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RAÚL BARTOLOMÉ MOLINA
Ambassador of Spain
Climate Neutrality by 2050

JOVANKA ATANACKOVIC
State Secretary for Green Energy in the Ministry of Mining and Energy
New Law, National Plan and Funds Under Way

CONFRONTATION: RIO TINTO AND PAKT
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Dear readers,

The year 2020 passed. It was not the first one that was long and heavy. I believe that each of us remembers both worse and better years. However, our nature is hopeful, so we expect from the next year to give us a little respite and strength since the pandemic has changed our lives, if not completely, then it has certainly changed the normal course of life.

However, I would say that in our country, environmental protection has not been forgotten. On the contrary, it has come to the fore. Topics such as air pollution, small hydropower plants, the jadarite mine and others were also in the media focus.

Given that our 20th issue is in front of you, you already know that the conversation with the ambassador is an indispensable column in every issue. Ambassador Raúl Bartolomé Molina spoke about environmental protection in Spain. He outlined to us the plans of the Spanish government to mitigate climate change and create the framework for sustainable growth that will enable the national economy to reach climate neutrality by 2050.

One of the main focuses in the coming period in the Ministry of Mining is certainly the Law on Renewable Energy Sources. We talked about the development of the use of renewable energy sources with State Secretary of the Green Energy Sector, Jovanka Atanacković.

We would like to draw your attention to the section Opinion in which Professor Vigor Majić, director of the research station Petnica, sheds light on the topic of smart cities in a different way.

We also recommend stories about engaging and young people and their inventions about which we regularly write in section People and Challenges. Nevena Čule explained to us how floating islands could be used to revitalize lakes and rivers as a powerful natural solution and Nikola Rakić from the company Natura Eco revealed to us where the first domestic "printed" house will spring up. Another Nikola, this time from the company White Lemur, talks about a new material that could replace the notorious and ubiquitous Styrofoam and reduce packaging waste.

Finally, one of the great successes of our editorial office this year is the photo competition "Natura 2000 in frame", which we organized in cooperation with the Delegation of the European Union in Serbia through the project "EU for Natura 2000 in Serbia". We received more than 1,500 great photos that reminded us of the beautiful landscapes, flora and fauna that characterize our country. They are also a kind of warning to us that in the coming years, we need to take more care of nature so that our heirs could enjoy the beauties that can be seen in these photos.

We wish you a nice start of 2021 and let that be just an introduction, as the morning shows the day!

Nevena Đukić,
Editor in Chief

LEVENTE SZEKERES – Feeding

AWARDED PRIZES OF THE PHOTO CONTEST **"NATURA 2000 IN THE FRAME"**

ANICA ŽUPUNSKI – Tisa Mayfly

VIOLETA MILUTINOVIĆ – Defiance

Levente Szekeres is the winner of the "**Natura 2000 in the Frame**" photo competition with the photo Feeding. The second prize was won by Violeta Milutinović with the photograph Defiance, while the third went to Anica Župunski for the photograph Tisa Mayfly.

During the competition, which was jointly organized by the Energy Portal and the project "EU for Natura 2000 in Serbia", from September 14th to November 27th, more than 1500 photos arrived. All participants, both professional and amateur photographers, showed exceptional skills to capture and perpetuate an unforgettable moment in nature.

JELENA SLIJEPČEVIĆ – Carefree Childhood

MILOŠ KARAKLIĆ – Playful Horses

JAN VALO – Dawn

MILOŠ KARAKLIĆ – Autumn Morning at Tara Mountain

PREDRAG KOSTIN – Kingfisher on a Branch

LEVENTE SZEKERES – Flight

LEVENTE SZEKERES – Attack

The winner of the competition, **Levente Szekeres**, has been photographing nature since 2011. He has won numerous awards and participated in several exhibitions in Serbia and abroad. "Each year, I make holes in the trees at the territory of Subotica sandstone. I am the happiest when I see chicks in the holes since I know that all my efforts have paid off. That is how my winning photo was created. I was checking the holes and I 'caught' the right moment of feeding the chicks", explained Levente, who will use the prize of 60,000 dinars to buy a new lens.

