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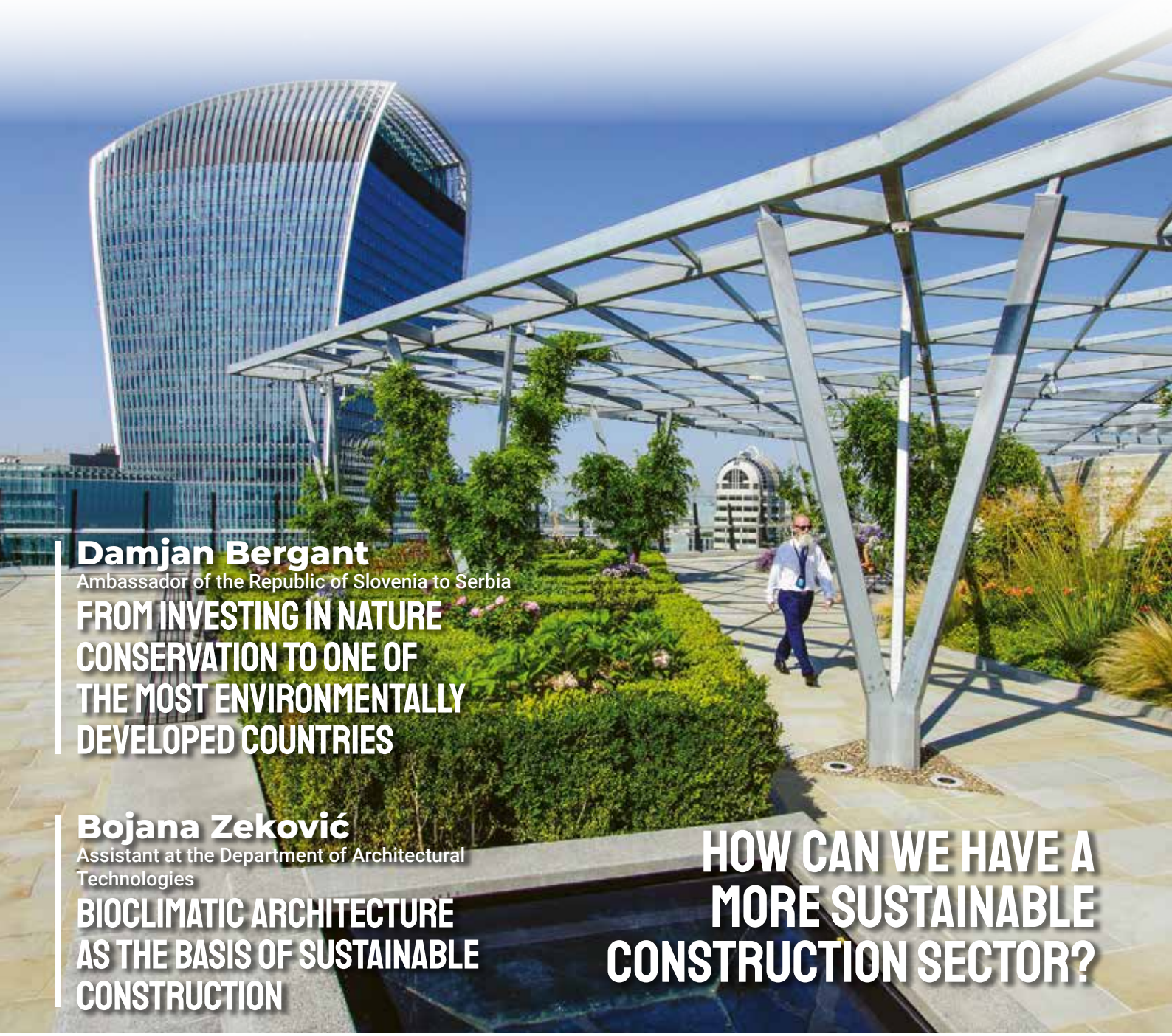

Damjan Bergant
Ambassador of the Republic of Slovenia to Serbia

FROM INVESTING IN NATURE CONSERVATION TO ONE OF THE MOST ENVIRONMENTALLY DEVELOPED COUNTRIES

Bojana Zeković
Assistant at the Department of Architectural Technologies

BIOCLIMATIC ARCHITECTURE AS THE BASIS OF SUSTAINABLE CONSTRUCTION

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Dear readers,

We have a very exciting year ahead of us where, as before, we continue to inform you about green topics. At the end of last year, the COP 28 Conference was held, where the initiative for a sustainable construction sector until 2030 was launched, which gave us the idea to devote the number before you to sustainable architecture and financing of green projects. During the work on this issue, we learned that there is an increasing demand for green bonds, which was confirmed by Zoran Grubišić, dean and professor of Belgrade Banking Academy. In the interview – Green bonds finance the development of ecological projects – you can read other interesting things he told us.

Sustainably managing the construction sector is an important requirement for a more sustainable future. Dragana Korica, the executive director, explained how the Serbia Green Building Council contributes to creating such a future in our country.

We spoke with Žarko Petrović, team leader for resilient development in UNDP Serbia, about the unique financing program for those who have innovative solutions but need technical and financial support to implement them.

Damjan Bergant, Ambassador of the Republic of Slovenia in Serbia, told us all about the investments, laws and preserved nature of one of the smallest but greenest countries of the European Union, which quickly managed to accept European standards and approach the highest level in the field of environmental protection in the world.

In Croatia, the implementation of green infrastructure is also increasingly widespread, which leads to significant investments in this area. We spoke with Ines Androić Brajčić from the Ministry of Physical Planning, Construction and State Assets of Croatia about the current situation and green building standards that must be respected as a member state of the European Union.

The exact dates of the start of the DDOR BG Car Show 08 and the 16th Motopassion International Motorcycle Fair, and the fifth Energy Summit in Trebinje can be found on the pages in front of you.

Of course, there are also always inspiring stories of enthusiasts who are trying in unique ways to help and change our attitude toward planet Earth and natural resources. You can read them in the People and Challenges section.

We know how important renewable energy sources are and how much solar power plants contribute to a more secure electricity supply. The residents of Kikinda, thanks to the vision of the leaders of the company MT-KOMEX, will soon receive a solar power plant with a capacity of 7 MW AC.

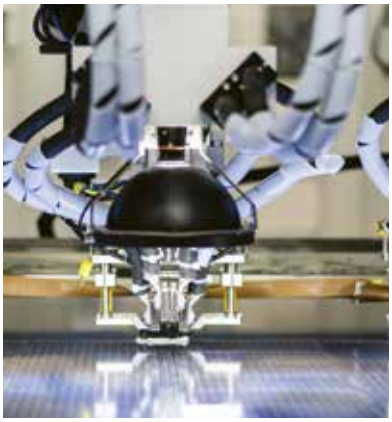
And there are many more texts that we have prepared for you, and they are waiting for you to read them. Enjoy!

Nevena Đukić

Nevena Đukić,
editor-in-chief

Photograph: courtesy of Nevena Đukić

IN THIS ISSUE...



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FROM INVESTING IN NATURE CONSERVATION TO ONE OF THE MOST ENVIRONMENTALLY DEVELOPED COUNTRIES

One of the smallest but greenest countries in the European Union – Slovenia – very quickly adopted European standards and achieved a high level of environmental protection. According to the report of the American universities Yale and Columbia, which, with the help of their EPI index, assessed how close countries were to accomplishing the established environmental policy goals, Slovenia has always been at the top of the world, most often among the top 20 countries, along with Finland, Denmark, the United Kingdom, and Austria.

H.E. Mr Damjan Bergant, Ambassador of the Republic of Slovenia to Serbia, says that Slovenia regularly ranks high on quality of life by relevant scientific and international organizations. This is partly attributed to the country's preserved nature, which is its great asset as it provides clean water, air, quality food and various opportunities for relaxation and recreation. Slovenia invests a lot in nature conservation, with funds allocated for that purpose significantly increasing since the country became a full-fledged EU member. The Ambassador points out that environmental protection is comprehensively regulated by the Law on Environmental Protection, which, together with the Law on Nature Conservation and the Law on Water, forms the basis of the umbrella state strategy – the National Environmental Protection Programme. Slovenia has been trying to ensure that all national strategic and programme documents comply with the 2030 Agenda and contribute to accomplishing the 17 global sustainable development goals.

Q: You are well on your way to becoming a fully environmentally friendly country. How is ecological transition

Photographs: (top) www.slovenia.info – Luka Karlin, Studio Virc; (middle) www.slovenia.info – Mitja Kobal, Karata Film

Based on the National Strategy for Coal Phase Out and Restructuring of Coal Regions following the fair transition principles, we decided to stop the operations of the Šoštanj Thermal Power Plant and to end the exploitation of lignite in Velenje by 2033 at the latest

Damjan Bergant
Ambassador of the Republic of Slovenia to Serbia

implemented in one of the greenest countries in the EU? What is the vision for Slovenia's ecological development based on?

A: If we focus on energy, we are directed towards reducing energy consumption and applying energy efficiency measures at all levels (households, industry and services, public sector, system level and grid loss problems). Also, we strive towards using renewable energy sources (RES). Thus, we have set goals for 2030 – RES' share in the final energy consumption ranges between 30 and 35 per cent, which we are trying to achieve by implementing various measures.

In 2023, we recorded exceptional growth in the solar power sector, increasing the total capacity from 690 to over 1,100 MW. The growth of solar power plant production capacities in 2023 was the highest per capita compared to all EU countries. Such an increase of about 400MW of additional capacity per year should be maintained yearly to achieve the goal set in the National Energy and Climate Plan, which foresees about 3,500MW of solar power plant capacity by 2030.

However, much still needs to be done, especially regarding the use of wind farms, where we are among the last in the European Union. We also have a lot of problems with spatial planning. Here, we would benefit from having more information about projects and implementation in the Western Balkan countries.

Q: What is the structure of energy sources in Slovenia? What is the share of renewable energy sources in the total energy mix, and how will you increase this share in the coming period?

A: Domestic energy production in 2023 was more than 131,000 terajoules (TJ), which is eight per cent less than the previous year. Almost 47 per cent came from nuclear power, 32 per cent from RES, including hydropower, while 21 per cent came from coal. Slovenia met less than half (48 per cent) of its energy needs from domestic sources, while the remaining quantity was imported. Compared to the previous year, energy dependence increased by five percentage points.

Photograph: (middle left) www.slovenia.info – Luka Karlin, Studio Virc; (Bergant) Irena Herak

Almost 268,000 TJ were available for energy supply, taking into account energy imports and exports. In terms of the energy supply structure, petroleum-based products dominated with over 36 per cent share, followed by nuclear energy (23 per cent) and energy from renewable sources together with hydropower (about 17 per cent), coal (12 per cent) and natural gas (11 per cent).

In the final consumption structure, petroleum-based products dominated with 47 per cent, followed by electricity (23 per cent), RES (14 per cent), natural gas (12 per cent), heat (three per cent) and solid fuels (one per cent).

Q: You are a regional leader in the circular economy. How did you achieve that? Did you apply the practices of other EU countries?

A: Slovenia actively promotes the circular economy principles manifested in the Smart Specialization Strategy. Line ministries are implementing campaigns to boost the circular economy, primarily through the Recovery and Resilience Plan and the 2021–2027 European Cohesion Policy.

Following the Integral Strategic Project for the Decarbonization of Slovenia, we have created a supportive environment to help businesses transition to a low-carbon circular economy and use digital technologies to increase their competitiveness.

We have also launched a public call to encourage decarbonization and the transition to a low-carbon circular economy, which will support enterprise projects in developing sustainable and circular business strategies and implementing new business models. Through the 2021–2027 European Cohesion Policy, we implement measures that contribute to more efficient use of resources and improvement of material productivity. Special attention will be devoted to supporting low-carbon and circular business models and establishing the Circular Economy Centre, which will connect Slovenian stakeholders in this area.

Since 2016, we have had the Strategic Research and Innovative Partnership, an important platform with 94 members, including companies, educational and research institutions, and non-governmental organizations.

Q: More than 60 per cent of the Slovenian territory is covered with forest and green areas. There are also 40 national parks and reserves with over 30,000 species of animals. How much do you invest in biodiversity conservation?

A: Located at the crossroads of the Alpine, Pannonian, Dinaric and Mediterranean bio-geographic regions, we are proud to say that we are one of the most naturally abundant areas. Despite its smaller size (0.004 per cent of

Photographs: (top) www.slovenia.info – Unitur d.o.o., Iztok Medja: (middle) www.slovenia.info – Andrej Tarfila

The growth of production capacities of solar power plants in 2023 was the highest per capita compared to all EU countries

the world's surface), more than 1 per cent of all known living species live here, amounting to over 30,000 species, although estimates range as high as 120,000. Slovenia has the largest share of Natura 2000 areas among all EU members – more than 37 per cent of the country's total area. Together, various protected areas cover almost half of the country's size. In the last seven years, we have set aside more than 100 million euros for biodiversity conservation projects, and we allocate 12 million euros from the state budget annually for this purpose, while an additional 5 million euros come from the Forestry and Climate Change Fund. In the 2021–2027 program period, we expect to receive around 130 million euros from EU funds.

Q: In which way and how much have you reduced the share of coal in the total energy consumption?

A: Coal consumption in Slovenia is declining. Based on the National Strategy for Coal Phase Out and Restructuring of Coal Regions following the fair transition principles, we decided to stop the operations of the Šoštanj Thermal Power Plant and to end the exploitation of lignite in Velenje by 2033 at the latest. This will also end the use of domestic coal. Furthermore, through significant investments in the Ljubljana Thermal Power and Heating Plant, we reduced imported coal consumption by 70 per cent. The primary energy source for heat production in Ljubljana is now natural gas.

Q: Slovenia is a good example of positive practice in collecting and recycling special waste. Thanks to the existing regulation, you have regulated the obligations of users and electronic and electrical equipment manufacturers. What are the user's obligations under the relevant regulation, and how does extended producer responsibility work?

A: Extended producer responsibility (EPR) is a key element of environmental policy in Slovenia, where producer responsibility is extended to the entire product life cycle. Within the EPR system for electrical and electronic waste (EEW) in place, producers jointly ensure the handling of EEW with the help of joint plans. Each producer participates in the joint plan in proportion to its market share. According to the relevant regulation, all involved actors have obligations. Manufacturers must be registered with the Republic of Slovenia's Environment Agency and report twice a year to the country's Tax Administration on the quantities of electrical and electronic equipment placed in the market. Users hand over household EEW to collection centers, distributors, or utility companies. Distributors and utility companies are then required to pick up EEW from households free of charge under the separation guidelines. The goal of the EPR system is greater sustainable use of resources and reduction of environmental impacts.

Q: Ljubljana is the European capital with zero waste. Which projects earned you this title? How have you organized waste dumps in your country?

A: Ljubljana constantly improves its municipal waste management system and raises people's awareness. The separation of paper, glass and pac-

Photograph: www.slovenia.info – Andrej Tarfila

kaging was introduced in 2002. Four years later, the separation of biological waste began, and in 2013, every household got containers for waste packaging and paper. Underground containers have been put in the city centre, where the space is limited. In 2008, only 29 per cent of municipal waste was collected separately; by 2022, that percentage will increase to 72 per cent. Since 2015, the Regional Waste Management Centre in Ljubljana has mechanically and biologically processed almost a quarter of the mixed municipal waste generated in Slovenia.

We closed landfills that did not meet the requirements of the EU Landfill Directive. In 2007, 2,361,539 tonnes of waste were deposited, and by 2022, due to the establishment of a waste management system, this percentage fell by 93 per cent to 162,962 tonnes. The number of landfills where waste was disposed of from 2006 to 2022 also decreased significantly, from 59 to 13. With the existing municipal landfills, Slovenia has achieved self-sufficiency in relation to the disposal of the rest of the processing and municipal waste.

From 2025, mixed municipal waste must be subjected to mechanical-biological treatment, and such treatment has already been implemented in nine facilities, mostly built with EU support.

Q: Following the Sustainable Urban Mobility Plan, you have defined sustainable mobility goals. What are the goals based on? How did you adapt to the new, sustainable form of transport?

A: Slovenia adopted the traffic policy goals in 2015 in its Traffic Development Strategy that covers the period until 2030. Following the changed conditions and the more ambitious commitments we have taken on after that, we are preparing a new Integrated National Energy and Climate Plan (INECP), which will determine the framework parameters for the transport sector. We also adopted the Law on Comprehensive Traffic Planning,

Photographs: (top) www.slovenia.info – Jacob Riglin, Beautiful Destinations

which regulates comprehensive traffic planning at municipal, regional, and state levels. Based on that law and considering the boundary conditions from INECP, we plan to pass a new national traffic strategy by 2025. Slovenia's environmental and climate obligations are the key guidelines for making strategic decisions in the transport sector.

Q: How is the development of electric vehicles and chargers going? How much are you investing in infrastructure? What contributed the most to the development of cycling and this type of traffic?

A: Slovenia started promoting e-mobility in 2011 by subsidizing the purchase of electric vehicles. To date, we have subsidized the purchase of almost 6,000 cars, and the subsidies range between 4,500 and 6,500 euros for electric passenger vehicles and 3,500 euros for light commercial cars. Starting June 2023, subsidies will also be available for used electric vehicles.

Regarding infrastructure, there are currently 26 fast charger locations at petrol stations along the motorways. Slovenia plans to install charging stations along motorways with an output power of up to 3MW. This will be quite challenging as it involves large, connected power that is impossible at all petrol stations. First, we need to improve the network in certain locations.

> Slovenia plans to install charging stations along motorways with an output power of up to 3MW

We are also launching state support for establishing electric charging infrastructure this year. For this purpose, we have set aside 65 million euros, covering a minimum of 1,730 charging stations. Currently, many cities and major shopping malls offer free use of chargers.

Cycling is becoming increasingly popular. Research shows that the share of bicycle trips in traffic is 5.3 per cent and growing, especially in cities. The country is taking steps towards developing cycling infrastructure and supports the vision of becoming one of the countries with the best cycling conditions in Europe by 2030.

Q: What else awaits Slovenia on the way to becoming an utterly ecological state? What are the biggest challenges to further green transformation?

A: There are still many challenges to overcome. In terms of energy, we are primarily focused on increasing the share of RES in the total energy mix. We are introducing an obligation to install solar power plants on buildings and parking lots. With the new legislation, we also enable the installation of independent solar power plants and the use of agrophotovoltaics. The integration of wind farms remains one of the key challenges, too. We are working on shortening the licensing procedures. We want to increase the number of RES communities and their projects. With the growing share of RES, especially in mobility, establishing a strong energy infrastructure is undoubtedly one of the biggest challenges.

But the most significant effort awaits us in adapting society to the new reality, which we caused by excessive environmental interventions. With modern technology and numerous investments, we can achieve a lot, but not everything. The key to changing attitudes towards nature lies in the education and training of young generations, which is a complex and long-term process.

Interviewed by Mirjana Vujadinović Tomevski

Photograph: (middle left) www.slovenia.info – Luka Karlin, Studio Virc; (Bergant) Irena Herak

SUSTAINABLE ARCHITECTURE PRINCIPLES THROUGHOUT HISTORY AND TODAY

Back in 2017, the United Nations Global Status Report revealed the fact that large-scale pollution came from buildings and the construction sector, supporting it with concrete data. As stated, 36 per cent of global energy use and 39 per cent of energy-related carbon dioxide emissions came from these two sources alone. Although the COVID pandemic led to a drastic reduction in demand in this sector, in 2021, construction activities almost completely recovered. Building on some recent information, last year's United Nations Climate Change Conference (COP28) launched the so-called Building Breakthrough as a global initiative for a sustainable building sector to be implemented by 2030. On the occasion, 27 countries pledged their commitment to achieving the set goals and it is these countries that make up over 30 per cent of the world's population and contribute about 50 per cent to global greenhouse gas emissions.

All of the aforementioned points to the need for an increasing implementation of sustainable architecture principles and solutions when designing and constructing buildings, to

A building can be more energy efficient if its position in relation to the sun is taken into account during the design

Photograph: Unsplash/Ricardo Gomez Angel

reduce negative environmental effects. This implies that architecture is no longer focused exclusively on the aesthetic appearance of buildings, but also includes environmental and social benefits. Although the term is very broad, some of its most important factors can be singled out.

