developing a space arrangement design with existing elements
- Fully individual design and visualization of solutions
- Coordination of project implementation according to the schedule agreed with the customer
- Development of educational and image materials for the customer
- All consultations and ongoing contact



Jakub Kosiński
CMO, Board Member

+48 691 435 425
kosinski@gp-renewables.energy
www.gp-renewables.energy



Dominika Mackiewicz
Marketing Manager

+48 503 140 467
mackiewicz@gp-renewables.energy
www.gp-renewables.energy

These wind blades have already been given a second life. All products were made by hand, based on our own or our customers' designs.