LEVENTE SZEKERES – Food Chain

LEVENTE SZEKERES – Acrobats

LEVENTE SZEKERES – Twilight

IVANA TODOROVIĆ – Pedal to the Metal

GORAN JORDANSKI – A Kiss

VIOLETA MILUTINOVIĆ – Blue Morning

ZORAN MILUTINOVIĆ – A Scary Black-crowned Night Heron

Violeta Milutinović, who won 45,000 dinars as the second prize, plans to invest that money for the trip to Sjenica. There she will wait to catch the photo of a wolf which is the only one missing from her collection of nature photographs. So far, she has participated in 250 exhibitions in 30 countries worldwide and has won more than 200 awards and commendations for her work. Violeta was happy to participate in this competition, because, as she says, "she has an impression that the nature photographs have been unfairly marginalized."

NENAD MARIĆ – The Sunset with the Most Beautiful View

VESNA MIJAILOVIĆ– Rača Canyon

DEJAN ILIJIĆ – Sunny

MARINA STANČEVIĆ – Krčedin Ada

VLADIMIR MIJAILOVIĆ – The National Park – Zaovine Lake

The third prize winner at the competition, **Anica Župunski**, a doctor by vocation, who has been engaged in photography for two decades, won 35,000 dinars with her Tisa mayfly. "For me, photography is a step into the world of beauty. Medicine's essence is the relationship with a human being, great love and respect for the life that person carries within. I think we all have potentials which we express in different ways. For me, it is photography", says Anica, whose Tisa mayfly has participated in 18 exhibitions so far and won six awards.

DANIEL KNEŽEVIĆ – Meadow Kišelez

MARINA STANČEVIĆ – Drina Canyon

IVAN BUKVIĆ – Uvac

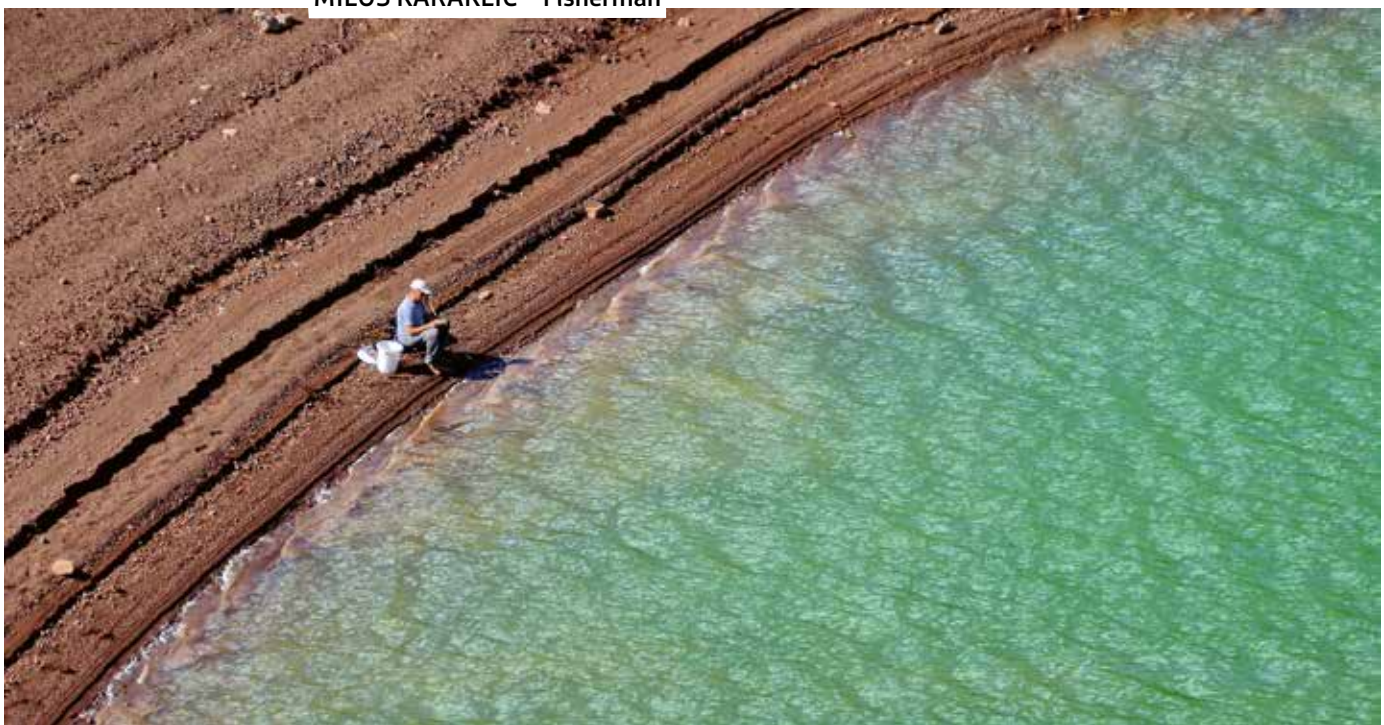
The jury consisted of Ana Iñigo on behalf of the EU project for Natura 2000 in Serbia, Antoine Avignon from the EU Delegation to Serbia, Snežana Prokić from the Ministry of Environmental Protection, photographer Bojan Džodan, multimedia artist Mina Radović and the Editor in Chief of Energy Portal Nevena Đukić.