The use of sustainable materials refers to those materials whose production causes less pollution to the environment, recycled materials or which can be recycled at a later date, materials produced from renewable resources, as well as those supplied by local environments. For instance, one of the biggest polluters in terms of polluting emissions in the construction industry is cement, which is an integral part of concrete. Therefore, scientists have been working on finding alternative solutions to produce more sustainable concrete, omitting the use of cement. Some of the solutions are the production of concrete based on algae, hemp, lime or for example, the use of coal ash, which reduces the required quantity of cement. Increasingly, industrial hemp is used in construction, which, among other things, is a very good insulator. Some other renewable materials used in construction are bamboo and cork.

Waste reduction is linked to the previous paragraph. This includes minimizing construction waste, which is facilitated if the material is recyclable. Furthermore, buildings can also have a recycling and composting system.

Energy-efficient buildings imply good insulation, efficient electrical devices and lighting systems, good natural ventilation, use of natural light, installation of solar panels and others. Building shading devices prevent too much sunlight in summer, while in winter it serves as additional insulation. We should also highlight quality doors and windows. One of the good solutions is windows that darken automatically depending on the amount of light. Of course, the material used to build walls itself is also very important, so one can use stone that absorbs and stores the sun's heat and then releases it when needed. The importance of natural insulation, i.e. green areas that are made up of trees alone, but also interesting solutions such as green walls, should be mentioned too. A building can be more energy efficient if its position in relation to the sun is taken into account during the design.

Water conservation involves several very useful systems. The first of them is the rainwater collection system, which allows the water collected in this way to be used later, for example, for irrigation or flushing

Photograph: Unsplash/Carles Rabada

The use of sustainable materials refers to those materials which production causes less pollution to the environment, recycled materials or which can be recycled at a later date, materials produced from renewable resources, as well as those supplied from local environments

toilets. Grey water systems collect wastewater from taps, showers, washing machines and dishes and with special treatment it can be reused for specific purposes. There are also efficient irrigation systems as well as low-flow systems. We should also mention green roofs, where vegetation can be grown, and which use rainwater for watering.

Sustainable transport means promoting electromobility through provided charging points. Additionally, garages should also include a safe place where alternative means of transportation such as bicycles or scooters can be stored. In Serbia, for example, recent amendments to the Law on Spatial Planning and Construction prescribe that in residential buildings every fourth parking space must have an electric charger, while for commercial buildings it is every third parking space.

A carefully chosen location requires that a building is constructed in a way that does not jeopardize the existing nature. For instance, if there are trees in a certain area in the city, the project should minimize cutting

Photograph: Unsplash/Conor Sexton

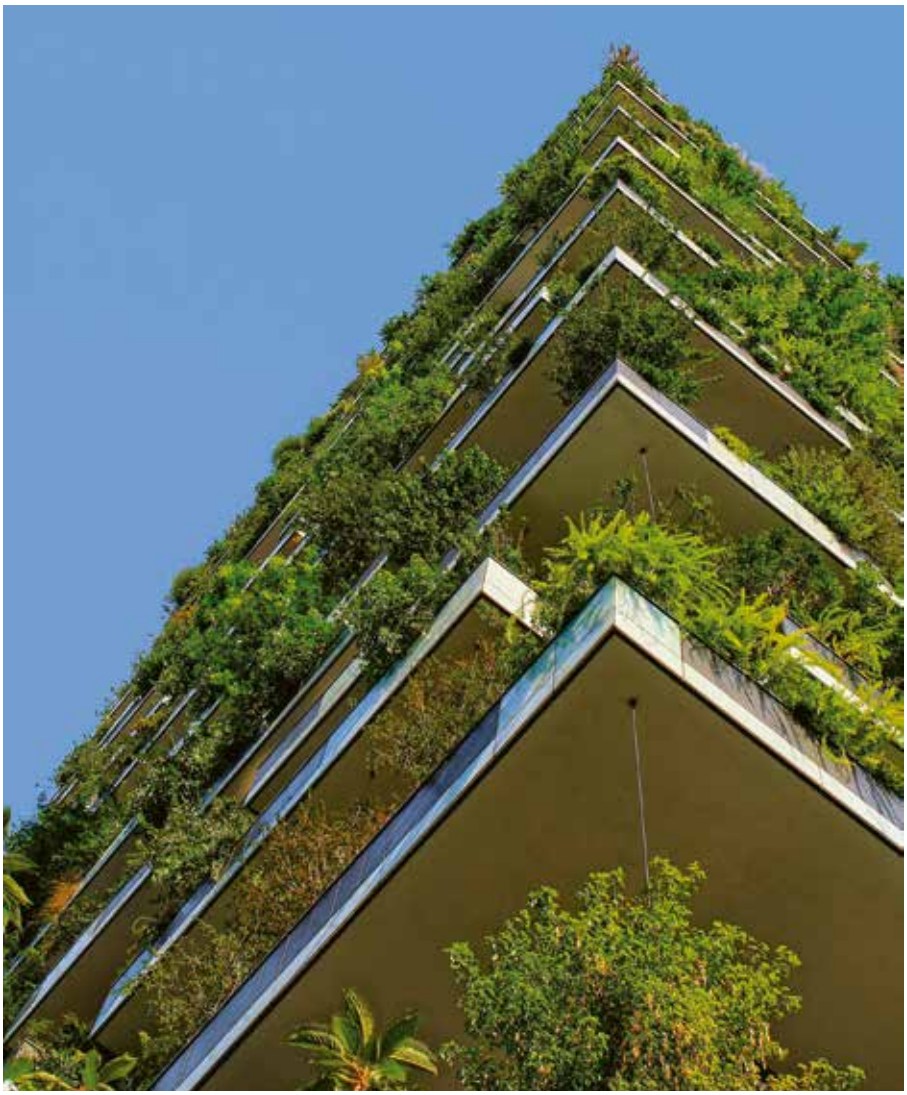
them down to make room for construction. If the project is planned outside urban areas, say on a mountain, it is important to take into account the biodiversity of that area so that their natural habitat is not threatened.

Passive House

The idea of a passive house was developed in the 1990s in Germany and implies standards that a building must meet, guaranteeing very low energy consumption for heating. It is crucial to point out that such houses do not have active heating, i.e. they do not use auxiliary heating elements, but the heating is done passively. One of the standards prescribes that the energy used for heating must not exceed more than 15kWh per square metre of net living space.

AN ARCHITECTURAL WONDER OF ANCIENT CIVILIZATIONS

The so-called wind catcher is a completely natural way of ventilation that was designed by ancient civilizations who lived in hot areas. Centuries-old houses in the desert city of Yazd in Iran were built exactly this way. With a distinct appearance, these tower-like buildings rise above the houses, whose height and position were designed with precision. They have openings thanks to which air is sucked in and circulates throughout the entire space. A hundreds-year-old solution very effectively solved the problem of high temperatures in homes but without the use of electricity. Some research has shown that the earliest solutions for catching the wind are over 3,000 years old and come from Egypt. This invention attracts the attention of many of today's experts in architecture and climate change.



Photographs: (top) Unsplash/Hasan Almasi; (bottom right) Unsplash/Ricardo Gomez Angel

There are several other criteria with precisely defined maximum values that a passive house must not exceed. A simpler explanation is that a passive house must have very good insulation, while the windows should have three-layer low-emissivity glass filled with agrone or krypton, due to the ability to conduct significantly less heat. Good sealing is also important, which means minimal

In order for buildings to have as little negative impact on nature as possible and at the same time to be energy efficient, it is necessary to take into account local climatic conditions such as rain, sun, wind, and soil, as well as the available resources based on which projects are drawn

Photograph: Unsplash/S. Tsuchiya

air leakage through small holes and cracks. Another prerequisite is the establishment of mechanical ventilation, i.e. one with heat recovery. This mechanism can recover the heat from the exhaust air, transferring it to the fresh air coming from outside. Last, but not least, the last standard pertains to avoiding thermal bridges, because they lead to the loss of about 30 per cent of heat.

Bioclimatic architecture

For buildings to have as little negative impact on nature as possible and at the same time to be energy efficient, it is necessary to take into account local climatic conditions such as rain, sun, wind, and soil, as well as the available resources based on which projects are drawn. In addition to the above, bioclimatic architecture implies the use of sustainable materials, quality solutions such as the good choice of glass on the windows and renewable energy sources. The building's position is another important element because when the position is right, it can contribute to the better regulation of the indoor temperature. Taking local climatic conditions into account means, for example, that if the area where the project is going to be implemented is colder, the building should be oriented towards the sunniest side during the day. Also, it will require the windows to be larger in order to use the sun's heat as efficiently as possible. When it comes to land, buildings in colder areas often rise above the surface of the earth, while in warmer regions, rooms are designed below the surface, because they are more pleasant to stay in during high temperatures. Rainwater collection systems will certainly be more useful for buildings located in areas with more frequent rainy days, while solar panels will be more effective in areas where it is mostly sunny.

Socrates' house

Socrates' house is a concept that is the forerunner of bioclimatic architecture. Namely, the classical Greek philosopher Socrates researched how the Sun affects the different shapes of houses. When we say Socrates' house today, we mean the one that is shaped like a trapezoid, the long side of which is positioned towards the south. The roof is laid diagonally in such a way that the fall is on the north side. As the sun is at a higher position in the sky during the summer, the highest part of the roof canopy located on the south side does not allow the hottest sun rays to penetrate directly into the interior of the house. However, since the sun is lower in the sky in winter, the sun's rays can penetrate the home. Another reason why the roof is lowered on the north side is to reduce the impact of winter winds.

Prepared by Katarina Vuinac

GREEN BONDS FOR FINANCING THE DEVELOPMENT OF ENVIRONMENTAL PROJECTS

Green bonds are a relatively young financial instrument dating back just over 15 years. In 2007, the European Investment Bank (EIB) issued these securities for the first time. Green bonds are debt securities that can be issued by the state or private institutions, under the condition that the money collected in this way should be used towards financing projects that have a positive impact on the living environment and are related to the sustainable development goals (renewable energy, energy efficiency, traffic, sustainable management water and wastewater) or activities related to climate change. Plus, the issuer is obligated to report to the public, and investors whether the funds thus collected are used in the manner stated in the prospectus.

We spoke with Zoran Grubišić, Dean and Professor at the Belgrade Banking Academy, about the first issued green bond in Serbia, the

> Altogether, the issuance of state and corporate green bonds would significantly contribute to the revival of the capital market in Serbia

Photograph: Pixabay/Sathish Kumar Periyasamy

According to data from the Climate Bonds Initiative, to prevent further damage to climate factors and reduce climate change, the money collected with the help of green bonds is most often used to finance projects in the renewable energy sector

country's laws that regulate green bonds and how these securities function in the Western Balkans.

Q: How long have these financial instruments taken root in the Western Balkans? Is there a legal framework in Serbia for issuing green sovereign bonds?

A: In 2020, together with the other Western Balkan countries, the Republic of Serbia signed the Green Agenda for the Western Balkans Declaration in Sofia. Soon after that, laws on climate change and renewable energy sources were passed. All this gave impetus to Serbia developing a framework document for issuing green bonds, which is in line with the principles related to green bonds published in June 2021 by the International Capital Markets Association (ICMA) and their four basic components: use of funds, cost evaluation and selection process, asset management and reporting.

In 2016, the Green Fund was established in Serbia as an institutional financial mechanism to implement environmental protection financing measures. The Green Fund is financed through donations and loans, the Serbian state budget allocations for this year and other public revenues.

Serbia also received the 2021 Sovereign Green Market Pioneer Award given by the Climate Bonds Initiative. This award is significant because it classifies us as an environmentally responsible country.

Q: What is the importance of green bonds for investors, and what are the advantages for the state?

A: When green bonds are issued by the state or local authorities (municipalities), the tax treatment related to interest rate income (financial income generated by green bonds) is clear. All government securities are exempt from this tax, which makes them even more attractive from the investor's point of view. Of course, another risk always considered in this situation is the currency risk, depending on whether the bonds are euro-indexed or classic dinar bonds, which carry such risk.

Nevertheless, taking into account that the foreign currency exchange rate has been stable in the last ten years, as well as that Serbia still seems

ZORAN GRUBIŠIĆ is dean and full-time professor at the Belgrade Banking Academy – Faculty of Banking, Insurance and Finance. He got his doctorate in 2004 from the Faculty of Economics in Belgrade, majoring in economics and finance. The topic of his doctoral thesis was "Comparative Analysis of Stabilization Policy Concepts". He continued his professional development at the University of the Cote d'Azur and became a member of the Doctoral Commission at the same university. Mr Grubišić took part in numerous international conferences. As a consultant, he participated in several projects financed by international institutions (EBRD, EAR) and domestic consultancies. He published several scientific and professional papers in national and international science journals.

Photographs: (left) Unsplash/piggybank; (Grubišić) courtesy of Zoran Grubišić

quite attractive in terms of capital influx from abroad, we can say that such a risk is acceptable in the medium term from the standpoint of investors who invest in dinar bonds. If we look at things from the state's point of view, it is clear that our public debt is dominated by Eurobonds that do not carry such a risk, so it is to be expected that this would also be the case with this specific financial instrument.

Q: Can green bonds be attributed to investors' environmental goals, i.e. that they obligate investors to invest in sustainable projects?

A: There are very important examples of acceptable costs in project financing for each of the so-called green categories: renewable energy, energy efficiency, transport, sustainable water and wastewater management, pollution control and prevention, the circular economy, environmental and biodiversity protection and sustainable agriculture. Altogether, it fits into the definition of the basic idea of green bonds, which is the question of sustainable development, a topic that is immensely popular today. Of course, all this is appropriately monitored through mandatory regular reporting.

Photographs: (top) Unsplash/Kasya Shahovskaya; (middle left) Unsplash/Micheile Henderson

In September 2021, Serbia issued a green Eurobond for the first time for 1 billion euros, with a maturity of seven years, which shows that we are an environmentally responsible country

Q: There are ongoing projects to replace fossil fuel with solar and other renewable sources at the sites of coal mines and thermal power plants. Would it be good for companies or the state to finance these ventures with green bonds?

A: I believe it would be useful from several angles, but it is particularly important to promote the so-called Green Agenda for the Western Balkans and the contribution that Serbia would make to it. Naturally, it would be very useful if companies were also involved and, along with the state, participated in issuing their corporate green bonds. Altogether, the issuance of state and corporate green bonds would significantly contribute to the revival of the capital market in Serbia.

Q: In which way does the financial sector support such projects in Serbia?

A: The financial sector would certainly support the issuance of government and corporate green bonds through the regulations that have been passed and this is something that investment banking does related to the issuance of these securities. This would entail the preparation of a prospectus and monitoring of the complete implementation of projects financed from green bond issues. On the other hand, the financial sector would certainly use the opportunity to invest in these attractive securities.

Q: When did Serbia issue green bonds, in what amount, and what are their advantages?

A: France was the first country to launch green bonds in its market in 2017, issuing its first green bond worth 7 billion euros with a maturity of 22 years. After that, other countries followed suit, i.e., embarked on sustainable development. According to data from the Climate Bonds Initiative, to prevent further damage to climate factors and reduce climate change, the money collected with the help of green bonds is most often used to finance projects in the renewable energy sector.

In September 2021, Serbia issued a green Eurobond for the first time for 1 billion euros, with a maturity of seven years, which shows that we are an environmentally responsible country. This is also reflected in the data collated by the National Bank of Serbia (NBS). This Eurobond was issued at the lowest-ever coupon rate of 1.00 per cent and yield rate of 1.26 per cent, with investor demand exceeding three billion euros at the auction. For the last few years, the NBS has invested part of its foreign currency reserves in top-quality, safe, and liquid green bonds, thereby transparently supporting environmental protection.

Interviewed by Mirjana Vujadinović Tomevski

Photograph: Unsplash/Natanael Vieira

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THE 15-MINUTE-CITY CONCEPT FOR MORE SUSTAINABLE URBAN LIVING IN SERBIA

Climate change is a challenge that needs to be approached comprehensively, which also implies solving the problem of urban living as an important link. Although based on a not-so-recent idea, the so-called 15-minute-city concept has gained importance only in recent years. Namely, the concept was devised in 2016 by Professor Carlos Moreno from the Sorbonne in Paris, and it gained wide publicity in 2021 at the height of the Covid-19 pandemic. Then Anne Hidalgo, the mayor of Paris, promoted it as a strategic planning policy and a kind of urban response to the socio-economic crisis caused by the pandemic. However, as mentioned, the concept is not new but originates from urban planning and design theory. According to Professor Moreno, the idea was inspired by Jane Jacobs' 1961 book The Death and Life of Great American Cities, considered the first comprehensive critique of 20th-century cities subordinated to the automobile and road infrastructure.

Ivan Simić, assistant professor at the Faculty of Architecture in Belgrade, with whom we talked about the problems related to urban living and the possibility of applying the 15-minute-city concept in Serbia, offered a simplified explanation. According to him, the 15-minute city is one of several related models based on the principles of chrono-urbanism. The concept rests on short intervals of 5, 10 or 15 minutes, a norm for creating autonomous city entities in neighborhoods or pedestrian and cyclist-friendly districts. The proximity and diversity of the city's facilities within the time limit of 15 minutes shorten the commuting distances to a maximum of 1,500 meters. The concept contributes to greater mobility and facilitates energy efficiency and overall autonomy of an urban neighborhood.

Q: Are there any good examples of this concept in the world? How did they perform in practice?

A: First, we should underline historical examples of European cities that are a model for various modern urban concepts of sustainable cities, such as compact cities, pedestrian cities, or 15-minute cities. When it comes to major European cities that have kept their historical patterns, we can single out Amsterdam, Copen-

Photograph: Unsplash/Miguel Ibáñez

Awareness of the importance of green and energy-efficient architecture is part of the wider body of environmental awareness of architectural engineers, including environmentally friendly urban design, climate-responsible planning and design, awareness of the importance of nature in the city, urban ecosystems, and other related disciplines

IVAN SIMIĆ, PhD, graduated from the University of Belgrade's Faculty of Architecture in 2008. In 2016, he acquired a doctorate with the thesis "Opportunities for improving the resilience of urban form to climate change", covering the scientific disciplines of Architecture and Urbanism and the narrower scientific field of Urbanism and Spatial Planning. From 2010 to 2016, he was employed at the Faculty of Architecture in Belgrade as an assistant and from 2018 as an assistant professor. As an expert and scientific associate, he has participated in several science & research and other international expert projects. PhD Simić has published many papers in international scientific journals and spoke at conferences in the country and abroad. He works on environmentally friendly urban planning and design, an adaptation of cities to climate change, urban resilience, and reconstruction and restoration of neighborhoods.

hagen, Prague, Florence, Edinburgh and Zurich, as well as many others. However, the authentic value of European urban heritage is the medium and small-sized cities that developed from their medieval urban nucleus. Therefore, a pedestrian-friendly city is their inherent property preserved and later served as a model for further urban development and growth.

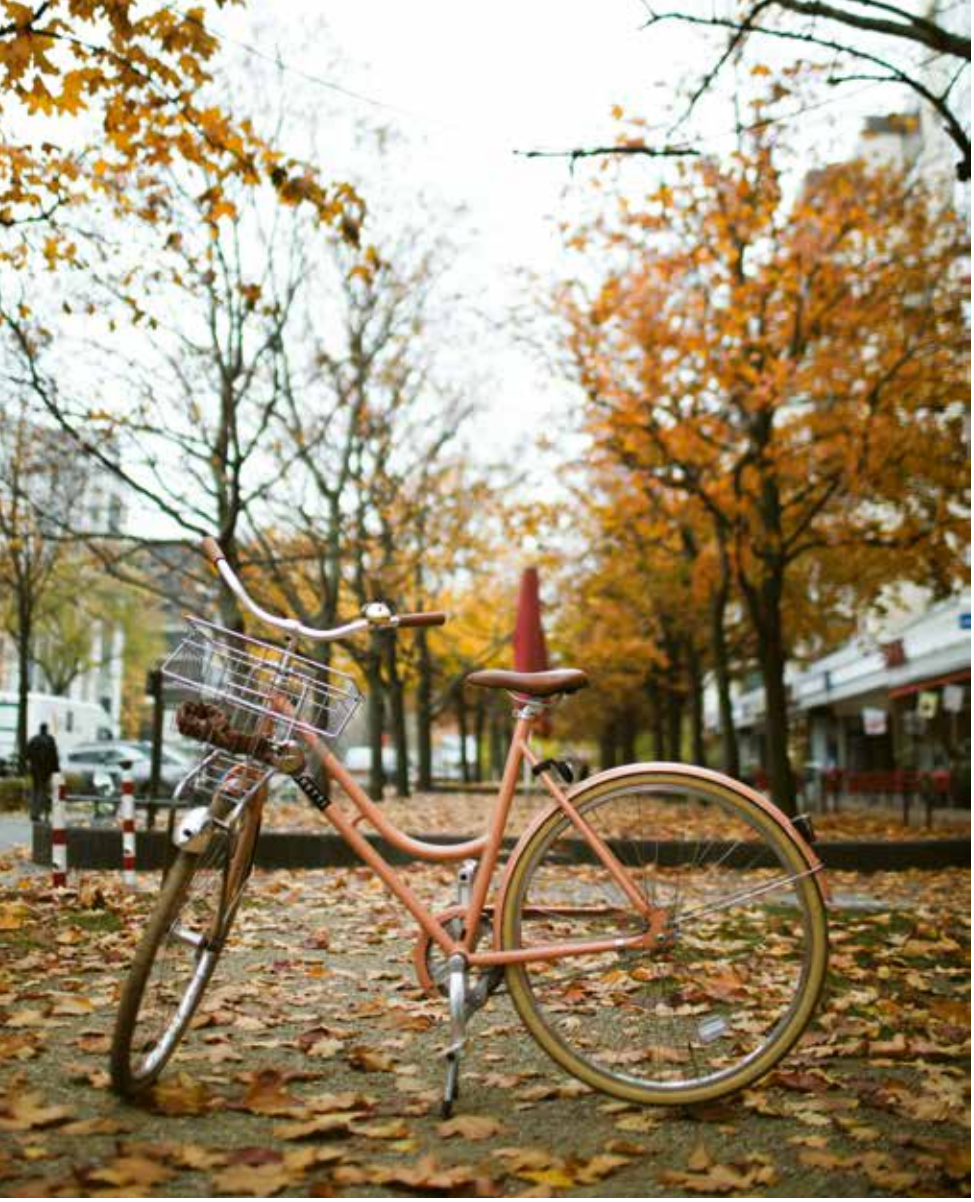
The paradigm shift in the 1960s towards car-free neighborhoods and city centers led to a wave of urban renewal in the US, so many cities successfully transformed into urban environments ideal for pedestrians and cyclists, such as Boston, San Francisco, Philadelphia, and Washington D.C.

Many modern examples rest on these principles. It takes time to determine whether they have been successfully implemented. Evolutionarily designed city units, which have been developed by many participants over a long period, have proven to be a more successful model of development than those that were designed and implemented in one breath.

Q: Could any parts of larger cities in Serbia, especially Belgrade, fit into this concept?

A: From the 1950s to 1980s, Belgrade had a very modern planning practice, the most prominent representative

Photograph: courtesy of Ivan Simić



HOW CAN WE MAKE BELGRADE MORE SUSTAINABLE?

When asked what could be done to make the capital of Serbia more sustainable, our interlocutor replied that given the sluggishness and slowness of the planning system in the processes of reforming and adapting to new socio-economic circumstances and the general trend of primarily catering to real estate developers' wants, the most effective measures would be education and promotion of environmentally friendly and optimal urban and architectural projects. They would target both real estate developers and residents of future residential areas.

"We need to change social awareness of the necessity to live and work in an ecologically and climatically optimized urban environment. The city administration should take on that task and, by highlighting examples of good practice, encourage developers to change the construction trend towards a more environmentally friendly one", says Professor Simić.

of which is the General Urban Plan (GUP) from 1972, which was publicly presented under an impressive slogan "Archipelago of Neighborhoods in the Sea of Greenery". This was the vision of Belgrade until the year 2000: to have polycentric development with new satellite neighborhoods surrounded by green areas and with all the necessary central functions. This made them autonomous urban areas, which coincided with the principles of the 15-minute city. Banovo Brdo is an example of a Belgrade neighborhood that sprung up spontaneously but was built according to Pešić's plan and fitted into the mould of a 15-minute city. Although Banovo Brdo is not ideal because of the many challenges it has faced in the last two decades, such as e.g. excessive construction and lack of parking space, it is a good example of a neighborhood where you can find almost everything

Photographs: (top left) Unsplash/Duo Chen; (bottom) Unsplash/Snowscat

you want, in a space-time dimension of 15 minutes or about 1,500 meters.

This is not the only example of a city within a city in Belgrade. Vidikovac, Sava blocks, Senjak, Dorćol and many other Belgrade neighborhoods complement the 15-minute city concept. Unfortunately, unplanned urban development and construction threaten to disturb the balance of these neighborhoods. Excessive construction, overpopulation, car traffic and scarce green areas act as dystopian processes, especially against the vision of an archipelago of neighborhoods in the sea of greenery of the 1972 General Urban Plan, which is a precious heritage because it offered visionary solutions to issues that are very topical today.

Q: How can we increase the number of such neighborhoods in Serbian citizens, and what are the biggest challenges and obstacles related to their implementation?

A: To implement this or similar concepts, we should have a strategic approach to planning our cities and a good alignment between the strategic level and the existing system of urban plans of general and detailed regulation. That should be guided and harmonized by good strategic documents that must be consistently implemented to get the expected results. The Strategy of Sustainable Urban Development of Serbia, which covers the period until 2030, is an example of such a document adopted. It was passed in 2019.

The proximity and diversity of the city's facilities within the time limit of 15 minutes shorten the commuting distances to a maximum of 1,500 meters

As in the case of European cities, we can also look up to good historical examples from very different eras of urban development. A bazaar is a linear urban pattern from the Turkish period based on the idea of a central pedestrian street containing everything required for a person to meet their daily needs. The legacy of Central European urbanism in Vojvodina is an orthogonal network of streets and public spaces planned for cyclists and pedestrians.

Q: New residential complexes, which resemble small neighborhoods, generally have a rounded space where facilities needed for everyday life are located. How far are they from the concept of 15-minute cities?

A: If we look at them through the eyes of the 15-minute city concept, we first notice their position and size within the wider city as a whole. They are part of a larger urban mosaic whose meaning must not be questioned. Each part of the city has its own integrity and autonomy, which, at the same time, contributes to the vitality and efficiency of the entire urban system.

In the last ten years, many residential complexes were built in Belgrade, which were promoted as a city within a city, offering all the necessary facilities for a comfortable city life. In practice, these are neighborhoods where housing, commerce and services dominate in relation to other

Photographs: Unsplash/Zhouxing Lu

city functions such as education, health, culture, and recreation.

Belgrade Waterfront is a new area built on the most valuable land along the riverbank. Belgrade Waterfront performs only two or three city functions, a favorite combination of real estate developers – housing, shopping, and services. It is obvious that Belgrade Waterfront has no other amenities except a combination of luxury housing with various forms of shopping and service activities. Someone accidentally or intentionally forgot about kindergartens, schools, hospitals, theatres, cinemas, and local community centers. These amenities are few and far between in a large central city area.

The Belgrade Waterfront residents need a car to fulfil all their daily needs apart from housing, shopping at shopping malls and eating and drinking at restaurants and bars. All of this will cause a lot of pressure on neighboring areas with main functions and excessive waste of time and energy in traffic.

Q: If we are generally speaking about the problem of urban planning and environmental protection, what is the biggest problem in Belgrade, and in which parts of the city are these problems the most prevalent?

A: In the last two decades, the city's biggest urban development problem has been relativizing the planning

In the last two decades, the biggest problem of the city's urban development has been the relativization of the planning system, with the General Urban Plan at the top

Photograph: Unsplash/Troy Mortier

system, with the General Urban Plan at the top. The transition of society towards a different economic model puts private real estate developers in the foreground, who assume the role of the main actors in the city's development and construction processes, especially in residential and business areas. The particular interests of real estate developers, on the one hand, and the outdated planning system, which was not adapted to the new economic circumstances, on the other hand, led to the post-socialist transitional crisis of urban development in Belgrade. This crisis is best reflected in the practice whereby when planning and building new residential and business areas of the city, priority is given to the interests of real estate developers, which are mainly interested in generating as much profit as possible, to the detriment of the public interest and other participants in city life.

The current situation in urban development affects all problems, such as scarce green areas, the poor energy efficiency of buildings, unplanned construction, and others, all of which are equally significant and result from the absence of a systemic approach to solving them. Green areas are most under threat in areas where they are the biggest, such as the Novi Beograd municipality and the banks of the Danube and Sava rivers. The city's peripheral areas have a big problem with the lack of proper sewage, while their green areas are also threatened. The energy efficiency problem is ubiquitous but mostly affects densely populated central areas with, on average, the oldest buildings.

Q: As a Faculty of Architecture professor, how aware are young people of green architecture and sustainable buildings?

A: Awareness of the importance of green and energy-efficient architecture is part of the wider body of environmental awareness of architectural engineers, including environmentally friendly urban design, climate-responsible planning and design, awareness of the importance of nature in the city, urban ecosystems, and other related disciplines. My experience in working with students shows that their environmental awareness is mostly a consequence of their personal, already-developed environmental identity and affinity that they acquired before enrolling in architecture studies, which they have been improving during their studies of their own volition by engaging in the topics of energy efficiency or environmentally friendly urban design. Most of them are aware of the necessity that the mentioned principles should be included in the early conceptual phase of the project to avoid the situation where green areas are just subsequently used as marketing labels. Nevertheless, an environmentally conscious and literate professional campaign should be, to a greater extent, a consequence of systemically incorporated and harmonized environmental knowledge within the existing curricula of undergraduate and master's studies in architecture and less a matter of personal interest.

Interviewed by Katarina Vuinac

Photograph: Unsplash/Ivan Bandura

SET TREBINJE – A RECORD NUMBER OF PARTICIPANTS IS EXPECTED

Preparations for the 5th Energy Summit (SET), which will be held in Trebinje from March 20 to 22, are entering the final stage. Close to a thousand representatives of energy companies, public and private companies, service providers from the energy sector and representatives of relevant ministries and other state bodies from the regional countries are expected to participate.

"Our program committee has completed all the tasks within their scope. We agreed on the summit agenda, which will be officially published on the Energy Summit's website and list all participants. This year, the Energy Summit is celebrating an important anniversary, the fifth year of its establishment. This year, we will have an even bigger number of participants and sponsors than ever before, which makes us especially happy. This is a validation that SET has grown into one of the most respectable events of its kind in the field of energy in the region, which gathers the most eminent experts and representatives of all relevant energy-related companies," says Aleksandar Branković, director of SET.

The 5th Energy Summit is being held under the slogan "Energy Connectivity of the Western Balkans", and apart from this topic, during the three summit days, we will hear seven panels, three one-on-one discussions and the opinions of experts in green energy, renewable sources, transmission systems, production and energy markets.

"Energy transition is always in the foreground, but there are also topics related to expanding the capacity of power grids, introducing renewable energy sources into the grid, energy trading in the region and some important topics for small energy producers, whose number keeps growing. We will also cover topics regarding the maintenance of solar power plants and their management," adds Mr Branković.

In addition to exchanging opinions and ideas on significant energy-related topics, we expect to see important contracts signed and new business partnerships established during the Trebinje Summit.

"The summit is developing into a real business conference, at which many companies that come to Trebinje will conclude their first business agreements. There are also implemented contracts as a result of the participation in the Summit, which makes us especially happy, and the fact that people keep coming back to us", said Aleksandar Branković.

He added that the Energy Summit in Trebinje was among the top five similar events in Europe, and the ever-growing number of summit participants proved this true.

"This year, it will definitely be like that. The accommodation capacities during the Summit are already quite full. We already have over 300 registered participants, and the Summit is still a month away. We will exceed 700 or 800 participants that we had last year", adds Mr Branković.

The general sponsor of the Summit is Elnos Group from Banja Luka, and the sponsors are the Ministry of External Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Energy and Mining and the Ministry of Economy and Entrepreneurship of the Republic of Srpska.

SET Trebinje

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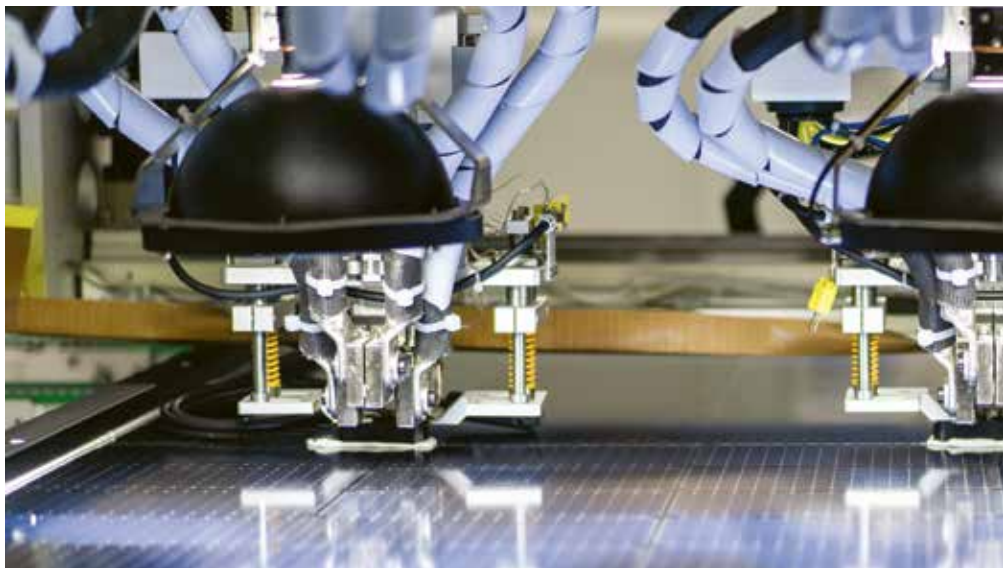
LUXEN SOLAR – CARING FOR EACH CUSTOMER

From its very formation, the Luxen Solar Company has clearly defined its operational principles and set up the production of a quality and reliable product that enables a faster return on investment, while taking utmost care of each customer. Abundant experience in the production of top-quality solar panels and the constant development of solar cell technology are confirmed by over 15 industry awards and the company declared one of the TOP 20 exporters. Today, its portfolio includes a wide range of products for both roofs and land projects, while one of its goals is to establish long-term partnerships in every country in which it operates.

Alisa Papadimitriou, Business Development Director for Europe at Luxen Solar, talks about how important it is to have good communication with customers and help them in project implementation, in addition to having a good quality product.

Q: What do you think is the company's greatest asset?

A: First and foremost, it's the care for every customer. Exceptional customer service is one of the most important things to us. Quick response and quick help, no matter what. Luxen Solar is oriented towards long-term business relationships that are built on trust and transparency. Clients appreciate having a partner they can rely on, who is always honest and re-



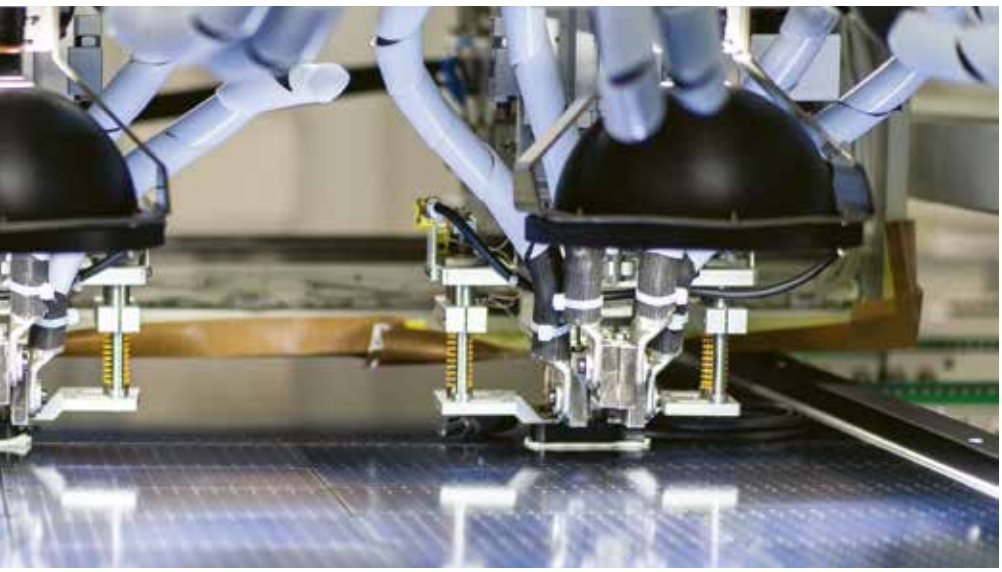
TECHNICAL CUSTOMER SUPPORT

Luxen Solar provides its customers with solar panels that can be delivered quickly thanks to the company's warehouse near Belgrade. The company also has engineers and local partners as technical support, who can also visit any location and provide after-sales support. With our local partners, we provide investors and industrial and commercial consumers, who want to reduce their electricity bills, with a safe and secure investment and the most efficient turnkey solution with a short payback period and higher energy production than conventional products in the market.

Photographs: *Luxen Solar*

Exceptional customer service is one of the most important things to us. Quick response and quick help, no matter what. Luxen Solar is oriented towards long-term business relationships that are built on trust and transparency

Alisa Papadimitriou
Business Development Director for Europe



ABOUT LUXEN SOLAR

Luxen Solar was founded in Spain in 2005. It opened its first production facility in 2011, which has been fully automated since 2015. Today, Luxen Solar is headquartered in Austria. Europe is the company's main market, but it also markets its products in Latin America, Asia, Africa and Australia.

ady to find the best solutions. For our team, there are no problems, only solutions, and it is made up of people who always think outside the box.

In second place is constant growth and orientation towards innovative technologies. Customers want a reliable partner they can trust. The constant growth of a company that has realistic goals and careful planning that is supported by a good financial situation, on the one hand, and always being in step with the latest innovations, to provide clients with the most advanced technology, on the other, are the biggest advantages of Luxen Solar.

Q: What are the benefits of doing business in the Serbian market?

A: Serbia is my homeland, it is the place where I grew up and the country I love. I am especially pleased to see the growing awareness among people about the importance of living in a carbon dioxide-free world, as well as the regulations in place which are required to achieve the set goals in this segment. I care very much about the pollution-free future of Serbia. Our goal is to help everyone meet their clean electricity needs. With the installation of our solar panels, we ensure a quick return on investment and a quality module of high durability and performance that will allow for a longer service life, far beyond the usual expectations. The solar panel is the most important part of the installation and must meet all the criteria and that is what we offer to clients.

Q: What is the biggest challenge manufacturers face and how does Luxen Solar overcome them?

A: The biggest challenges facing solar panel manufacturers are the rapid changes in cell technology. In today's world, research and development are progressing very fast in every industry. The development of solar cells dictates the direction of the development of solar modules and rapid changes are imminent. Very few manufacturers are able to respond to these changes, because keeping up with the development of technologies requires significant and constant investments in new machines. We closely follow the development of technology and choose to offer clients the one that is best in terms of the benefits it brings, keeping in mind a quick return on investment for investors. We are financially stable, have invested in new production lines and use only the most advanced robotics and artificial intelligence.

Photograph: courtesy of Alisa Papadimitriou

HOW CAN WE HAVE A MORE SUSTAINABLE CONSTRUCTION SECTOR?

The construction sector in Serbia is among the strongest economic branches in terms of volume and has been recording significant growth in real estate development. According to global statistics, the construction sector occupies a leading negative position in almost everything in the context of the impact on the environment and climate, with almost 50 per cent share when it comes to energy consumption, emissions of harmful gases, the use of natural resources (of which drinking water makes 14 per cent) and the quantity of generated waste. Managing the construction sector sustainably is important for a more sustainable future. Dragana Korica, executive director of the Green Building Council of Serbia, speaks for Energy Portal magazine about the Council and its contribution towards such a future.

The Green Building Council of Serbia was founded by eight companies from the construction sector in 2010. The companies shared a great awareness and values, recognizing that the turn towards sustainability was inevitable, as was responsibility towards society, the living and the built environment. Following the direction of the construction sector, which was already developing fast in other parts of the world, but also the desire to achieve a necessary and noticeable positive effect on their local environment

Photograph: (bottom left) Pixabay/Văn Hồng Phúc Bùi; (middle) Pixabay/Silviu

Membership in the World Green Building Council made it possible to keep abreast of current issues and problems, find solutions and keep up with the latest knowledge and innovations related to a sustainable built environment

DRAGANA KORICA is a licensed architect with a master's degree in architectural engineering from the University of Belgrade – Faculty of Architecture. She has been working as executive director of the Green Building Council of Serbia (SrbGBC) since 2017. She is in charge of implementing the organization's goals, which encourage and lead the transformation of the Serbian construction sector and the built environment towards green and sustainable construction practices. Driven by the motivation of the much-needed improvement of the sector in the direction of sustainability, she advocates that the positive impact of the implementation of green principles on the built environment should be available to all relevant stakeholders in the construction sector and the general public.

and community, led the Council to join the global green building movement and thus improve its original goals.