OLJA SIMOVIĆ – Spring

NIKOLA VLAHOVIĆ – Nature at Heart

Photography The Great War by Vladimir Marković, which was shortlisted, was published within an interview with Jovanka Atanacković on page 30.

MILOŠ KARAKLIĆ – Fisherman



JOSIP ŠARIĆ– Juxtaposition Beljarica

JAN VALO – Dance of Valley

SRĐAN KIS BICSKEI – Waterfall Walk

VLADIMIR MIJAILOVIĆ – Green-blue

DEJAN VALEK – Dancing in the Fog

The photo exhibition of finalists has been postponed due to the specific epidemiological situation, and it will be organized during 2021.

14 **RAÚL BARTOLOMÉ MOLINA,**
The Ambassador of Spain in Serbia
By 2050 We Will Reach Climate Neutrality

The Spanish electricity system must be 70 per cent renewable by 2030 to reach the set goal of 100 per cent by 2050. This goal will require installing new renewable energy production capacities, and sufficient reserve capacities to guarantee the security of supply, says the ambassador Raúl Bartolomé Molina for our Magazine.

26 **JOVANKA ATANACKOVIĆ, State Secretary for Green Energy in the Ministry of Mining and Energy**
New Law, National Plan and Funds Under Way

The National Plan for Climate and Energy will concretize measures and activities, including projects in the field of renewable energy sources, which to should position the Serbian economy and energy, reveals Jovanka Atanacković, on the European and world market as a sustainable economy that produces goods and services with the greatest possible use of renewable sources.

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Photographs: (Molina) courtesy of Raúl Bartolomé Molina; (Atanacković) courtesy of Jovanka Atanacković

Photographs: (Majić) courtesy of Vigor Majić; (Karpenter) EBRD; (bottom right) MT-Komex

AT THE HEART OF TECHNOLOGICAL TRANSFORMATION AND MODERNIZATION

Spain is one of the European countries most concerned about climate change. The southern areas of this Mediterranean country are characterized by rather harsh climatic conditions, such as high temperatures, droughts, scarce rainfall and insufficient water. Nevertheless, the Spanish government is actively working to mitigate climate change, among other things, and to create a framework for sustainable growth that will enable the national economy to reach climate neutrality by 2050. The first step was the adoption of the Strategic Framework for Energy and Climate.

The Ministry of Environmental Transition will also provide support through the financing of projects that meet certain criteria. Perhaps the most important condition is that the applied technology contributes to reducing dependence on fossil fuels. Energy storage within wind farms and solar power plants will also be financially supported, and priority will be given to projects located on the sites of closed coal-fired power plants. Simultaneously, the Spanish government has also committed to building 3,000 MW of wind and solar power plants over the next decade.

During the conversation with Spanish Ambassador to Serbia Raúl Bartolomé Molina, we sought to learn how the authorities plan to mitigate the vulnerability, increase the country's security and resilience to climate change, and improve its ability to adapt to new and challenging climate and energy scenarios.

EP ***According to the results of a survey conducted by Ipsos in March 2019, more than 50 per cent of Spaniards considered global warming to be the most important environmental challenge facing Spain. What is being presented to the concerned public to mitigate the consequences of global warming in the future?***

Raúl Bartolomé Molina One of the key elements is adopting the National Integrated Energy and Climate Plan. It sets the path for decarbonization for the next decade and contains the following goals to be achieved by 2030, such as a 23 per cent reduction in greenhouse gas emissions compared to 1990, and a 42 per cent share of energy in final consumption from renewable energy sources, improving energy efficiency by 39.5 per cent and 74 per cent of the share of renewable energy in the electricity sector.