"Today, the Council has over 50 members who know why building green is an inevitable and irreversible direction that we should all strive for and who pave that way with their membership and activities under the Council's auspices. The Council has come a long way since its establishment. In the past 14 years, many things have changed, both locally and globally, and the topics of climate change, green transition and sustainability have come to the forefront

Photographs: (Korica) courtesy of Dragana Korica; (bottom right) Unsplash/Wonderlane

as crucial and inevitable during that period. We have learned that we must face these pressing issues together on a planetary level", says Ms Korica.

Membership in the World Green Building Council made it possible to keep abreast of current issues and problems, find solutions and keep up with the latest knowledge and innovations related to a sustainable built environment. At one point, the Ministry of Construction, Transport, and Infrastructure appointed the Green Building Council of Serbia as the "umbrella organization for all issues related to green construction",

which they do not take lightly, but it is a validation of their work so far and achieved results.

In addition to being a member of the World Green Building Council, this organization is also a member of the European Regional Network (ERN), in which they actively participate. Their representatives from the Serbian chapter of the Green Building Council participate in the thematic working groups and events held by the World Green Building Council, which they also organize locally, such as World Green Building Week. Furthermore, their members give their expert contributions to publications and international projects in which they participate through the ERN. This global network allows them to implement all the relevant and current trends locally, which are related to the necessary transition of the construction sector and the built environment.

"Of course, outside of this framework, we also have direct communication and inter-member cooperation with many individual European councils. For example, through this form of direct cooperation, we recently ensured that two members of the Green Building Council of Serbia went through certification training of the German DGNB certification system for free", Ms Korica adds.

Promotion of sustainability

Construction products rely heavily on natural resources. Global statistics say that this reliance amounts to 50 per cent, while natural resources are decreasing. One of the Council's basic roles is to promote the necessary transformation of the construction sector in the direction of sustainable construction and highlight the fact that this sector is one of the most receptive to the implementation and innovation of the circularity model. A change is necessary for the sake of energy and emissions related to the environment and also because of the

ongoing crisis caused by the lack of energy and the overrepresentation of emissions. Such promotion is implemented through conferences, panels, workshops and webinars.

The Council also participates in the activities of other organizations and institutions with which it shares related topics, as well as with state institutions, ministries and all relevant stakeholders. Furthermore, the Council is involved in monitoring regulations, especially draft laws, and regulations.

Improving regulation and education

The Council participates in drafting the Rulebook regarding the new green article of the Law on Spatial Planning and Construction. The Council's internal working group plays a special role here—to support and help draft this Rulebook. The novelty of introducing green construction into the national regulatory framework is the most practical example of the Council's influence and work, which will directly affect the entire construction sector.

Last year, in cooperation with the Chamber of Commerce and Industry of Serbia and the Ministry of Economy, the Council produced a publication called Roadmap for the reuse, recycling or valorization of construction waste and an analysis of the current situation in the field of concrete waste management, which is available on their website. In addition to this project, and thanks to the cooperation with the Public Investments Management Office, the Council participated in the project of creating an urban/architectural solution for the new building of the Faculty of Electrical Engineering with common amenities of the technical faculties in Belgrade, because for the first time, green construction was a prerequisite for participating in a competition for the construction of a public building.

The Council's partnership with One Click LCA provided free access

UNDERSTANDING THE GREEN CONSTRUCTION CONCEPT

Green construction is a global term that has already taken root in the sector, although the actual knowledge of this holistic approach, which rests on the aspects, methods and tools that lead to sustainability, is still not sufficiently represented. Very few people think about a building through its entire life cycle. More precisely, a lack of thoughtfulness at the beginning of the process leads to benefits in the building's exploitation phase, although this approach is used for other key choices. We need to start by planning and implementing bioclimatic, environmental, circular, and smart benefits in line with our capabilities and needs while being mindful of all the economic and environmental benefits of green construction.

Photographs: Pixabay

from Serbia to the cloud tool for measuring captured carbon. Under the auspices of the Western Balkan Circular and Climate Innovation Beacons project, which was supported by the European Union's initiative for innovation related to adaptation to climate change—EIT Climate KIC—there is also a practical education format as a transfer of know-how and instructions for the practical implementation of circularity in construction an.

The Council especially emphasizes their work with the young in the form of an interesting and educational workshop called "How Do We Build Tomorrow?" which they implement with school-aged children because, as Ms Korica says, children are our investment in the future, although this activity might not have a direct influence on the construction sector at the moment.

"First and foremost, we would like to point out that the Council members practically apply the principles of green construction through their activities. They adapt their production and products, apply the principles of green and sustainable construction in their design activities, construct certified green buildings, and consult and educate the staff in charge of carrying out this green transformation. After all, the Council would not be where it is today and would not exist in general without its members, who believe in its mission and goals and make it possible for us to get closer to achieving those goals", Ms Korica explains.

Membership in the Council

Membership in the Green Building Council of Serbia is open to everyone who is in the Council's mission, is ready to take steps to achieve it, and is somehow connected to the construction sector. These can be architectural studios that design buildings, owners and/or developers who build them, manufacturers and distributors of materials, products and systems, contractors, consultancies, real estate agencies, universities, colleges, etc. Financial institutions also have a huge influence on the construction sector. IT and technology companies also have a great potential to influence positive changes, for example, by developing innovative systems and solutions that are integrated into the construction sector and implemented in new buildings. Furthermore, local governments in cities and municipalities also play an important role in the green transition. Individuals are also as important as other members, as are the media, and should be recognized for conveying awareness of the required transition to the public.

Ms Korica explains that the Council membership is multifaceted due to the networking and establishing a link between knowledge, expertise and resources available to everyone. The Council offers members a platform through which they can connect and be recognized, increase visibility in the domestic market, have a more prominent profile in front of national and international institutions and major stakeholders and use other opportunities they would never have had on their own. In turn, the expertise, experience, knowledge, and strength that members bring to the Council are key to its quality of work.

The membership procedure is simple. The application form and charter are available on the Council's official website. They need to be filled out and submitted, usually with an explanation of the motivation for membership. Based on that, the Council decides on the admission of a new member. The Council's office will provide all the necessary information or assistance in this process.

Photograph: Pixabay

GREEN FINANCING OF SUSTAINABLE CONSTRUCTION

Financing of green construction in some form already exists in our country. Recently, investments have been announced in public-private partnerships that are only energy-related. The Council will have the opportunity to get involved in this matter and point out that there is room to include other parameters that can further contribute to the context of green and sustainable construction. “We hope financial institutions will soon recognize the mentioned good practices so that developers can take out loans under favorable conditions. We have already had some initial conversations with financial institutions on that topic, and the next step is to conclude together that such financing is not risky and that it is measurable. If this kind of financial help were available in our country too, it would support the state’s development”, Ms Korica explains.

The Council especially emphasizes their work with the young in the form of an interesting and educational workshop called “How Do We Build Tomorrow?” which they implement with school-aged children

The Council is also working to raise awareness of the importance of green construction. According to Dragana Korica, the greatest recognition of green construction at the moment is reflected in the green certification of buildings, with the commercial sector leading in this. Its development over the years is shown by the fact that the energy passport was introduced in 2012 and that the first green-certified building was built in 2013. Today, this certification trend is constantly growing.

The Council’s goal is also to promote the wider application of innovative practices such as renewable energy sources, systems for optimizing energy consumption, smart systems for monitoring comfort aspects, systems for collecting and purifying rainwater and others.

Prepared by Katarina Vuinac

Photographs: (bottom left) Pixabay/12019; (middle right) Pixabay

KIKINDA GETS A SOLAR POWER PLANT

The northern part of our country will get yet another solar power plant. The MT-KOMEX Company continues to build a sustainable future and produce green kilowatts. Its team of engineers, who have already implemented numerous successful projects with a total installed capacity of over 100MW, will build this solar plant.

After two successful projects implemented in Vojvodina, a third one will follow shortly, more precisely, the construction of a solar power plant in the administrative centre of the North Banat District. Namely, the latest MT-KOMEX project is located in Kikinda.

The project – the B2 Sunspot solar power plant, for which the market premium was obtained at the first auctions held in Serbia – will have a power of 7MW AC, while the installed power will be 7.8MWp, which will make this power plant an essential player in the green energy sector.

The area where the power plant will be located spans 8,500 square meters and was chosen because of its previous status as a former landfill.

Photograph: Pexels/Boris Hamer

Building the plant in this location will not only transform an unused space into a productive area but also lead to an environmental revitalization of a plot.

Once the former landfill is turned into a location for solar panels, the environmental impact becomes positive. Suddenly, a power plant emerges from the landfill and produces electricity that will be forwarded to the power distribution system. A once unattractive, polluted, and neglected area becomes productive, with investors not having to occupy pristine natural areas or agricultural and fertile land to build.

Another positive aspect is that embarking on projects of this type implies that the required infrastructure usually already exists, such as the power grid and roads in the vicinity of the former landfills. All of this, put together, is an example of true sustainable development.

In terms of panels, the power plant will use bifacial solar panels from the renowned manufacturer Canadian Solar. Their individual power will be 660Wp. The mentioned bifacial solar panels allow double absorption of sunlight on both sides of the panel, leading to higher and more efficient electricity production. Their efficiency, depending on how ideal the weather conditions are, can be 10 per cent or even over 20 per cent higher than that of monofacial panels.

Fronius International inverters traditionally play a crucial role in converting solar energy into electricity. The Tauro Eco 100-3-P model was specifically chosen for this project. The total number of inverters will be 70, ensuring high-quality and safe energy transformation from one form to another.

Seven dry energy transformers with a 1,000kVA capacity will be installed at the project site, further improving the system's efficiency and reliability.

In addition to the inverters and the solar panels themselves, the rest of the equipment also comes from the Turkish manufacturer Kirac Metal. This manufacturer will provide structures that are long-lasting and resistant to different weather conditions, which last year proved to be a more than significant issue, considering that Vojvodina was hit by extraordinary-scale supercell storms.

All the features we have mentioned will contribute to the estimated annual production of 11,000MWh, which will position the B2 Sunspot solar power plant in Kikinda as a significant stakeholder in the renewable energy sector. Thus, it will contribute to reducing carbon dioxide emissions.

The MT-KOMEX Company will once again have the opportunity to show its competence, professionalism, and, above all, experience in this field. After a hundred thousand installed panels throughout Serbia, it still effectively solves all field challenges ahead.

Prepared by Milica Vučković

> Once the former landfill is turned into a location for solar panels, the environmental impact becomes positive

Photographs: Aleksandar Rajić

GREEN INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT OF CROATIAN CITIES

Green spaces in urban areas significantly raise the quality of life in a society undergoing intense urbanization. Constant improvement of green infrastructure contributes to sustainable development and, at the same time, has social, environmental, and economic benefits. In Croatia, one of Serbia's neighbors, implementing green infrastructure is becoming increasingly common while applying green principles has generated recognizable benefits, which have led to significant investments in this area.

After the Government of the Republic of Croatia adopted the Program for the Development of Green Infrastructure in Urban Areas, which covers the period until 2030, in December 2021, the Ministry of Physical Planning, Construction and State Assets launched two calls for grants – one for the development of green urban renewal strategies and the other for the implementation of a pilot project, to which almost 25 million

The Republic of Croatia also provides national funding, awarded through tenders launched by the Environmental Protection and Energy Efficiency Fund

Photograph: Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia

One funding source for local governments is the 2021-2026 National Recovery and Resilience Plan from the NextGenerationEU and REPoverEU mechanisms, with 25 million euros at local governments' disposal

euros have been allocated to through the 2021–2026 National Recovery and Resilience Plan.

We spoke with Ines Androić Brajčić, Head of Sector for Green Urban Infrastructure and Circular Management of Spaces and Buildings in the Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia, about the green construction standards in architectural practice, the development of green infrastructure in urban areas, EU funds, as well as the Green Urban Renewal Strategy,

Q: What is the way to greener cities and municipalities in Croatia?

A: The way to greener cities and municipalities is the development of the Green Urban Renewal Strategy, an important strategic basis for local governments. The strategy refers to accomplishing green infrastructure development goals, integrating nature-based solutions, improving circular management of space and buildings, meeting energy efficiency goals, adapting to climate change and boosting resistance to risks.

Ninety-six cities and municipalities applied following our public call to develop Green Urban Renewal Strategies, which clearly shows that the importance of green urban renewal has been recognized. In addition to providing implementation policies and co-financing from the EU and national sources, the Ministry also supports the development of various guidelines and methodologies and holds training sessions and the like.

Q: How do you define green infrastructure, and what are its benefits? There would be no green construction without green architectural projects. How long have green building standards been used in architectural practice, and what do they most often imply?

A: The Spatial Planning Act defines green infrastructure as planned

INES ANDROIĆ BRAJČIĆ graduated in architecture and urban planning at the Faculty of Architecture in Zagreb. She dedicated her professional career to spatial and urban planning, energy efficiency in buildings and the implementation of EU green policies. Ms Androić Brajčić has worked in several public institutions, from the local to the national level. Since 2009, she has been working in the Ministry of Physical Planning, Construction and State Assets, where she worked in construction inspection, development of spatial plans, tasks related to green urban infrastructure and circular management space and buildings, energy efficiency in buildings, sustainable development of cities and programming and implementation of EU projects and program. She is Head of the Sector for Green Urban Infrastructure and Circular Management of Spaces and Buildings. During her nearly 30-year-long career, she worked on drafting various strategies, laws and by-laws, transposing EU directives into national legislation, and implementing various professional programs and procedures in the broader sense of architecture and urban planning and energy efficiency in buildings. Ms Androić Brajčić is a recognized expert at the international, EU and national level in sustainable urban development, spatial planning, development of cities and towns and development of green urban infrastructure.

Photographs: (left) Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia; (Androić Brajčić) courtesy of Ines Androić Brajčić

green and water areas and other nature-based spatial solutions which are applied in cities and municipalities, and which contribute to the preservation, improvement and restoration of nature, natural functions and processes as well as generate environmental, economic, and social benefits. The benefits of green infrastructure are multiple and vary from environmental to economic and diverse social benefits.

Environmental benefits are, for example, the reduction of pollution and greenhouse gas emissions or the mitigation of the thermal island effect, achieved by reducing the air temperature in cities. Economic benefits include a reduction in overall energy demand, indirect damage reduction from extreme rainfall and flooding, higher value of real estate and others. Social benefits include improving the quality of life and health of people living in cities, creating a pleasant living environment, connecting different social groups and encouraging their interaction and contributing to the preservation of architectural heritage and the vision of cities by renovating parks and gardens, as well as amassing new heritage by creating new spaces. These are just some of the many benefits of green infrastructure.

The Ministry also encourages the energy renovation of public and multi-apartment buildings and family houses and the implementation of green infrastructure elements in those buildings, such as green roofs and building fronts. We encourage integral renovation, which includes at least one energy renovation measure, with a minimum energy saving of 50 per cent.

Furthermore, we support the in-depth renovation defined by the Construction Law, which implies a reduction of energy consumption for heating and primary energy by 50 per cent annually and a complete

Photograph: Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia

Ninety-six cities and municipalities applied following our public call to develop Green Urban Renewal Strategies, which clearly shows that the importance of green urban renewal has been recognized

renovation prescribed by the Directive on the energy properties of buildings from 2018, which additionally includes increasing seismic resistance, fire protection and improvement of indoor climate conditions in buildings. None of that is implemented without special consideration for preserving the quality of the built space, which directly affects the quality of life.

Construction excellence is achieved through the thoughtful action of architects and all spatial development actors. In Croatia, building culture is defined and improved by architectural policies formulated in documents such as the policy of national guidelines for quality and building culture. It is promoted under the auspices of projects such as the New European Bauhaus through creating inclusive, sustainable, and aesthetically valuable spaces.

Q: What are the goals of the 2021-2030 Development of Green Infrastructure in Urban Areas Program? What do you expect from its implementation?

A: In cooperation with the University of Zagreb's Faculty of Architecture and the Urbanex Company, the Ministry devised the 2030 Development of Green Infrastructure in Urban Areas

Photograph: Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia

Program. This Program was created to establish sustainable, resilient, safe, pleasant, and orderly cities and municipalities in Croatia, i.e. its goal is to create prerequisites for a better quality of life and health of people and contribute to sustainable social, economic and spatial development. This will be achieved by quality planning and management of the development of green infrastructure and its improvement, as well as by ensuring its availability and boosting knowledge and social awareness of sustainable development.

Q: How much money did Croatia receive from EU funds and green infrastructure development programs, how were they used, and how many countries encourage this important segment?

A: Through EU funds for the development of green infrastructure, local governments have several sources of funding at their disposal. One funding source for local governments is the 2021-2026 National Recovery and Resilience Plan from the NextGenerationEU and REPoverEU mechanisms, with 25 million euros at local governments' disposal. This money is for the development of the Green Urban Renewal Strategy and the implementation of pilot projects.

THE GREEN INFRASTRUCTURE REGISTRY APPLICATION

The Green Infrastructure Registry, developed in Croatia as an application, is conceived as a new module of the existing Spatial Planning Information System. All the new-generation spatial plans will be created within this system. At the same time, the Registry will provide data for spatial planners and decision-makers so that they can better understand and plan the space in their respective cities and municipalities.

Also, the 2021-2027 Operational Competitiveness and Cohesion Program has envisaged 71 million euros for green infrastructure development projects in urban areas that will come from the European Regional Development Fund. Costs related to investments in green infrastructure are also justifiable costs as part of the 2021-2027 Integrated Territorial Program.

The Republic of Croatia also provides national funding, awarded through tenders launched by the Environmental Protection and Energy Efficiency Fund.

Photographs: (top) Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia; (left) Unsplash/Studio Dekorasyon

In cooperation with the University of Zagreb's Faculty of Architecture and the Urbanex Company, the Ministry devised the 2030 Development of Green Infrastructure in Urban Areas Program

Q: The EU is expected to adopt the Nature Restoration Law. What will this legal document contain, when is it expected to enter into force in the EU Member States, and how will it be applied in Croatia?

A: The draft Nature Restoration Law prescribes a series of provisions related to the renewal of urban ecosystems, i.e., it stipulates that there must be no loss of urban green areas in cities or a reduction in canopy cover at the national level until 2030. Another requirement is increasing the total area of urban green spaces and canopy coverage. Each Member State must draw up its nature restoration plan based on the draft Law. Currently, the European Commission is preparing guidelines for developing those plans, and when they are completed, more will be known about the Law's implementation.

Q: Green urban strategies generate many benefits, but cities must overcome certain problems to implement them. You created the Manual for implementing the Green Urban Renewal Strategy in partnership with the EBRD. What does it include, and why was it written?

A: The manual for the implementation of the Green Urban Renewal Strategy was developed by sustainable urban regeneration experts, with the professional support of the Ministry, under the auspices of an EU-funded project, through the Technical Support Instrument, with the implementation support of the EBRD and in cooperation with the Directorate-General for Structural Reform Support (DG REFORM).

Its goal is to facilitate the implementation of the Green Urban Renewal Strategy and offer solutions to the challenges faced by municipalities and cities, which include financing from various mechanisms, ensuring public participation, and monitoring and evaluating implementation.

Q: What should the Green Urban Renewal Strategy contain? What are the best examples of good green infrastructure in Croatia?

A: The Ministry has drafted the Guidelines for preparing the Green Urban Renewal Strategy, which prescribes the mandatory content and optional chapters. Strategies must contain an introduction in which the purpose and reasons are elaborated, the process of writing the Strategy and the connection with the legislative framework. Furthermore, they must formulate a medium-term development vision as the main and final goal for implementation of the Strategy. The Strategy should also contain an analysis of the current situation, namely a description of development needs and potential and a description and cartographic representations of the area with a description of its main characteristics. This includes demographic, physical, territorial and other characteristics of the scope, as well as climatic data.

Analysis of valid strategic and spatial planning documents, historical analysis of the development of significant public green areas, socio-economic analysis, previous investments, and other analyses should also be conducted. Subsequently, a strategic framework defines the activities and projects contributing to green urban renewal.

For example, although some strategies have already been adopted, our cities and municipalities are mostly still drafting their strategies. Their implementation is in its infancy, so it may still be too early to discuss concrete examples. However, many good examples of individual projects related to green infrastructure in Croatia exist.