RAÚL BARTOLOMÉ MOLINA was born in Bilbao in 1966. He graduated in law and began his diplomatic career in 1991. From 1996 to 1999, he was the Consul of Spain in Venezuela, then Counselor at the Spanish Embassy in Paris from 1999 to 2004, and in 2005 he moved to the position of Chief of Staff to the Secretary-General of the European Union. He was charge d'affaires at the Spanish embassies in Rome and Oslo. In December 2016, he became the head of the Secretary State's cabinet for the European Union until he was appointed the Ambassador of Spain in Belgrade in April last year.

Spain is one of the leading countries in terms of initiatives aimed at **making our cities "smart"**. We already have over 60 in our network!

Photographs: (on the previous page) Unsplash /David Russeler; (Molina) courtesy of Raúl Bartolomé Molina; (middle right) Pixabay; (bottom left) Unsplash /Ruggiero Calabrese

These goals will enable the achievement of long-term goals, primarily climate neutrality by 2050, which means 100 per cent of renewable sources in the electricity system and a reduction of at least 90 per cent in the total emissions of greenhouse gases (GHG) compared to 1990.

EP ***The European Environment Agency (EEA) predicts that the largest increase in droughts in Europe will be in the Iberian Peninsula, contributing to a greater risk of desertification. What is the plan for adapting to these changes?***

Raúl Bartolomé Molina Most of the effects of climate change could be drastically reduced and prevented through adaptation programs. In this context, the recently adopted National Climate Change Adaptation Plan 2021–2030. defines 81 areas of action to build resilience and reduce damage in 18 sectors, including human health, water, natural heritage, biodiversity and protected areas, coasts and marine environment, forest protection, combating desertification, agriculture and livestock or food safety. These actions will have to evolve over the next decade and require legislative changes and profound structural reforms.

EP ***Spain has launched an ambitious plan to switch to renewables by 2050 completely and soon after to completely decarbonize its economy. What measures have been taken and what remains to be done to achieve this goal?***

Raúl Bartolomé Molina Spain is strongly committed to achieving climate neutrality by the middle of the century, taking the lead in implementing the Paris Agreement and the international community's commitments. In this regard, the Bill on Climate Change and Energy Transition - currently

The Spanish power system must be 70 per cent renewable by 2030, to reach the set goal of 100 per cent by 2050

Photographs: (top) Pixabay; (bottom right) Unsplash /Alejandro Cartagena; on the next page: (bottom) Unsplash /Florian Wehde; (middle right) Unsplash /Alex Vasey

being debated in the Spanish Parliament - includes a significant range of ambitious targets to reduce greenhouse gas emissions and switch to renewable energy sources by 2050.

To achieve this goal, it has been determined that by 2030, at least 35 per cent of the final energy consumption should be from renewable sources. It can be achieved by expanding the network of electric vehicles, changing the mode of transport, using the electric railway instead of freight transport, or changing the energy source with lower emissions in the residential, industrial and service sectors. Moreover, the Spanish electricity system must be 70 per cent renewable by 2030 to reach the set goal of 100 per cent by 2050. This goal will require installing new renewable energy production capacities, and sufficient reserve capacities to guarantee the security of supply.

Besides, energy efficiency measures will have to reduce primary energy consumption by at least 35 per cent, for example through systems implemented in new construction projects and the renovation of existing buildings and the application of new industrial processes.

EP ***Coal-fired power plants in the EU are closing, and Spain has two that are still operating. Are they expected to close in the coming years?***

Raúl Bartolomé Molina Spain closed many thermal power plants in a short period and reduced their use by 69 per cent in two years. In 2020 alone, seven thermal power plants in Spain ceased to operate. Their closure is justified for environmental and economic reasons because they are the main source of pollution and are not economically sustainable.

In 2020 alone, seven thermal power plants in Spain ceased to operate. The closure of the remaining thermal power plants is not expected in the next few years until all economic, environmental and social aspects have been considered and fully resolved

However, the social consequences of these measures are not negligible and should be addressed appropriately. Therefore, the recent closure of coal-fired power plants has taken place in the spirit of an intensive process marked by strong social dialogue to ensure a fair transition of jobs and regions, so that no one is left out.

As you pointed out, there are still some coal-fired power plants operating, and we are making continuous efforts to reorganize and further develop coal-rich areas. Therefore, the closure of the remaining power plants is not expected in the next few years, until all economic, environmental and social aspects are considered and fully resolved.

EP ***Air Pollution in Madrid is a huge problem whose long-term solution is expected by planting a large forest belt, on the outskirts of the city, which will be 74 kilometers long. Until the city forest grows, what is already being applied to reduce pollution in the city?***

Raúl Bartolomé Molina The city of Madrid has made significant progress in improving air quality by adopting new measures, such as restricting vehicle access to the city center, which has helped reduce carbon dioxide emissions in the area. On the other hand, the 74 kilometer long forest belt is an ambitious green infrastructure project, and it will be the largest urban forest in Europe. The advantages of this project are certainly diverse and significant.

The contribution will be reflected in the ecological and landscape renewal of degraded areas, reduction of greenhouse gas emissions and improvement of the city's environment. Predictions show that when the forest belt reaches its level of "maturity", it should be able to absorb 170,000 tons of CO_2. With the help of the forest belt, the overall population's health will be improved by creating new recreational areas such as hiking and biking trails.

EP ***Spain already boasts one of the most generous incentive systems for electric vehicles in Europe. This summer, the government announced two new plans, Moves II and Renove. What exactly is it about, and what will it bring to the citizens?***

Raúl Bartolomé Molina Achieving our ambitious climate goals requires renewing the vehicle fleet, as they are the biggest source of pollution in Mediterranean cities. In this regard, Moves II and Renove are two different plans that encourage the purchase of environmentally-friendly vehicles. On the one hand, Renove provides assistance to replace old vehicles with new low-carbon vehicles. On the other hand, Moves II provides financing to purchase energy-efficient cars: electric, hybrids and gas vehicles.

These plans will contribute to a significant reduction in CO_2 emissions and will also increase the competitiveness of the automotive sector. However, the greatest benefit of these plans will be felt by citizens who will enjoy cleaner air in cities and the assistance received for the purchase of new vehicles, which is especially important in this current context of reducing private consumption.

EP ***Spain has a very active role in European technological development. Madrid stands out, Barcelona also arrives. What are the next important projects in the development of the smart city concept across Spain?***

Raúl Bartolomé Molina Spain is one of the leading countries in initiatives to make our cities "smart". We already have over 60 in our network! However, we are all well-aware that there is no end when it comes to improving the systems that provide services to citizens. In this regard, the National

Photographs: (middle left) Pixabay; (bottom) Unsplash /Raul Cacho; on the next page: (top left) Hert (middle right) Cala Macarella

Smart Areas Plan sets out priorities that guide reforms and actions at the national, regional and local levels. I would especially like to mention "smart tourism". As you know, the power and impact of tourism in the Spanish economy are enormous. Therefore, we are committed to the transformation and modernization of tourism, using technology and new processes to redefine the relationship between tourists and residents, improve the services provided and improve energy management.

Besides, significant actions are being taken in the field of "smart areas" to solve the problem of depopulation of rural areas and improve public services in cities, thus facili-

tating the exchange of data and redefining the relationship between cities and various urban facilities such as airports, ports and other buildings.

EP Barcelona is among the first European cities to adopt smart city technologies and today is considered the "smartest" European city. How did Barcelona use technology? Did urban planners and engineers involve the community during that process?

Raúl Bartolomé Molina Cooperation with other public administrations and public-private partnerships has been crucial, along with several local and regional actors, such as private companies and universities. However, the key elements of transforming Barcelona into a city that will be able to better serve its citizens in the way they choose were privacy, sovereignty and data security.

As a smart city, Barcelona has achieved a wide range of advantages in energy efficiency, waste disposal, air pollution, noise control, and the improvement of the system of using city bicycles and bus transport. Despite being unknown to the wider public across Europe,, Barcelona is the first city in the world to have a public network of fab laboratories (these are small workshops that enable (personal) digital production, i.e. fabrication). The slogan of this project is "there is no smart city without smart citizens".

Interview by: Jovana Canić

FLOATING ISLANDS IN THE FIGHT FOR CLEAN LAKES

The project "Revitalization of the lake at the locality of Trešnja by the System of floating islands" has been recognized on several occasions as an example of good practice, both by the domestic and international scientific community. The project was realized from 2018 to 2020, and the financier is the Secretariat for Environmental Protection of Belgrade, while the executor is the Institute of Forestry from Belgra-

de. The main goal of the project is to enable the treatment of polluted lake water in a completely natural way, without the use of chemicals and additional energy, which could further endanger the environment and human health. This goal was achieved by setting up and validating a predefined floating island model, which can be further used to revitalize lakes and rivers as a powerful nature-based solution for a sustainable and resilient society. We talked to Nevena Čule, PhD, one of the project managers, about how the project was conceived and then realized.