Interviewed by Mirjana Vujadinović Tomevski

Photographs: Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia

BIOCLIMATIC ARCHITECTURE AS THE BASIS OF SUSTAINABLE CONSTRUCTION

If you were to ask me whether bioclimatic architecture is the basis of sustainable construction, I would answer with a resounding "yes". Bioclimatic architecture does not represent any style or direction in architecture but a systematic approach to design. By using this term, we want to describe buildings that are designed and constructed in such a way that they build a rational relationship with the climate in which they are created, primarily through the relationship with climatic influences but also with numerous other natural conditions. The very term "bioclimatic" contains two key determinants – climatic conditions and everything that the term bio refers to – from the Greek term bios, i.e. everything that makes life possible. It implies, first and foremost, the relationship between the object and nature, whether we're talking about using natural materials, bringing nature and users closer together, or implementing solutions to improve the natural conditions at the location. It is clear from this that the environmental principles of design and construction are based on bioclimatic principles. We also call this approach in architecture – *contextual architecture* because it respects the characteristics of the context – the object's environment, at both the micro and macro level.

What bioclimatic architecture is not are all examples of contextual,

Photographs: courtesy of Bojana Zeković

> The relationship to the climatic conditions, often harsh, in cooperation with the available materials, led to the development of specific forms, structural assemblies and details that become a climate characteristic

imported, and ill-considered solutions which do not correspond to the local climate, the scale of the environment, the choice of materials, or the characteristics of a certain assembly. This perhaps explains the term in a better way.

Vernacular architecture

Why must bioclimatic architecture be the basis of sustainable construction? Because it always has been. Examples of buildings that have stood the test of time in terms of their durability are various examples of folk vernacular architecture around the world, which is now part of the cultural heritage of humanity. This includes our Dinaric log cabin and the Vojvodina log house. The buildings made by folk builders, most often unnamed, were built mainly using locally available materials, with a thoughtful attitude towards local climatic conditions, which has been perfected over centuries. The relationship to the climatic conditions, often harsh, in cooperation with the available materials, led to the development of specific forms, structural assemblies and details that become a climate characteristic. Examples of vernacular architecture were first recorded and exhibited by the architect Bernard Rudofsky in a highly influential exhibition at the MoMA (Museum of Modern Architecture, NY), titled "Architecture Without Architects" back in 1964.

Shortly after that came the 1973 energy crisis, when the world realized that modern buildings, which throughout the 20th century increasingly resembled each other regardless of where they were built, relied heavily on heating, cooling and ventilation systems that consume large quantities of energy. Awareness regarding the energy that buildings consume for their functioning and the need to build them more rationally directed the profession towards searching for more logical solutions regarding the organization, materialization, and construction of buildings. Examples of vernacular architecture and local building traditions have become some of the basic role models, still inspiring contemporary architects.

BOJANA ZEKOVIĆ graduated from the Faculty of Architecture in Belgrade in 2010 and received her doctorate in 2017, with the topic of her doctoral thesis being "Examining modalities of renovation of family houses by improving energy performance". She acquired a LEED GA license in 2011. Since 2015, she has been an assistant at the Department of Architectural Technologies. Ms Zeković is the author of numerous papers published in international and domestic scientific journals and papers presented at domestic and international conferences and chapters in scientific monographs. Ms Zeković took part in several international science and research projects (TABULA/EPISCOPE, HORIZON 2020 EMBUild, Erasmus + KLABS, HERSUS), was a member of the teaching team of the TwistBox student project at the Solar Decathlon Middle East competition (SDME 2018) and a member of the Faculty of Architecture's team in research projects related to the construction fund of residential and public facilities, which was implemented in cooperation with GIZ (German agency for international cooperation).

There have been numerous examples of how, in the last half-century, vernacular architecture objects have influenced contemporary architecture. One research direction relates to the study of bioclimatic principles according to which traditional buildings were designed, which made it possible to improve the comfort of staying in them without the implementation of technical systems, such as integration of the natural ventilation principles in dry, hot climates, or passive solar heating in cooler and temperate climates. Integrating these principles into the design concept of modern buildings, which nevertheless require

a higher level of comfort, leads to significant energy savings during their use. Also, the reuse of recently forgotten and neglected construction techniques and locally available materials (e.g., rammed earth) gives great results in revitalizing local communities, significantly contributing to local economies and cultural diversity. It is clear from these examples that bioclimatic architecture includes all aspects of sustainability – environmental, economic, and social. All the aforementioned examples belong to the contemporary direction, or better, to the tendency in architecture that defines the connection and foothold in the local tradition through a neo-vernacular approach.

Although the development of bioclimatic principles in vernacular architecture took a long time, based on relatively constant natural conditions, but also more or less unchanged user needs, only to later form recognizable forms that were then attributed to the folk builder through several centuries of trials, errors and constant correction and improvement, today you should never try to build without architects. Preferably good ones! These architects know how to listen to requests, recognize users' needs (real estate developers), and design projects that complement the natural conditions, programs,

regulations, rational relationship to resources and many other conditions in the best possible way.

This is perhaps a good place to examine the relationship between bioclimatic architecture and technology. As we live in a world of instant solutions and numerous technological aids, one might think that to achieve quality architectural solutions, it is enough to insert a few key parameters into the software, which will then offer the optimal solution. However, although using modern technologies is an indispensable part of designing and constructing buildings, it does not guarantee quality solutions.

Adhering to bioclimatic principles does not exclude any principle of relation to technology, as Claus Daniels formulated it in his book from 1998 – "low-tech/light-tech/high-tech". Imposing a certain principle as exclusively correct is not possible.

Solar architecture

I like to illustrate the issue of the bioclimatic approach with an example of an adequate attitude towards the Sun as the most important factor in designing buildings in accordance with natural conditions. The very beginnings of the development of the bioclimatic approach to design are related to the development of the so-called solar architecture, whose primary goal was the maximum utilization of the Sun's energy through passive and active systems. Characteristic examples of solar architecture can be found mostly in Scandinavian countries, Western Europe (France, Germany), North America, and Australia, but also in the former Yugoslavia, through the actions of individuals who recognized the importance of this topic for the future development of sustainable construction. Unfortunately, in the rest of the world and especially in our country, such tendencies in architecture have been developed slightly away from the dominant architectural trends, so there are very few such buildings in our climate. In the decades to come, the bioclimatic approach to architecture became recognized as the basis for forming a comprehensive direction of green construction worldwide.

In temperate climates, such as ours, the complexity of the bioclimatic approach is reflected precisely in the diversity of natural conditions and the presence of a large variety of variables: hot summers, cold winters, frost, periods with high air humidity, periods with strong wind, periods without wind with a high degree of air pollution, dry periods... Although without dominant temperature extremes, which still make our climate desirable and pleasant, the design's response to all the above variables is not easy. Large glass surfaces, which in the transitional and winter months enable passive heating and reduce heating needs, become a source of problems with overheating in the summer without adequate protection from the Sun. Temperature fluctuations throughout the year reduce the life of elastic materials (waterproofing, gaskets, etc.), so joints must be handled carefully.

Improved natural ventilation, which reduces the need for cooling systems when there is high air humidity and high temperatures, is not an ideal solution during severe air pollution in most urban areas. Formulated in this way, it seems that no solution can reconcile all these conditions, especially in combination with functional requirements, specific user requirements and regulations. But again, we are witnessing truly inspiring examples of buildings in which an optimal relationship between different requirements has been achieved, emphasizing the relationship to natural resources. Such solutions are possible only in the so-called integrative approach to planning and building, where all key actors are involved in the decision-making process – from the initial design stages to the solution. Even more importantly, all actors must be willing to consider the relationship to the environment, climatic influences, and natural conditions as important elements that influence decision-making. Oftentimes, good solutions rest solely on the enthusiasm of individuals – usually the client and/or architect – who form a team that will share their enthusiasm for creating an unconventional solution. Such a scenario would have to change so that in the coming decades, the bioclimatic approach to design and the imperative to reduce the consumption of natural resources become part of conventional solutions.

SMART LIVING ABB-STYLE

In today's age, when the prices of energy products and electricity have reached their highest historical values, smart houses, apartments, and business premises are presented as an effective solution for bridging the energy crisis. These facilities, combined with renewable energy sources and other energy efficiency measures, ensure comfort and safety at all times and provide significant energy savings. Therefore, it is not surprising that the age of smart buildings has already arrived in our area.

Relying on the decades-long tradition of the KNX standard, the ABB Company has developed the ABB free@home system, which has been raising the quality of the everyday life of its users in Serbia for more than five years. Because this company operates in over 100 countries and its continuous commitment to the development and improvement of its own systems and equipment, in cooperation with reliable system integrators from the Pametan Stan Company (the Smart Apartment Company), users can be rest assured that they will enjoy the system's performance for decades to come.

On the other hand, considering how expansive the offer of new buildings is, developers have to stand out in the market, and they can do that by choosing a smart home system that creates a significant advantage. For instance, the experience of ABB experts worldwide shows that implementing this system greatly expedites the sale of buildings that are branded as smart. The first smart building in Serbia, B2, was built in Terazije, in the heart of Belgrade, where a complete ABB home automation system, intercom system, and weather station for each apartment were installed and commissioned. Furthermore,

Photographs: ABB

preparations are being made for electric car chargers for each parking space in the facility. Other buildings that contain this system include the building of the Regional Air Traffic Control in Surčin and several luxury mansions. Royal Art Residence & SPA, an exclusive facility located at 21 Kosančićev Venac, known for bringing its Paris-like charm to the very centre of Belgrade, has apartments that are equipped with an ABB home automation system (smart home systems). In recent times, smart home systems have become common in mass residential construction, i.e., in buildings with hundreds of apartments. The solutions that the ABB Company provides are ready for any challenge that may occur, which was also recognized by the developers from Novi Dorćol. As a cross between authentic, traditional and modern architecture, the building in Novi Dorćol, spanning 16,800 square metres, has had 4,300 smart home devices installed in 225 apartments. Furthermore, 950 scenarios have been created, and six weather stations have been installed in the building to inform its tenants about the weather and warn them of dangerous situations. In the same urban architectural spirit, the ABB free@home system is integrated into the ZepTerra residential-business complex in Novi Beograd, built in accordance with state-of-the-art standards and energy efficiency requirements.

Comfortable, safe and economical side

The term *smart* is used by these home automation systems to describe their ability to act based on predefined parameters and rules entered by the installer or users themselves, according to their personal preferences and needs. These systems do not rely on artificial intelligence for autonomous decision-making, so users can rest assured that smart homes cannot take control of their lives. The ABB home automation system gives the user full control in managing the home in four ways. The classic management method implies that a smart home has switches and sockets that perform predefined functions. Electrical installations such as lighting, blinds, motorized awnings, heating and cooling, and household appliances are managed remotely via a mobile phone, tablet, or computer. Motion sensors and presence sensors allow, for example, the light to be turned on as long as someone stays in the room, and when someone leaves the room, the light turns off. The timer feature allows users to define functions that will activate or end at a specific time or last for a specific period.

Ease of installation and management

The ABB free@home system is completely open to all manufacturers, so we can have numerous devices from different manufacturers in the house that will successfully communicate with each other. Smart homes can integrate a wide range of smart devices, including smart TVs, speakers, home entertainment devices, kitchen appliances and more. This allows users to centrally manage all their smart devices and systems through a single interface. ABB practically has its own cloud in which information about the user's system is stored, and devices such as the washing machine in the user's home have their own cloud in which the associated information is stored. Therefore, the communication between the smart system ABB free@home and other devices is cloud-to-cloud, where the security of communication against external intrusions and its continuous improvement is at the forefront. ABB free@home can be installed in new buildings; in this case, installation is carried out with wired devices. It is installed classically with the addition of another BUS conductor at minimal cost and cuts on the use of cables in the apartment. In addition to wired devices, ABB also offers WiFi devices that can be installed later.

A great advantage is combining WiFi devices in one system with wired devices. For example, if the user is renovating an apartment that already has an ABB system and wants to add a new heating element, it is enough to place the WiFi valve on the heating element for the central unit to detect the new device and within a few minutes, for it to become available on the user's mobile to create new functions. The advantage of the ABB free@home system is that it is easily managed. Now, the users can perform this task through the app whenever they want to and adapt it to their lifestyle. The system has its own automatic update, and nothing can disrupt it. Also, there is always a backup option to restore the system if the user wishes. Another important feature is that all ABB smart home system users have 24/7 technical support available. The complexity of smart homes depends on the needs and preferences of each user, and smart home systems make them very comfortable. On the other hand, their features make them practical, safe and energy-efficient, which is particularly important in the era of energy transition.

ABB

THE POSITION OF THE BIRD'S WINGS IN FLIGHT AS A SOLUTION FOR MORE EFFICIENT USE OF WIND ENERGY

Ambitious goals related to renewable energy sources and zero emissions require not only boosting the capacity of such sources and expediting infrastructure development but also improving existing and creating innovative technology. Energy obtained from wind recorded good results during the previous year, but additional efforts are needed to achieve the set goals. Blagoje Krivokapić, a mechanical engineer from Nikšić, offered one of the solutions to make wind energy more efficient.

At the European Researchers' Night in Podgorica, he initially presented his invention – the Nikšić Turbine. After additional improvements, the invention was presented at the Global Investment Forum Cyprus – GIF 2023. The turbine was declared the best among 200 presented projects from 25 countries and was awarded a gold medal. Additionally, it also received a Grand Prix. This award boosted the invention's value and facilitated the creation of a team for its implementation.

Mr Krivokapić says that the inspiration for the idea came from the solutions given to us by nature. Explaining what makes his solution more successful than conventional

Photographs: Unsplash/Jan Kopriva

wind turbines, he said that the current design is not in harmony with nature. Namely, the position of the turbines fights against the wind instead of surrendering to it and using its power.

"Nature offers us the best and simplest solutions, like the position of a bird's wings during flight", Mr Krivokapić explains.

He adds that the propeller design he created mimics precisely the position of the bird's wings in flight because birds move best through the air. The famous Archimedes' quote – "Give me a lever long enough and a fulcrum on which to place it, and I shall move the world" – was his guideline. The lever plays a vital role in Mr Krivokapić's project, as he explains, in layman's terms, how energy is generated using this technology.

"A bird's wing is shaped in a way that it accepts the wind's resistance instead of going against it, and the power is generated thanks to the lever, i.e. when we place the shaft on the levers, thanks to wind force, we generate the movement of a circular circuit. This is how the best utilization of its is achieved, in addition to its greatest efficiency", he says, adding that once power is generated, it can easily be transformed into speed.

Applying such a solution would enhance environmental protection, taking into account that it has the potential to produce three times more electricity than conventional wind turbines. More precisely, one windmill currently produces about 2.4MW of electricity, while his solution could produce up to 8MW. Regarding finances, construction will require almost two times less funds.

"Montenegro has good wind potential, which is why I believe it could become a producer of wind turbines. The solution I devised would enable easier and cheaper production," Mr Krivokapić adds.

In terms of the Nikšić Turbine project, the next steps are creating a prototype, i.e. a pilot project, to demonstrate the advantages of this innovation. In the future, Mr Krivokapić plans to present more mechanical engineering ideas, including those that generate energy from nature.

He also reveals that he was a very curious child who liked to take toys apart and put them back together because he was interested in how they worked. This kind of curiosity developed over the years, and while observing how power plants were overhauled, he contemplated how their operations could be simplified and become more efficient. That's when he came up with the turbine idea. Mr Krivokapić reminds us that the first windmills were designed about 150 years ago, while those that exist today are only slightly improved. Therefore, we need to develop a new technology that will ensure that the wind does not destroy the wind turbines but that they are designed in a way that is complementary to the power of the wind.

In addition to his day job, business management in customs clearance, freight forwarding and insurance, Mr Krvokapić writes poems, stories, and aphorisms in his spare time.

Blagoje Krivokapić
mechanical engineer from Nikšić

> In terms of the Nikšić Turbine project, the next steps are creating a prototype, i.e. a pilot project, to demonstrate the advantages of this innovation

Photographs: Unsplash/Thomas Reaubourg

Prepared by Katarina Vuinac

NEWS FROM THE COUNTRY AND THE WORLD

HOW DANGEROUS ARE EXCESSIVE AMOUNTS OF PHOSPHORUS FOR THE ENVIRONMENT, AND HOW CAN WE USE IT MORE SUSTAINABLY?

Food safety is a very important topic, especially at a time when pollution, climate change, urbanization and population growth have never been more intense. Phosphorus is important in ensuring food safety as a nutrient that promotes plant growth. It is primarily used to produce synthetic fertilizers to increase crop yields but is also a key ingredient in animal feed. Furthermore, its use is recorded in producing steel, food additives, pesticides, household cleaning agents, and more. Although it is very useful, its excessive and improper use can cause many unwanted effects and negatively affect the environment and the living world.

Agriculture is the main polluter when it comes to phosphorus. Its benefits end when there is too much of it. If too much of it is present in the soil, phosphorus depletes the soil of its natural resources. It becomes particularly harmful when it ends up in rivers, lakes, and oceans because eutrophication can occur. The increase in nutrients in the water leads to algal bloom, i.e. excessive reproduction of aquatic plants, mainly algae, which further affects the living world in this ecosystem. The so-called algal bloom degrades drinking water quality and creates dead zones where there is not enough oxygen, which living things in the water need to survive.

Phosphorus pollution of water has doubled in the last century, and the trend continues. To solve the problem, sustainable practices of phosphorous use have to be put in place. The United Nations Environmental Protection Program (UNEP) explains that claiming crop yield will increase if more phosphorous is used is false. It adds that the solution lies in determining a suitable amount. Instead, different farming practices would significantly solve this problem. Some examples are the use of manure or, say, the reduction of the frequency of soil cultivation, as this will improve soil quality and reduce the need for fertilizer.

Additionally, wastewater releases large amounts of phosphorus into the environment, and with proper treatment, its concentration can be reduced by about 80 per cent.

Finally, it should be noted that phosphorus is a limited resource, which is another reason why it should be used more responsibly. As stated on the UNEP website, this can be achieved through more efficient mining and processing of phosphorus. Other data show that a significant part of global phosphorus reserves have already disappeared and that those remaining are found in only very few areas, including Morocco and the Western Sahara. More precisely, close to 170 million tons of phosphate rocks are mined annually for the sake of agriculture, that is, to keep the soil fertile.

Katarina Vuinac

Photograph: Unsplash/Mathias Reding

MT-KOMEX IS BUILDING IN THE EUROPEAN UNION FOR THE FIRST TIME

In early February, the MT-KOMEX Company started the construction of a photovoltaic power plant in Sisak-Moslavina County in Croatia. For the first time, the company is engaged in EU territory, thus continuing to expand its operations and gain more experience beyond Serbia's borders.

The project is implemented in the city of Novska. MT-KOMEX is building a rooftop solar power plant with a total power of 280 kW AC and 340,625 kWp for Thermo Stone d.o.o. Novska.

The construction is planned to be completed by the end of the current month or by the beginning of March at the latest.

Regarding equipment, the roof panels will be positioned in the southwest and northeast direction, with a slope closely following the roof's slope. The company opted for Luxor Solar 545 Wp as the panel manufacturer, using inverters from Fronius and a TR sheet structure for pitched roofs made by K2 Systems.

The electricity produced by this solar power plant will be used exclusively for local needs and will not be forwarded to the national power grid.

Considering that this is the first time MT-KOMEX has worked in the EU, it is interesting to note the differences and challenges they faced. However, they are not drastically different from the usual working conditions the company is accustomed to.

The work is carried out based on the Electric Power Installations Main Project and the Electric Power Permit (EPP) obtained by the Croatian Electric Power Company (HEP). The company has to strictly adhere to the requirements and conditions stated in the EPP. The project also implies conducting certain studies, including the Power Grid Impact Study.

The procedure for building a power plant in Serbia is very similar. To begin with, HEP very much resembles the Serbian power provider, EPS. It has similar design and connection requirements (the so-called UPP), with a slight difference in the aforementioned studies that must be drafted.

Essentially, both documents – EPP and UPP – are necessary when planning, designing, and implementing infrastructure projects and issuing certain permits, such as connecting the facility to the power grid. The two documents' goals coincide, but the biggest difference is in the terminology.