EP ***How does the System of floating islands work and how is it implemented at the mentioned site?***

Nevena Čule Floating islands are a green technology based on plants, which have the ability to remove excess nutrients and heavy metals from surface waters under different conditions. By imitating natural processes, without the use of chemicals or additional energy, and thanks to the symbiotic relationships of its basic components, i.e. plants, algae, small invertebrates, zooplankton, microorganisms, substrate and water, this green technology enables the revitalization of polluted and wastewater treatment. Plants can accumulate various substances characterized as water pollutants, translocate them and store them in their tissues. The amount of intake and storage of nutrients, heavy metals and other substances depends on the plant species and the concentration of these pollutants in water and is positively correlated with the overall efficiency of the biological system.

The installation of the System of floating islands within rivers, lakes and ponds **can enable the revitalization and reuse of water, nutrients and various biological resources, as well as protect shores from erosion**, but also lead to increased land and real estate value near the river and the potential of the entire areas for tourism development

Microorganisms, which are located in the rhizosphere of plants, remove large amounts of organic carbon, heavy metals, nutrients and other substances from their water, and it also affects the reduction of the number of pathogenic microorganisms. The floating islands themselves are square in shape, measuring 1×1 meter, which allows easy connection of islands to the System, their easy anchoring, makes it easier to make island carriers and reduces the possibility of retaining various solid waste within the System.

EP ***Is this the first time such a system has been implemented?***

Nevena Čule The model of floating islands, which was used for the revitalization of the lake, is the result of my awarded doctoral dissertation and the project of revitalization of the Topčiderska river. After research conducted in the laboratory and within the pilot plant, this was the first time that floating islands were used in practice, in a real environment. The proposed model of floating islands has the character of an innovative technology, because so far in Serbia it has not been used for purification and revitalization of polluted waters. Also, based on the conducted research and review of scientific-professional and relevant literature on the existing types of floating islands, it was concluded that such a model in terms of construction of

All photos: courtesy of Nevena Čule

the lattice girder, substrate, composition of island vegetation and anchoring methods was not constructed in the world or in our country.

EP ***How do you assess suitable sites for the application of such a system and why was Trešnja selected?***

Nevena Čule Further development of all biological methods for wastewater treatment, including floating islands, must move in the direction of their commercialization. The two biggest obstacles to achieving this goal are their non-recognition in the laws and other relevant regulations of the Republic of Serbia and the lack of financial resources to support and invest in such environmental projects, although they have multiple significance for the whole community. One of the first steps to overcome these problems is to create examples of good practice, which can attract investors for further projects and enable changes in laws and

The construction of the Systems of floating islands **enables the elimination of omissions caused by unplanned construction**

built numerous weekend facilities with illegal septic tanks and field toilets whose contents flows into the streambed polluting the entire environment. The lake has a landscaped shore and water with low to moderate concentrations of pollutants, and since water of excellent ecological status is one of the most desirable natural elements of any resort, revitalization of the lake has multiple significance for this locality and could become a central factor in recovering a forgotten resort in the immediate vicinity of Belgrade.

EP ***What results do you expect from this project?***

Nevena Čule The main goal of the Project is to enable the treatment of polluted lake water in a completely natural way, which will be efficient, environmentally friendly and economically viable. The results at the end of the research showed that the floating islands additionally enriched the lake water with oxygen and had excellent potential for reducing electrolytic conductivity and chemical oxygen demand as well as concentrations of nitrite, nitrate, total nitrogen, total phosphates and suspended solids. Also, the floating islands removed aluminum, arsenic, boron, barium, calcium, cobalt, chromium, iron, magnesium, manganese, lead, sulfur and zinc from the water with great efficiency. Achieved pollutant removal efficiencies are between 30