When simpler projects are implemented without a building permit, the project participants must adhere to the relevant Rulebook, based on which supervision is not required, nor is reporting the execution work or keeping a construction site diary, which is very similar to the relevant rules in Serbia. As for the project which MT-KOMEX is currently implementing, the engineers in charge of this task have registered the works and keep a construction site diary according to their standards, given that in Croatia, the diary is kept exclusively through the eGrađanin website, which requires inputting a building permit number, which is another difference. One of the key challenges is actually exporting the required equipment, for which export customs clearance from Serbia and import customs clearance for Croatia must be carried out.

All in all, MT-KOMEX has added another town, this time in Croatia, to its reference list, where it will produce green kilowatts and enhance the work experience of the company's engineers.

Enery Portal

Photograph: Mihailo Nanić

WOODEN WIND TURBINE AS A MORE SUSTAINABLE FUTURE OF WIND ENERGY

Most people know that renewable energy plants are being developed to achieve decarbonization goals, but their energy production produces emissions. One company has devised a way to make wind turbines an even greener technology. Believe it or not, instead of using steel and concrete, they make wind turbines out of wood and claim they could become an important part of the next generation of wind energy.

The wooden construction is based on a tower made from laminated wood. The wood is coated with a thick waterproof paint to keep moisture out of the tower. Currently, such wind turbines are produced for land use, but with additional improvements, they could be installed in the water in the future.

Several questions could be raised regarding these wooden structures, including how safe they are from frequent wildfires. The solution to this problem lies in the very density of the logs because the tower is made from solid wood, and it is very difficult to catch fire. Direct exposure to fire would cause charring, and, as stated, it would occur at a very controlled rate. On the other hand, steel becomes soft when exposed to high temperatures, so a wooden structure could also have better structural strength. Currently, the height of the towers ranges between 150 and 200 meters, but they have the potential to become even higher.

An even greener technology

The data on carbon dioxide emissions during their lifetime shows how green these wind turbines are compared to the usual steel ones. Namely, the emissions of a typical wind turbine with a height of 110 meters amount to about 1,250 tons. On the other hand, wooden ones emit up to 90 per cent less.

It is also important to note the sustainable harvesting of the trees used to make the towers. The trees for these purposes are sourced from sustainably managed forests certified for the reforestation program.

Certain renewable energy sources have been criticized because nobody has figured out how to sustainably manage them once they become waste. The circular economy has drawn much attention in recent years, which is why more work is being done to resolve the mentioned problem. Thanks to the wooden construction, which allows the tower to be dismantled more easily, this material can subsequently be used as beams of high quality and strength in the construction industry.

Honestly, I was skeptical when I came across the information about wooden wind turbines. Still, with all the existing performances, which will be further improved in the future, this green solution could become an integral part of wind energy's future.

Katarina Vuinac

Photograph: Unsplash/Chalo Garcia

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HUAWEI

CIGARETTE BUTTS – FROM WASTE TO ASPHALT MIXTURE

The health hazard that cigarette consumption causes for both active and passive smokers is a problem that most people are familiar with. In the EU countries, cigarette packets feature disturbing photos and inscriptions of diseases that can develop from smoking. However, this problem affects not only people but also nature, which is not discussed enough. Relevant data show that more than 15 billion cigarettes are smoked globally per day. The problem becomes even bigger when we take into account the results of a survey that showed that over 70 per cent of smokers throw cigarette butts into nature.

The negative impact that this waste has is not only evident at the place where the cigarette butt is discarded. When it rains, the rainwater that soaks cigarettes releases more than 6,000 toxic and carcinogenic substances into the ground, which then travel deeper into the soil and groundwater. Moreover, just one cigarette can contaminate up to five liters of water. As everything in nature is connected by a continuous cycle, these harmful substances that end up in the soil also reach the plants that take nutrients from such polluted soil. If someone does not care about nature but the people's health, this is a good explanation of how everything returns to humanity like a boomerang. If we eat food produced from these polluted plants, we are re-engesting harmful substances into our bodies again.

Other research highlights another problem when it comes to plants, which is that cigarette butts affect their growth. The following experiment was conducted – plant seeds were planted in two pots, and a cigarette was placed in one of them. The result showed that 30 per cent fewer plants (quantity) grew in the pot with the cigarette butt and that those plants that managed to grow were also 30 per cent smaller (in size) compared to those that grew in the healthy pot.

To solve the pollution that cigarette butts cause, the EcoButt Company from Slovakia devised a way to recycle cigarette butts. The end result is a top-quality product which is used in the production of asphalt mixtures.

Everything starts with good infrastructure, that is, special ashtrays placed in public places where smokers often smoke. The second step is the collection itself, which, given that cigarette butts are not considered municipal waste requires a special organization. This kind of collection is done once or twice a month.

How to turn cigarette butts into asphalt?

The company published an interesting piece of information on its official website – out of 500 people, a third thought that the cigarette filter was made of paper. In contrast, another third said that it was made of cotton. However, plastic is hidden inside a cigarette, i.e., the so-called acetyl cellulose, which takes about 15 years to decompose. This material is used in the production of asphalt. Acetyl cellulose granulate is produced by the processing of cigarette butts, which replaces the usual cellulose granulate needed in the process of creating an asphalt mixture.

Using this kind of recycling not only reduces cigarette waste but also saves trees. Namely, cellulose is a natural polymer found in plants, and the material is obtained by its modification.

How does Serbia treat this kind of waste?

The streets in cities throughout our country are full of cigarette butts. Moreover, Serbia occupies one of the highest positions globally in terms of the number of smokers. That is why we should fully support such solutions.

However, our country does have ideas on how to reduce cigarette waste. A few years ago, the Dušan Trivunac Dragoš High School students in Svrljica invented a biodegradable cigarette filter made of unbleached cellulose and contains plant seeds. Also, the Naša Kuća Parent Association produces recycled paper from cigarette packs. Environmentally conscious smokers can take their cigarette packs to this association for recycling.

Katarina Vuinac

Photograph: Unsplash/Joshua Sukoff

MINI NUCLEAR BATTERIES – TECHNOLOGICAL INNOVATION FOR EVERY DAY?

Nuclear batteries are a completely new concept and are a part of devices that we use every day. Using specialized converters, a nuclear battery produces electricity by using the energy released during the radioactive decay of a nuclear isotope.

Such batteries are a significant technological advance and have excellent features, such as durability. Still, some concerns are raised whenever someone mentions radioactivity and nuclear processes.

Nevertheless, electricity generated in this way is safe and produced at a smaller scale than large nuclear reactors, which most people associate with electricity production.

The Chinese company Betavolt has been using a combination of technologies to produce nuclear batteries, now the size of a small coin. These batteries provide electricity produced by the decay of the radioactive element nickel-63. Because of its multi-layer construction, Betavolt claims the risk of the battery catching fire or exploding is minimal, according to World Nuclear News.

However, the use of nuclear batteries is not without controversy, as we have already stated. There are environmental concerns, given that radioactive materials are used. The use of such minerals and materials for products in everyday use could run into legal hurdles. However, it is still too early to tell, given that the product has yet to be launched for wider commercial use at the moment, although there are plans to use it in drones and phones.

Milica Vučković

UNEXPLORED SEABED OF NORWAY: CHALLENGES AND OPPORTUNITIES OF SEA MINING

Seabed mining is the process of extracting minerals from the deep sea. Hundreds, even over 1,000 meters below the water's surface, cobalt, nickel, zinc, copper, lead, lithium, and other minerals are hidden in various sources.

Every day, people use appliances, laptops, phones, electric scooters, and, in some countries, even electric cars. However, all of these require the use of certain minerals. On the other hand, the deep sea hides mostly unexplored marine life, species, and habitats.

For this very reason, Norway is facing a dilemma – to choose economy over ecology or vice versa. On the one hand, the political structures have already decided that Norway will be one of the first countries to engage in seabed mining. On the other hand, researchers, scientists, and environmental advocates think these processes can destroy ecosystems whose importance we cannot even comprehend, as the ocean is still untested. There are concerns about environmental impacts, such as habitat destruction, sediment disturbance and water pollution.

The good side is that Norway has the experience, technology and working conditions, unlike some countries that export ore. Certainly, Norway is no stranger to industry, the sea and mining, given that the country has been active in this field since the discovery of crude oil, the WWF says. However, the flora and fauna at these depths are still a mystery to everyone. Because of this, several petitions have been launched and appeals forwarded to the European Parliament. However, without the Norwegian Parliament opposing, the government still has the last say.

Norway is known for implementing many environmental standards – electric cars are everywhere, and petrol and diesel cars will soon be banned. At the same time, wind generators and solar panels generate renewable energy that does not produce harmful emissions. However, for these technologies to exist and for Norway to be sustainable, clean, and unpolluted, it must use minerals that require mining. The question is how and at what cost?

Milica Vučković

Photographs: (left) Unsplash/Jeff Hopper; (right) Unsplash/Joshua Kettle

THERE WON'T BE ENOUGH LITHIUM FOR EVERYONE – ARE SODIUM-ION BATTERIES THE SOLUTION?

Abandoning fossil fuels is part of global efforts to produce electricity efficiently and with as little pollution as possible, further implying the transition to renewable energy sources.

The European Union is actively working to encourage the production of green kilowatts and promote environmentally friendly vehicles. It devised a plan whereby the sale of petrol and diesel cars will be phased out of the EU market by 2035. However, solar panels, car batteries, wind turbines and similar technologies require metals such as cobalt, nickel, lithium and others, whose extraction is neither simple nor without consequences. Today, the largest deposits of these much-needed metals are mostly located in countries with economic or geopolitical problems, making it difficult to regulate permits, or mining occurs under difficult or illegal working conditions, such as in Africa. At the same time, this process also leaves environmental consequences.

As the RES sector is becoming increasingly popular, the demand for the necessary components is also growing in parallel. This implies that bigger production will require more of the aforementioned materials (cobalt, lithium, nickel...) in many other locations of the world. As the demand increases, there is a fear of inadequate supply because these resources are limited, and large deposits may be exhausted due to future expansion. As scientists from the Chalmers University of Technology in Sweden explain, the current deposits cannot satisfy the mentioned future expansion, especially when it comes to electric cars and the growing number of car manufacturers moving to mass production.

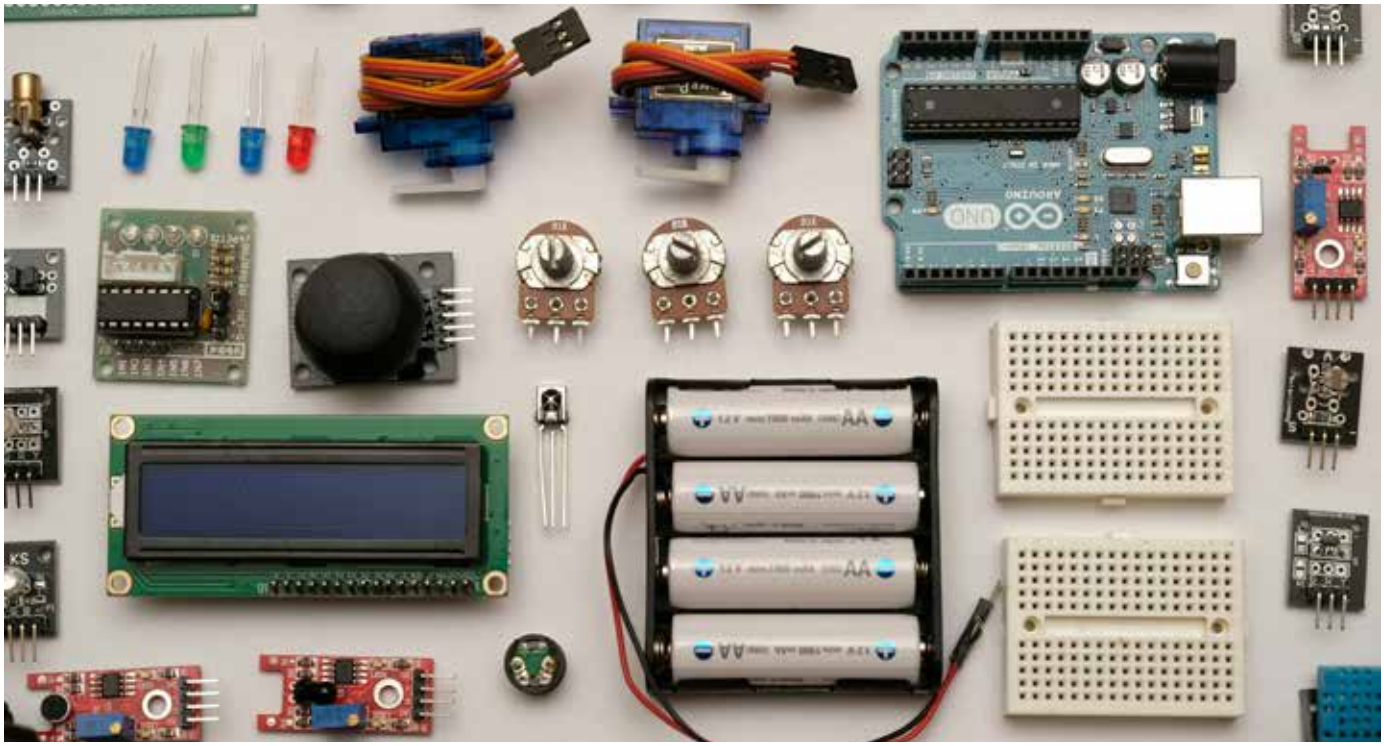
We need to search for new technologies because lithium sources may reach the point of exhaustion while the market and the demand for raw materials continue to grow.

Chalmers' research team embarked on testing sodium-ion batteries, which, as the name says, mostly rely on sodium, which is much more common than lithium. When examining the density, life span, environmental aspect, and other characteristics, they concluded that sodium-ion batteries are better in terms of supply due to their accessibility, environmental aspect and climate.

Overall, sodium-ion batteries use sodium, which is much more abundant than lithium because it can also be extracted from sea salt. This makes them potentially cheaper, more environmentally friendly and more available. On the other hand, lithium-ion batteries have a higher density and, therefore, store larger amounts of energy in a smaller space than sodium-ion batteries. This makes them ideal for applications where space and weight are limited, such as electric vehicles. Sodium-ion batteries can operate over a wider range of temperatures. They can, therefore, withstand more severe weather conditions. At the same time, lithium-ion batteries are known to have altered performance during cold days or extreme heat, resulting in a much shorter drive as the car uses more energy when it's cold outside.

Technology is changing fast, though. The development of sodium-ion batteries and their use for energy storage in the power grid are imminent. Given the scarcity of lithium deposits, this battery could also be used in electric cars.

Milica Vučković



Photograph: Unsplash/Robin Glauser

WITH THE NOVASTON TEAM, SCHNEIDER ELECTRIC HAS LEED PLATINUM CERTIFICATION

The InGrid office building of the company Schneider Electric recently received LEED Platinum certification. The entire certification process, from the very beginning of implementation to realization, was led by the Novaston Project Management (NPM) company team, which is part of the Novaston real estate platform.

"It is an office project that covers approximately 17,000 square meters and is intended to accommodate 800 employees. Our company, Novaston Project Management (NPM), has been in charge of this process from the beginning – of the implementation to its realization. Of course, we also owe a great deal of gratitude for the joint work and effort to obtain such a high level of certification to our collaborators, Triple Green BC, and above all to Schneider Electric, which sets high demands and applies sustainability in every segment of its business and corporate policy. From the beginning, we had very clear concept guidelines based on sustainable principles: the integration of space with greenery and natural light, the organization of the workspace in accordance with the principles of social sustainability," said Jelena Jolović, Head of Operations at NPM, who led the entire process.

The company Novaston Project Management (NPM) says that they are very proud of the fact that in a short time, they managed to fulfil all the requirements for obtaining the highest level of LEED certificate – the LEED Platinum certificate. Many things influenced the fulfilment of the conditions; some of them are:

- Energy performance: the project achieves almost 50 per cent energy savings compared to a standard similar project and receives additional LEED points for the production of renewable energy, which accounts for one-fifth of the building's energy consumption.
- BMS: management of the facility with more modern systems to be aware of energy consumption at all times. The facility received additional points for reduced internal water consumption (by more than 55 per cent compared to a similar facility) and the ability to use the project as a green building education tool.
- Innovations: the project met high innovation criteria thanks to quality design, access to nature through the view and interior atriums, and biophilic design that provides a soothing and productive environment. High-quality micro-environments, which are equally accessible to all company employees, have been achieved.
- Exceptionally good location: the project has excellent access to public transport for more than 1000 passengers, thus reducing the carbon footprint of private vehicle transport.

According to currently available data on the official website of the U.S. Green Building Council, Schneider Hub is one of the three owners of the LEED Platinum certificate currently in our country. The LEED certificate is essential for investors who show responsibility in business and set an excellent example in the construction industry. A building designed and built according to the LEED Gold or Premium standard has reduced electricity and water consumption, lowered CO_2 emissions by 10–30 per cent, reduced operating costs, and increased the value of the building. The LEED certificate is also extremely important for the end user of such facilities; they are healthier and happier, have better working conditions, more natural light, and greenery, but they also have the feeling that in such a working environment, they contribute to the betterment of society and the community.

Source: Novaston

Photograph: Novaston

SUPPORT FOR THE IMPLEMENTATION OF INNOVATIVE SOLUTIONS FOR A SMOOTH GREEN TRANSITION

The United Nations Development Programme (UNDP) has a unique financing programme designed by the organization's key development team. The financing programme is related to Public Calls in the form of challenges for innovation under the auspices of their Green Finance Platform in Serbia, which aim is to support those organizations/individuals who have innovative solutions for climate change, environmental protection, and green transition of both the economy and society and who need technical and financial support to implement them. From 2017 to January 2024, they supported 103 green initiatives with a total of 6 million dollars in co-financing and attracted $55 million for the implementation of the said initiatives. Co-financing was provided by donors whose support ensured the implementation of green transformation projects, including the European Union, the governments of Sweden, Switzerland, and Japan, as well as the Global Environment Facility (GEF).

The maximum amount that projects can receive is 250,000 dollars

Photograph: New pen/Irena Stevanović

The Programme ensures that its participants work with mentors in practice and provides concrete guidelines for acquiring the know-how and skills needed to carry out sustainable and financially profitable venture

Žarko Petrović
leader of the vital development team of UNDP Serbia

In an interview for our magazine, Žarko Petrović, leader of the vital development team of UNDP Serbia, says that the initiatives implemented thanks to the programme contribute to mitigating climate change, decarbonizing the economy and increasing energy production from renewable sources, thus accelerating the transition to a circular economy, reducing waste, improving air quality and biodiversity, establishing sustainable food systems, as well as increasing energy efficiency and ensuring the fairness of the energy transition process in Serbia.

"Initiatives are implemented throughout the country while ensuring that the green transition is taking place evenly. Many of these initiatives have great potential to be further expanded and applied in other places," says Mr Petrović.

According to him, several co-financed projects have exceeded the originally planned frameworks thanks to the support of UNDP experts, opportunities for networking, and public promotion. One project managed was granted 9 million euros worth of bank loans to advance a new approach to producing electricity from biomass.

Application process

All companies from the private and public sectors, research institutions, civil society organizations, local governments, agricultural holdings and cooperatives can participate in public calls for innovation.

"After evaluating the received applications, the creators of the selected solutions undergo training and receive mentoring support to turn ideas into tangible business plans and feasible green investments. Applicants who complete this process receive co-financing to implement their innovative ideas," explains Mr Petrović.

Supported investments are expected to contribute to the economy's green transformation and increase the quality of the environment and life in Serbia. At the same time, they must contribute to a just transition, reducing energy poverty and creating green jobs.

The Programme's unique points

Our interlocutor adds that the analysis of such an approach to green financing, which was carried out by an independent consultant, showed that the Programme has several unique points that give it a comparative advantage over other similar green financing support programmes in Serbia. The Programme enables innovative projects to be launched at an early development stage, which gives them a chance to attract other inve-

Photographs: (left) UNDP; (Petrović) courtesy of Žarko Petrović

FUNDS SUCCESSFULLY SPENT

One of the innovative solutions and initiatives supported by the Programme is the Bio Idea Association, a group of socially responsible entrepreneurs who use food waste to make soap. They have successfully replicated their business model by expanding their network of associates throughout Serbia. Furthermore, an innovative solution that entails the decomposition of plastic using the larvae of the large mealworm, devised by the Belinda Animals Company and the Siništa Stanković Institute for Biological Research from Belgrade, has also received funding.

"The coal-fired boiler that heats two schools in the Sokobanja municipality will be replaced by a heat pump that will use the waste hot water from the spa baths. A company that produces packaging will treat the gas vapors from the paints created during the production process and use them to produce energy for air conditioning and other projects," Mr Petrović said.

stors. This is one of the very few programmes that simultaneously focus on green initiatives and innovation and is one of the few that specifically targets green projects. Last but not least, it is the only programme open to a wide range of participants, including startups, small and medium-sized enterprises (SMEs), large corporations, and companies from both the private and public sectors.

"The Programme ensures that its participants work with mentors in practice and provides concrete guidelines for acquiring the know-how and skills needed to carry out sustainable and financially profitable ventures. Mentors also help project teams interpret laws and obtain the required permits to implement their projects in accordance with the legal framework," Mr Petrović adds.

Additional project financing

In addition to the co-financing provided by donors, the Programme has attracted substantial additional financing. Analysis of data on green innovations from the past seven years shows that the impact of finan-

All companies from the private and public sectors, research institutions, civil society organizations, local governments, agricultural holdings and cooperatives can participate in public calls for innovation

Photographs: (left) UNDP

cial support provided by the UNDP Programme is significantly greater compared to other similar programmes in Serbia. In particular, 69 supported projects received 4 million dollars through donor co-financing, with their total value amounting to 45 million dollars. This means that every dollar invested attracted another $10 from other sources, including the candidate's own funds.

"Co-financing beneficiaries are obligated to finance part of the planned activities from their own funds or other available sources of financing, mostly loans. Until now, SMEs have predominantly co-financed projects from their own financial resources. Large companies mostly co-financed their projects with loans or a combination of their own and loan funds. The Programme covers between 25 and 50 per cent of the project value and is scaled, whereby funds are allocated to projects according to their value. The maximum amount projects can receive is 250,000 dollars", explains Mr Petrović.

He adds that each project selected for donor co-financing receives funds through performance-based payment agreements. This type of contract encourages projects to meet set goals within 6 to 12 months, as funding is only paid to them after the successful accomplishment of the set results. The spending of funds is controlled by the UNDP project team. Each project goes through a rigorous assessment of effects that are tailored to its unique characteristics. For instance, it is estimated how much the project will contribute to the reduction of greenhouse gas emissions, which confirms the project's credibility and potential.

"In terms of the distribution of donor funds, between 85 and 95 per cent of the total budget goes to financial support for projects, and only 5-15 per cent is spent on administrative costs, mentoring, expert support, and training. We have come up with a way for donor funds to be spent efficiently and transparently. Thanks to this approach, the Programme attracted great interest from donors. While the GEF funds helped us to pilot the Programme, the EU significantly scaled up green investments under the auspices of the Green Agenda in Serbia, following which Switzerland, Sweden and other partners joined the support programme. Switzerland originally decided to contribute close to 4.5 million and later another 2.2 million euros. Sweden contributed around 1.7 million euros. Within a year, the total donations to the Programme increased from 8 to 17 million euros", Mr Petrović points out.

The key steps for further scaling this UNDP Programme include the additional adjustment of support to the needs of innovators. They plan to monitor the projects after implementation to ensure that they can network with other similar initiatives. They will continue to help innovators access additional funding sources and influence public policies to facilitate the implementation of innovation.

UNDP will also support the creation of a sustainable green financing mechanism in Serbia to ensure long-term support for companies to remain competitive in the European and global markets. This will expedite the economy's green transformation and the road to a greener and more sustainable future.

Prepared by Mirjana Vujadinović Tomevski

Photographs: (top) UNDP; (middle left) New pen/Ana Radojković; (top right) UNDP

CEEFOR IS DESIGNING ANOTHER POWER PLANT

At a time when countries worldwide are searching for sustainable solutions, reaching for renewable energy sources and striving for energy independence, every new project implemented along the way is a symbol of progress. The construction of a ground solar power plant on land is planned on the outskirts of eastern Serbia, in the Braničevo district, which should significantly contribute to the production of clean, renewable energy in our country.

The entire design and technical documentation of this solar power plant was entrusted to the Center for Energy Efficiency and Sustainable Development (CEEFOR), more precisely to their engineers with abundant experience in developing renewable energy projects.

> If we take an average value of 20 kilograms per year for a typical mature tree, the carbon dioxide savings of the mentioned power plant are equivalent to the annual absorption of approximately 180,000 trees

The company's team of professionals offer design and consulting services related to energy efficiency and renewable energy sources – from conducting energy audits (preliminary, short and detailed energy inspections), writing feasibility studies for energy technologies, designs required for obtaining various permits, contractor projects for construction and use renewable energy sources and other necessary services in this segment.

According to the drafted project, this solar power plant will require 5,400 photovoltaic panels with an individual power between 570

Photographs: CEEFOR

At the location of the power plant, the average annual irradiation, or more precisely, the quantity of incoming sunlight, is 1300kWh/m2, which is why the plant's annual production is expected to be 4,533,541kWh, with a specific production of 1,271.46kWh/kWp

and 720Wp that will be connected to 30 inverters with a power of 100kW. CEEFOR's engineers decided to use inverters manufactured by Fronius GmbH, the model TAURO ECO 100-3-P. These inverters guarantee efficient conversion of solar energy into electricity and are at the top of the market range. The final choice of construction and foundation method will depend on the results of geomechanical analyses and static calculations.

The solar panels will be arranged in 18 rows, in the west-east direction, with a vertical orientation and a tilt angle of 20 degrees. The power plant will be located within the boundaries of the 4.04-hectare plot, thus demonstrating efficient use of space, given that the length of these rows depends on the land plot's shape. The height of the construction pillars at the lowest point will be 50 centimeters.

At the location of the power plant, the average annual irradiation, or more precisely, the quantity of incoming sunlight, is 1300kWh/m^2, which is why the plant's annual production is expected to be 4,533,541kWh, with a specific production of 1,271.46kWh/kWp.

Regarding its positive effects, this solar power plant will save more than 3.6 million kilograms of carbon dioxide annually. To approximate this figure, we can draw a parallel with an average mature tree, which can absorb about 20 kilograms of carbon dioxide per year, depending on the species, age, health, and other characteristics. If we take an average value of 20 kilograms per year for a typical mature tree, the carbon dioxide savings of the mentioned power plant are equivalent to the annual absorption of approximately 180,000 trees.

The plant will not only contribute to the reduction of harmful gas emissions. Still, it will also generate significant quantities of clean energy for the local community's needs once it is connected to the power grid.

With a total installed power of 3,564 MWp DC/3MW AC, this power plant is a significant step towards sustainable development, energy independence and the accomplishment of the set renewable energy goals.

The CEEFOR Company will once again have the opportunity to demonstrate its professionalism and expertise, derived from many years of experience in energy efficiency and renewable sources. The company's work is based on detailed planning and precise implementation by engineers, making it one of the leaders in its field and in generating greener and cleaner energy in our region.

Prepared by Milica Vučković

PROCREDIT BANK – THE NEW FACE OF DIGITIZATION

Most banks worldwide are digitizing banking services, and the challenges that their clients have to face are identical – changing their habits and accepting that digital banking brings multiple benefits. Thanks to online banking, bank clients have access to their accounts and transactions at any time of the day, from the comfort of their homes, without having to go to the bank in person.

Digitized banking processes are significantly faster than traditional ones, so time savings are enormous, while advanced technologies are built on high-security standards. The green context of online banking is particularly significant: the use of paper is significantly reduced, thus saving trees, the emission of carbon dioxide is reduced because clients do not have to come to the bank in person, and all banking processes are faster and more efficient, which reduces energy consumption.

We spoke with Nemanja Tomić, a member of the Executive Board of ProCredit Bank, the first 100% online bank in our country, about digitization in banking and what we can expect as the next development stage of banking services begins.

"ProCredit is the first bank to recognize the numerous benefits of digitizing banking processes for all client categories. Hence, it was one of the first banks in the country to digitize its

Digitized banking processes are significantly faster than traditional ones, so time savings are huge, while advanced technologies are built on high-security standards

Photographs: (top) Pixabay/Tumisu; (bottom) ProCredit Bank

In 2024, ProCredit Bank's services will remain digital while the bank continues to invest in its performance to make it even more efficient and simple. Earlier this year, the bank launched a new m-banking application and continues to innovate

Nemanja Tomić
member of the Executive Board of ProCredit Bank

operations and open 24/7 Zones where clients can do all types of transactions independently, 24 hours a day. This was a big change for our clients and a serious challenge for our business, but when you dare to go down the digitization path, you very quickly prove to yourself and your clients that both of us are at a huge advantage. People really like the fact that they can open an account, start saving, and get a loan online without having to go to the bank in person. We save time, energy, and other resources and reduce pollution as everything is done faster and safer. The development of banking processes with the help of digitization has to align with the bank's business strategy, annual plans and client target groups. Until last year, ProCredit Bank was the No. 1 bank for small and medium-sized enterprises, and the urban part of the population was already used to digital devices and online processes. As of this year, ProCredit Bank is opening up even more to doing business with individual clients, as we can offer them truly competitive products and conditions. Such goals imply a double upgrade of digital processes", Mr Tomić explains.

In 2024, ProCredit Bank's services will remain digital while the bank continues to invest in its performance to make it even more efficient and simple. Earlier this year, the bank launched a new m-banking application and continues to innovate.

As Mr Tomić points out, in 2024, ProCredit will be recognized for its improved quality of communication with clients.

"Through face-to-face communication in our branches, we will now draw even closer to our clients. As of this year, advisors will again be available in our branches to answer all your questions and doubts and provide any type of assistance. The banking processes remain exclusively digital, and the advisors, as a 'humane upgrade' of digitization, will boost the quality of all retail banking services. By talking to people face-to-face, which includes assisting clients on the spot, we are confident that we will transform into a completely tailor-made bank to all population segments", he adds.

ProCredit Bank says that its business is already quite simple and fast. It doesn't ask unnecessary questions, saves clients time and other resources, is competitive with its offers, and will build a more intimate contact with clients through advisors in the bank's branches.

"If you ask me about the next step in digitizing financial services, it is exactly this – a human moment. I am confident that this concept provides a full set of modern banking, which our clients deserve", concludes Mr Tomić.

ProCredit Bank

Photograph: (Tomić) ProCredit Bank

NEW MATERIALS FOR A NEW AGE

Within technological engineering, one of the narrower disciplines is called materials engineering – an area whose focus is understanding the various characteristics of materials to create new materials with improved properties to make them more resistant, stronger, more durable, more sustainable, more economical, depending on the needs of different industries. Engineers researching this field examine how various processes and processing of materials affect the resulting state and structure of the materials. Due to the current discourse on recycling, waste management and circular economy, materials engineering plays a significant role in solving the mentioned challenges.

Young industrial designers, former students of the Faculty of Applied Arts, decided to devote themselves to their study program – industrial design.

Nikola Đurašković and Nedeljko Tica founded Sferikon to deal with the problems of agricultural waste from our environment. They first discussed this project with Professor Irena Živković, who is an expert in the field of science and engineering. As Professor Živković, the third member of the Sferikon team, explains, their product is a series of materials called Sfericorn – a combination of production industry, sustainable development, and circularity.

PARTICIPATION IN FAIRS

The Serbian Chamber of Commerce recognized their ideas, so Sferikon participated in the Circular Innovation Fair at the Western Balkans Circular Economy Summit. They also participated in the Ecomondo fair of green technologies in Italy for two years in a row as a delegation from our country.

Photographs: Sferikon

Sfericorn materials use biodegradable and compostable materials, one of which is a reinforcing component obtained from agricultural waste from corn cultivation

– Sfericorn materials are classic composite materials made of two or more different materials, giving the composite some new properties compared to the starting components. Sfericorn materials use biodegradable and compostable materials, one of which is a reinforcing component obtained from agricultural waste from corn cultivation. Corn is the most represented crop on the fields in Serbia and generates a large amount of agricultural waste that has no other purpose than fuel production and, in certain species, for animal feed – explains Professor Irena.

The goal is to develop a material to be used as an alternative to synthetic polymers, i.e. common plastic. Interestingly, their materials have the potential to be applied to a variety of products, including hard plastic parts of electronic devices, furniture components, car interiors, and even the architectural industry. One of the key attributes of the Sfericorn material is its exceptional sound insulation ability, which makes it ideal for products where acoustic properties are essential. For example, in-home air purifiers, where fans or turbines produce noise, Sfericorn can effectively act as a sound insulator by reducing the resonance and noise generated by standard plastic parts.

Although the material is still in the development phase, there is already considerable interest in it. Also, Sferikon members work to make integrating their material into other products as simple as possible to be as competitive and economical as possible, besides being functional, aesthetic and sustainable, and to avoid costs related to applying such specific materials.

The awareness that the planet Earth is oversaturated with plastic, both in everyday use and through waste, which decomposes over hundreds of years, characterizes the team's ideas. Regarding the Sfericorn material, it is interesting that the analysis showed that the circularity is fully fulfilled. All Sfericorn materials are completely degradable under controlled composting conditions – biowaste recycling. Composting and biodegradation were performed at the Institute for Molecular Genetics and Genetic Engineering in Belgrade, and the results showed that the only residue is bacterial nanocellulose, which can be used as a natural strengthening component for numerous purposes.

Sferikon team

The challenge they are facing is the economic segment, given that the production of material that carries with it a new specification – care for the environment, of course, requires additional expenses, which is why this team must work on optimizing all costs.

– Industrial design did not know this segment before. The exploitation of resources, life on a landfill and the time required for decommissioning were not the focus of the industrial design – says Irena.

However, the current situation on a global scale seems to be opening the door to viable ideas and providing the possibility for materials like Sfericorn to become the industry's future.

Prepared by Milica Vučković

THE INTELLIGENCE OF THE YOUTH IN SERBIA ILLUMINATES THE GREEN PATH OF SUSTAINABLE DEVELOPMENT OF LOCAL AREAS

Even if you are not interested in the topics related to sustainable development and energy efficiency, you must have heard of Aspern Seestadt. This completely self-sustaining city gets energy from renewable sources, wind and water, and processes rainwater. Around 20,000 residents will be housed in this smart city, which has been developing since 2013 near Vienna. All buildings there are made of natural materials and are completely energy efficient.

Such successful projects give sufficient reason to be optimistic about the world moving in a positive direction, sustainable development. However, they often also cause frustration due to the belief that sustainability-based development is reserved only for economically strong countries and enlightened urban communities.

The purpose of info corners and youth spaces is for young people to gather, exchange ideas and join forces in their implementation, but also to develop the skills for planning and implementing projects related to environmental protection and renewable energy sources, with a focus on solar energy, which they can later apply in their local communities

However, that is not the case. There have been numerous projects around the world, as well as green ideas in six smaller towns in Serbia,

Photograph: Pixabay/Dim Hou

which typically belong to rural areas, were initiated and implemented by young enthusiasts with the support of GIZ in partnership with the Ministry of Mining and Energy and the Ministry of Tourism and Youth of the Republic of Serbia.

Thanks to a group of young enthusiasts, a schoolyard in Vlasotince now has a solar bench that serves as a light source, thus improving the safety and usability of the yard in the evening hours. By adding a USB port for charging mobile devices, this bench is also a practical step towards reducing the consumption of electricity generated from non-renewable sources, and it provides a comfortable and safe place

where young people like to gather and socialize.

Young people from Donja Stražava, in the suburbs of Prokuplje, now also have a "green" gathering place. The three students who make up the Foton Group implemented this idea under the auspices of their project called Solar Bench for Sustainable Connectivity – Let the Sun Connect You to the World. Their goal, as well as those of other young people who initiated and implemented the said projects, is to educate the community and animate primarily young people about the importance and potential of renewable energy sources and create a sustainable connection.

"Both young and older people who live in the countryside have fewer opportunities to acquire the knowledge necessary to raise awareness. The Foton Group plans to do as many projects as possible and help people in rural areas and cities acquire the knowledge necessary for our survival", says Petar Stojanović.

The project, which also has a double positive effect as it reduces the environmental footprint and emissions of harmful gases while encouraging the community to use solar technologies, was initiated and implemented by young people from the village of Brankovina, near Valjevo.

Photographs: GIZ

In the schoolyard, they installed a solar information notice board, which serves as an information centre for the local community and, above all, for the students. This project ensures the availability of useful information and contributes to environmental sustainability, as the info-board also contains an integrated solar-powered mobile device charger.

Sokobanja is another town that will soon have its solar info-board. A group of young people who have been working on implementing green ideas in this town has noticed the lack of information about activities for young people. They believe that this info-board will help them obtain information more easily and, based on that, connect more quickly and simply in implementing new ideas. Until the board is installed, this group of young activists will hold a series of presentations and workshops for young people on renewable energy sources and environmental protection.

The rural bus stop in the village of Crljenac in the Malo Crniće municipality and the local bridge in the village of Zlot, near Bor, now play a new role in the lives of young people living

Thanks to a group of young enthusiasts, a schoolyard in Vlasotince now has a solar bench that serves as a light source, thus improving the safety and usability of the yard in the evening hours

Photographs: GIZ

there, as well as set an excellent example of how green energy improves the quality of life of the community. Both villages had been sidelined until the aforementioned projects were implemented.

"This bus stop is the only one connecting the municipality with our village. Before we got this bus stop, it was very unpleasant, especially for women, to wait for the bus to come here at night, because it was not lit at all. This has now been solved by installing solar panels and LED lighting", explains Gabrijela Vasić, a 22-year-old who was part of the team of young people who launched the initiative.

Their project also entailed setting up a notice board to inform residents about local events.

In the village of Zlot, young people turned the only local bridge and the area around it green and energy-efficient by properly illuminating them.

"By installing solar lighting, painting the fence, collecting waste from around the bridge and holding an information day during which an expert talked about the benefits of renewable energy sources for the local community, we promoted solar energy and improved the village's safety", says Uroš Lalović, a 16-year-old medical school student from Zaječar, member of the group of young people who initiated this idea.

Like other young people who launched the aforementioned campaigns, Uroš and Gabrijela attended the Solar Camps for Young Leaders, which, in cooperation with Vojvodina Environmental Movement and under the auspices of the German Development Cooperation, were organized by GIZ in partnership with the Serbian Ministry of Mining and Energy and Ministry of Tourism and Youth.

The result of this cooperation is the creation of youth spaces, so-called info corners in the villages of Stubal near Vladičin Han, Kljajićevo near Sombor and Rača near Kuršumlija, as well as in the town of Kostolac.

Apart from acquiring windows, doors, and lighting that ensure better energy efficiency, these youth spaces are equipped with technical equipment, mostly computer equipment and furniture according to the wishes and needs of young people. Several info corners were also given sports equipment, board games, or other equipment in line with the young people's needs.

For instance, in Sombor, where the youth space was formed in the old Fisherman's Home (Ribarski Dom), a boat was also provided for cleaning the Danube-Tisa-Danube canal. The initiative came from young people who are members of the Association of Sport Fishermen "Amur". In Kostolac, a smart solar bench was installed in front of the youth space in the local park, where people can charge their mobile phones, electric scooters and bicycles.

The purpose of info corners and youth spaces is for young people to gather, exchange ideas and join forces in their implementation, but also to develop the skills for planning and implementing projects related to environmental protection and renewable energy sources, with a focus on solar energy, which they can later apply in their local communities.

GIZ

Photographs: GIZ

BELGRADE CAR SHOW AND MOTOPASSION FROM 21 TO 27 MARCH 2024

There are no unknowns when it comes to holding the DDOR BG Car Show 08 and the 16th Motopassion International Motorcycle Fair. This unique fair manifestation and the most significant annual event in Southeast Europe's automotive and motorcycle industry sector will be held at the Belgrade Fair in the traditional spring term from March 21 to 27, 2024.

For the eighth time in this fair format, exhibitors and visitors will be able to see for themselves the importance of sustainability and technological progress in the automotive and motorcycle industry, as well as to explore a wide range of vehicles and a variety of engines, including electric cars, hybrids and those with classic engines, and to get to know with the latest trends and learn more about the future of mobility.

According to the announcements of the participants and organizers,

Photographs: Belgrade Fair

about thirty car brands and as many motorcycle brands will be presented in the fair halls. About 40 new models are expected in the auto sector and more than that number in the motorcycle sector. The Serbian Association of Vehicles and Parts Importers, which gathers all potential exhibitors at the fair, has also announced for this fair the presentation of all new models from all brands represented on our market, the latest achievements of the entire auto-moto industry and the most diverse possible range of performance, design, technical and technological innovative solutions in all sectors of this industry. It is about new technologies that are current in the auto industry today and those that will be in the near future.

The fact that the global trade fair industry concerning the automotive sector is still recovering from the consequences of the COVID-19 pandemic also speaks of the potential and impact of an event such as the BG Car Show. In comparison, relatively few car fairs will be organized under the auspices of OICA this year – Washington and Geneva before Belgrade, then Bangkok, Birmingham, Milan-Monza, Hanover (commercial and transport vehicles), Paris and Sofia after. Although it is not under the OICA umbrella, being in such a company for the BG Car Show means prestige and praise for the organizers.

At this fair, the spotlight will be on electric vehicles, their performance, autonomy, the advantages of this technology, charging infrastructure, subsidies, and sustainability. The focus is also on hybrid vehicles, which combine traditional engines and electric drive, and technologies that reduce emissions and save fuel, providing an optimal balance between efficiency and performance. It also includes an exclusive selection of classic cars with improved features, from the latest models of sports cars to luxury sedans. These cars continue to offer top performance and innovative technologies tailored to traditional motor enthusiasts.

We should not forget the increasing interest of both visitors and exhibitors in the sector of the supporting automotive industry, garage-service equipment, spare parts, both standard and universal equipment, and compatible and supporting equipment for environmentally advanced vehicles. An updated, innovative selection of chargers for electric vehicles and solar modules for use in the auto industry and other appropriate infrastructure is also expected.

Exactly the same fair enthusiasm and development logic prevails on the occasion of the Motorcycle Fair – Motopassion, especially because the sale of motorcycles, quads and scooters grows from year to year at a rate of as much as thirty per cent.

The most visible fair participants list includes banks, leasing and insurance companies, professional organizations, clubs, associations and specialized media. Visitors will be offered a rich accompanying professional program, which is full of informative, educational and entertaining content, competitive activities, test drives and other benefits for both exhibitors and visitors.

The BG Car Show was organized as a biennial exhibition and sales event for the first time in 2006 as part of the rearrangement of fairs under the auspices of the OICA, and the traditional International Car Show switched to a biennial rhythm. The BG Car Show has more than successfully replaced the Salon in the years when it was dormant, both in terms of the wealth of content and the interest of exhibitors and visitors.

Source: Belgrade Fair

OMV SERBIA – ENERGY FOR A BETTER LIFE

An integrated energy, fuel, raw material, and chemical company, OMV, based in Vienna, is transforming into a leading company in sustainable fuels while playing a key role in the circular economy. The company is going through an important transformation to become climate-neutral by 2050 at the latest. About 40 per cent of OMV Group's planned annual investments to support organic growth are intended for sustainable projects. As part of this transformation, OMV invests in and works with startups in the energy sector to drive progress in low-carbon business. OMV has committed to supporting the goals of the Paris Agreement and key climate goals – zero greenhouse gas emissions from

Photographs: OMV

operations by 2050 or earlier, a leading position in the circular plastics economy (thanks to innovative solutions such as ReOil®) and at least 60 per cent portfolio made of low- or zero-carbon products. The goals will be achieved thanks to the increased use of crude oil for petrochemical products, a greater share of gas in the product portfolio, hydrogen solutions for mobility and industry, e-mobility solutions and the delivery of advanced biofuels.

Growing number of e-vehicle chargers at OMV petrol stations

OMV Group plans to have more than 2,000 chargers at its petrol stations throughout Europe by 2030. As the number of electric car users is increasing in Serbia, the expansion of the electric charger network has taken place at 13 locations in the OMV Serbia network so far, in cooperation with partner companies. Together with its partners, OMV installed electric chargers at its petrol stations in Doljevac, Gradina, Bačka Topola 1, Lapovo Sever, Martinca 1, Kruševac, Vranje, Ruma, Beška 1, Bubanj Potok, Novi Sad and in Borska Street and Kneževac in Belgrade. The company plans to further expand the electric charger network throughout Serbia.

OMV SERBIA PART OF THE LEADING INDUSTRIAL GIANT

OMV Serbia is part of the OMV Group, which, thanks to its sales revenues of 62 billion euros and a workforce of around 22,300 people in 2022, is considered one of the biggest industrial companies in Austria. Through its subsidiary Borealis, OMV is one of the world's leading suppliers of advanced and sustainable polyolefin solutions and the European market leader in recycling basic chemicals and plastics. In the energy segment, OMV explores and produces oil and gas in four key regions of Central and Eastern Europe, the Middle East and Africa, the North Sea and the Asia-Pacific region.

About 40 per cent of OMV Group's planned annual investments to support organic growth are intended for sustainable projects

MaxxMotion petrol meets the highest quality requirements

The OMV Company is the first in Serbia to import 100-octane fuel from its refinery in Austria. OMV MaxxMotion 100plus petrol meets the highest quality requirements of the Worldwide Fuel Charter category 6, which enables maximum engine efficiency and minimum exhaust gas emissions. All OMV MaxxMotion Performance fuels, with their ACTIVEFLOW™ technology, protect the engine and extend its life. The new Euro 6 carbon emission standards came into force in 2014, and to adhere to these standards, OMV started using the SCR technology (Selective Catalytic Reduction). The AdBlue® liquid, which is required for implementing this technology and thanks to which pollutants such as nitrogen oxides are converted into nitrogen and water, both harmless to the environment, is available at OMV petrol stations at all times.

Sustainable business in focus

A solar power plant has been installed on the roof of the OMV Razanj petrol station, which produces 72,000kWh of clean electricity every year and covers 23 per cent of the facility's total electricity consumption. Solar panels were installed in cooperation with a partner company at the Krnjača petrol station, and the plan is to expand the network of green petrol stations that will use solar energy. 58 OMV petrol stations have VIVA shops and restaurants – favorite places to take a break while travelling, where you can enjoy Single Origin coffees from responsible farms that are Fairtrade certified and El Salvador coffee that adheres to the Direct trade concept, which implies buying coffee beans directly from farms, so farmers get a better deal and consumers better access to some of the best coffee in the world.

OMV Serbia

Photograph: shutterstock

EDUCATION FOR SAFER MANAGEMENT OF ELECTRICAL AND ELECTRONIC WASTE

Refrigeration devices are the type of technology we need every day, especially during warmer periods. However, as much as devices make our lives easier, they can negatively impact the environment and, thus, indirectly affect our health if they are not treated properly when their working life is over. These are devices like air conditioners, freezers, and refrigerators because, apart from being electrical devices and containing hundreds of harmful chemical substances, they also need something else to function, and that is freon – a gas that, on the one hand, contributes to global warming and, on the other damages the ozone layer. Prolonged exposure to this gas affects people's health and causes frostbite/burns in direct contact with the skin.

Our country lacks awareness of the danger of dumping electrical waste into the environment and landfills. When old devices are disposed of in uncontrolled conditions where they may come into contact with other types of waste or water, pollutants are released, which can end up in the soil, rivers and other segments of the environment. Pollutants can cause soil contamination, which is a permanent problem. Unfortunately, many people do not know how dangerous this waste is, and those who manage it must be specially educated. Improper handling can expose them to serious health risks. Zudija Hopić from Laćarak, near Sremska Mitrovica, a man with many years of experience in collecting secondary raw materials, is committed to solving the problem of insufficiently high awareness of the dangers that this waste causes.

When a defunct device is picked up by collectors, they disassemble it to extract the parts they need. A big problem is the engine of cooling devices, which usually ends up being disposed of somewhere in nature or at a landfill as unnecessary. According to Zudija, the engine is usually disposed of because it is heavy and unnecessary.

Photographs: (top) Unsplash/Hafidh Satyanto; (bottom right) Unsplash/Alex Plesovskich

In addition to organizing workshops, the plan is to establish a cooperative of collectors of secondary raw materials, including collectors from three towns

Zudija Hopić

Still, an even bigger problem arises if the collectors cut it up before disposal to remove the copper parts. When collectors of secondary raw materials cut the motor of the device in pieces, freon is released. We are still not sufficiently aware of how harmful this gas is.

In the desire to pass on his knowledge to others, Zudija plans to organize educational workshops on the proper way to separate this type of waste, especially the motors of refrigeration devices and its subsequent management in recycling centers where collectors can dispose of those parts that they don't need. Zudija explains that recycling centers have a special technology that safely extracts freon, but many people who collect waste are not informed about it.

In addition to being environmentally friendly, the idea developed by Zudija is also recognized as socially responsible. In addition to organizing workshops, the plan is to establish a cooperative of collectors of secondary raw materials, including collectors from three towns. With the acquired knowledge, they would be better qualified for handling this type of waste and have the opportunity to register and be registered as working four hours a day. At the same time, this would translate into a better-paying job, which will encourage them to manage waste more carefully. As Zudija explains, the idea is to try to provide secure work for 20 collectors in this way.

He also advocates for the opening of a smaller recycling facility in Sremska Mitrovica, which would help collectors get better prices when they sell these raw materials.

His efforts have been widely recognized, which is why, last year, the Business Development Centre in Kragujevac awarded him the best business idea.

Prepared by Katarina Vuinac

EE WASTE

Electronic and electrical waste (EE waste) contains numerous substances, some very valuable and can be reused, while others are polluting and toxic. Iron, copper, lead, aluminum, zinc, platinum, silver, plastic, paper, and silver, as well as those materials that are not subject to recycling, can be found in this kind of waste. According to the European Union 2012 Waste from Electrical and Electronic Equipment Directive (WEEE Directive), this waste is divided into 10 categories: large household appliances, small household appliances, IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools except large stationary industrial tools, toys, leisure and sports equipment, medical devices except all implanted and infected products, monitoring and control instruments and finally automatic dispensers.

Photographs: (middle) Unsplash/Vladislav Nikonov; (Hopić) courtesy of Zudija Hopić

SERBIAN SCIENTISTS IN THE FIGHT FOR CLEANER AIR AND GREATER ENERGY EFFICIENCY

In Western Balkan countries, thermal power plants are the leading electricity producers, accounting for about 54 per cent of the total energy production. At the same time, thermal power plants are the main source of NOX gas emissions, which account for about 80 per cent of the total gas emissions from coal combustion. The presence of these oxides in the atmosphere is very unfavorable. They are responsible for the appearance of smog and acid rain, and it has been confirmed that they cause the degradation of the respiratory functions of children and people with impaired health, with an emphasis on people who have asthma. Also, there are convincing arguments that the presence of these gases affects the increase in diabetes among vulnerable age groups, as well as the percentage of premature births and reduced birth weight of babies. The latest research shows that nitrogen oxides contribute to increased mortality due to cardiovascular diseases.

The NOXTROT project, under the leadership of full professor Željko Đurović from the Faculty of Electrical

NOXTROT establishes new standards in environmental responsibility and energy efficiency, which is extremely important for society

Photograph: Unsplash/Andreas Felske

Engineering, University of Belgrade, focuses on solving the air pollution problem with nitrogen oxides (NOX) from thermal power plants. Nitrogen and oxygen are natural gases that do not react with each other under normal conditions. Their reaction requires a high energy level. However, due to the presence of volatile organic compounds found in fossil fuels at high temperatures, which are common during the combustion of these fuels in the boilers of thermal power plants, a reaction occurs that results in the appearance of nitrogen oxide gases NO and NO2. These gases are called NOX and represent a serious environmental problem.

Great attention of the NOXTROT project, which is financed by the RS Science Fund as part of the Green Program of Cooperation between Science and Industry, is devoted to the reconstruction of thermal power plants in Serbia to reduce the concentration of nitrogen oxides in flue gases as one of the products of coal combustion. This is precisely what was considered during the reconstruction of certain blocks of thermal power plants in Serbia. However, the coal supply to the thermal power plants Nikola Tesla, TENT A and TENT B is facing severe problems. Namely, it is not uncommon for lignite, whose caloric value is significantly below the expected values, to be delivered from Kolubara mines for days.

For all the above reasons, the activities of the NOXTROT project are focused on evaluating the parameters characterizing the calorific value and chemical composition of coal. This information will be used for two primary purposes: adapting and optimizing existing airflow control systems and designing new systems based on artificial intelligence. The goal of these systems is the supervized management of thermal power plants, achieving the set active power, adequate load distribution of individual mills, and maintaining permitted pollution limits, considering the stability of all subsystems.

Within Europe's current political and energy crisis, the NOXTROT project is crucial in optimizing the operation of Serbian thermal power plants. The goal is maximum use of fuel and reduction of air pollution. NOXTROT establishes new environmental responsibility and energy efficiency standards, which is extremely important for society. The project's results, which will contribute to reducing the environmental impact of thermal power plants and improving their efficiency, have the potential for broad application in Serbia and globally. In addition to researchers from the Faculty of Electrical Engineering of the University of Belgrade, researchers from the Vinča Institute of Nuclear Sciences are also participating in the project. The project budget amounts to 169,906 euros.

Author: NOXTROT project team

Thermal power plants are the main source of NOX gas emissions, which account for about 80 per cent of the total gas emissions from coal combustion

Photograph: Unsplash/Jason Blackeye

INNOVATIVE TECHNOLOGY IS THE KEY TO CREATING A SUSTAINABLE FUTURE

The Siemens company published a global report on sustainable development for the fiscal year 2023, which pointed out that the development of technology is one of the key answers to the challenges facing the planet. In a year of record heat waves, wildfires and floods, at a time of rising energy prices, inflation, supply chain issues, labor shortages and rising geopolitical tensions, the demand to accelerate digital and sustainable transformation has never been greater, according to the latest Siemens report, which includes the company's operations from October 2022 to the end of September last year. This technology leader, which employs 320,000 people around the planet and operates in almost every country in the world, was one of the first global companies to commit to becoming carbon neutral by 2030 back in 2015. Meanwhile, Siemens has reduced the CO_2 footprint from its own operations by 50 per cent compared to 2019 and aims for a 90 per cent reduction by 2030.

– Innovative technology plays a key role in creating a sustainable future. What is the concrete impact of responsible business on sustainability, and thus on the lives of all of us, is shown by the fact that Siemens products sold in fiscal year 2023 alone will prevent about 190 million metric tons of CO_2 equivalent emissions during their lifetime. This represents more than, say, the emissions of the Netherlands. It is clear that the future depends on us, institutions, organizations, companies, and each individual,

SIEMENS AND MICROSOFT PARTNERS IN THE AI FIELD

Siemens and Microsoft recently announced that they will further deepen their cooperation with a new partnership in the field of artificial intelligence for industry. The two companies have unveiled a new project called Siemens Industrial Copilot, a generative AI assistant that aims to improve human-machine collaboration and increase productivity. Siemens and Microsoft will work together to build additional copilots for the manufacturing, infrastructure, transportation and healthcare industries. As announced by these companies, the next generation of artificial intelligence will accelerate innovation in the entire industrial sector. It can potentially revolutionize how companies design, develop, manufacture and operate. Making human-machine collaboration more accessible enables engineers to accelerate code development, shorten simulation time and accelerate innovation, the companies said in a joint statement.

Photograph: Siemens AG

SIEMENS – HEINEKEN'S GLOBAL PARTNER IN THE DECARBONIZATION PROGRAM

Well-known world beer producer Heineken has chosen Siemens as a global partner for a multi-phase decarbonization program that aims to reduce energy and CO_2 consumption in 15 breweries and maltsters by 2025. The program supports Heineken's Net Zero Production roadmap, aiming to reach net zero emissions in bands 1 and 2 by 2030 and across the value chain by 2040. The two companies will work together on a long-term decarbonisation program in which Siemens will implement solutions and services from its Siemens Xcelerator portfolio to reduce energy consumption at Heineken's production sites across Europe, the Americas and the Asia-Pacific region. A few months ago, these two companies launched a joint venture for the decarbonization of fertilizer production in the European Union with green hydrogen. It is a pioneer undertaking in transitioning to low carbon emissions in the European fertilizer industry. The construction of the first factory in Spain is planned for 2025, with the intention of replicating this idea in other European countries in the following years.

as well as on how we treat nature, society, and our businesses. That's why what we do today is important for our common tomorrow – Jovana Vukotić, Head of corporate communications at Siemens Serbia, said on this occasion and added that more than 90 per cent of Siemens' portfolio consists of products that enable a positive impact on sustainability.

According to her, the importance of responsible business is reflected in the fact that it does not determine our actions concerning the environment but the whole society and employees. During 2023, Siemens invested 416 million euros in a culture of active learning, ensuring sustainable employability in a rapidly changing labor market. Within the global company, women in the highest management positions now make up 31 per cent, which means that the goal of 30 per cent of women in management by 2025 has been achieved two years ahead of schedule.

Additional data on sustainable business

Energy consumption within the global company has been reduced by nine per cent compared to 2021, while 96 per cent of Siemens locations have implemented a strategy related to the use and consumption of water.

Sustainable operations within the supply chain are extremely important to Siemens. In 2023 alone, Siemens purchased goods and services worth 37 billion euros from around 140 countries. The company's goal is to reduce CO_2 emissions within the supply chain by 20 per cent by 2030. Despite increased procurement last year, CO_2 emissions within this chain were further reduced by one per cent compared to 2020.

The company's goal is to eliminate landfill waste by 2030. Compared to 2021, waste destined for landfills was reduced by 15 per cent in 2023.

Progress has also been made in the number of hours the company's employees spent learning, focusing on three areas (digitalization, sustainability, and leadership) with an average of 23 hours per person per year (the goal is 25 digital learning hours by 2025).

Source: Siemens

Photograph: Microsoft

A NATURAL SOLUTION FOR SLOWER DECAY OF FRUITS AND VEGETABLES

How often does it happen that fruits and vegetables in shops and homes start decaying after a short time? As soon as they change color, fruits like bananas end up as food waste.

According to data collated by the United Nations Food and Agriculture Organization, fruits and vegetables make up the largest share of wasted food – over 30 per cent – while cereals and legumes have the smallest share. Rotting plays a significant role in the accumulation of food waste globally, as freshness is an important factor for foods such as strawberries, grapes, lettuce, tomatoes and spinach.

Photographs: (top) Pixabay/Rebekka D; (bottom) Pixabay/Juan Zelaya

A group of researchers from the Institute for Multidisciplinary Research of the University of Belgrade developed a formula that can solve this problem. Protected by an international patent and tested in accredited laboratories in Serbia, B-fresh is a formula based on natural products that replaces toxic chemicals and prevents the rapid rotting of fresh fruits and vegetables, thus extending the shelf life up to one hundred per cent. We spoke with Goran Branković, PhD, Director of B-fresh Technologies, the company behind this formula, about the formula's composition, use and advantages.

"B-fresh is a biopolymer-based emulsion, i.e. based on natural materials such as chitosan and gelatin. It also contains active components such as essential oils and salts of some metals, such as zinc. These materials have antimicrobial and antioxidant properties, which is why they protect food from spoilage. The active components of essential oils are encapsulated in a biopolymer matrix and are slowly released, creating a protective atmosphere", explains Dr Branković.

After it is applied in a thin and invisible layer on the inside of the package, be it plastic, paper or cardboard, the emulsion forms a thin protective layer that has antimicrobial and antioxidant properties, which, in the next 10–15 days, prevent the development of bacteria, fungi and mould on fruits and vegetables. In this way, each package becomes active, and there is no need to change the packaging. It is interesting to note that the product is active even when the package is not completely closed or is styled in such a way that there are openings.

Although one type of B-fresh emulsion is currently available, it can be adjusted to a specific type of fruit. Different microorganisms attack and cause the rotting of different fruits and vegetables, but it is possible to find the most effective emulsion that will fight against the relevant microorganisms.

"For instance, berries such as raspberries are more susceptible to mould, while salads are mostly damaged by yeasts, so we can select active components to suppress the development of one or the other, depending on what sort of fruit and vegetable we are talking about", Dr Branković points out.

In addition to the clear economic benefit as a result of extending the shelf life of food twice, B-fresh is also part of the solution for reducing food waste. This, in turn, leads to a reduction in CO_2 emissions, which is why the product is of multiple importance.

The ingredients of the B-fresh emulsion are all natural and registered on the GRAS list (Generally Recognized as Safe), so they are recommended as safe for human health. The substances used are food grade, meaning they are edible and safe for humans and the environment.

There are products with a similar purpose on the global market, but they need to be applied directly to the fruit, while the B-fresh formula is intended to be used in fruit packaging. From the previous experience of farmers who coated their crates with this product the day before picking, it was concluded that, apart from the longevity of the fruit, they were also satisfied with the fact that there were no flies during picking because B-fresh is also an insect repellent.

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After the successful launch of the product, the team behind B-fresh is now striving to further develop active and smart packaging and new biopesticides and plant protection agents.

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