The right way for permanent revitalization of the lake is to regulate the wastewater outflow from the settlements, and then to revitalize the lake by setting up floating islands. Until that happens, **floating islands can provide water quality improvement at least seasonally**

regulations. The first systems of floating islands should be installed in important locations for the city and its inhabitants, noting that it is desirable to choose waters with low to moderate concentrations of pollutants. The lake at the Trešnja site, based on the project "Revitalization of the Topčiderska river with biological systems for purification of polluted waters", is marked as one of the potential areas for setting up biological systems for purification and revitalization of polluted waters, because it has some of the listed characteristics. This lake is about 35 kilometers away from the center of Belgrade and is located within the forest complex Trešnja. Thirty years ago, the site was a very popular picnic area, and today the lake is polluted with municipal waste and fecal wastewater, because in the meantime, just above the bank of the stream, whose waters fill the lake,

and 100 per cent depending on the type of pollutant. The analysis of sanitary-microbiological parameters for the assessment of the ecological quality of water concluded that the floating islands reduced the number of bacteria of fecal origin in the range from 97 to 100 per cent. The obtained results indicate that the water in the immediate vicinity of the floating islands had the characteristics of water of class I, i.e. excellent ecological status.

EP ***Do you plan the following location for setting up floating islands?***

Nevena Čule As announced by Ivana Vilotijević, Secretary and Vesna Šabanović, Head of the Sector for Strategic Planning, Project Management and Climate Change of the Secretariat for Environmental Protection of the City of Belgrade, the next location for setting up floating islands is Lake Pariguz. This lake was also recognized as a potential area for setting up floating islands within the mentioned project of revitalization of the Topčiderska river. This artificial lake with an area of about eight hectares is located in the settlement of Resnik, and a lot of communal waste can be noticed in the lake, while the water is loaded with fecal wastewater that flows directly into the lake from the surrounding houses.

EP ***How does this system affect the environment?***

Nevena Čule Based on the research conducted on the Project, the floating islands are an environmentally justified technology, which, while reaching the ecological optimum, enables the sustainability of natural resources. Of great importance is the fact that, thanks to the placement of floating islands within the water surface that is being revitalized, it directly affects the increase of biodiversity in an area that is often degraded. Although the biodiversity on the lake at the Trešnja site was not the subject of research, during the implementation of the Project it was noticed that the vegetation of the floating islands created a suitable habitat or shelter for various aquatic organisms, such as fish, frogs, snakes and others. It was especially noted that freshwater crabs were found around the roots of plants during the removal of floating islands, which are indicators of water with excellent or good ecological status, and which have not been observed on the lake for many years. Floating islands can also be alternative nesting places for aquatic ornithofauna, because they provide protection from predators and strong winds. And finally, thanks to their construction and completely natural appearance, the floating islands completely fit into the surrounding landscape and did not have a negative impact on the landscape within which they were located.

EP ***Are floating islands then enough to solve the pollution problem?***

Nevena Čule As long as there is a source of pollution in the lake, that is, as long as the discharge of wastewater from the settlement is not regulated, the lake will be polluted.

The right way for permanent revitalization of the lake is to regulate the wastewater outflow from the settlements, and then to revitalize the lake by setting up floating islands. Until that happens, floating islands can provide water quality improvement at least seasonally. As long as this does not happen to floating islands, water quality can be improved at least in one part of the year. Given that investment in the construction of a sewage system would be high, it is possible to solve this problem by installing different types of biological systems for wastewater treatment.

EP ***Are the floating islands a cost-effective green technology?***

Nevena Čule Taking into account potential limitations (ecological, social, financial, etc.), as well as the specifics of the location (purposes, composition of flora and fauna, etc.), purpose and goals of using floating islands, an analysis of economic justification of the project "Revitalization of the lake at the locality of Trešnja by the System of floating islands" according to which it was concluded that the invested funds can be returned within 2.5 years, which is a far shorter period than the economic period of 10 years. Given that it was assessed that the Project is economically justified and taking into account the effects that can be achieved through its implementation, it is recommended to be included in the list of priorities and provide financial support for its long-term implementation.

EP ***How do citizens react to the project?***

Nevena Čule Very positive! Thanks to the acceptance of this green technology by regular visitors to the site, in 2020, 24-hour surveillance was not required every day. Fishermen and recreationalists took care of the floating islands and informed the competent person if any problems arose. During the second year of the lake's revitalization, thanks to this, no damage was found on the set islands.

EP ***Are there any additional benefits to setting up floating islands?***

Freshwater crustaceans were found around the roots of plants during the removal of floating islands, which are indicators of water with excellent or good ecological status, and which have not been observed on the lake for many years

Nevena Čule In addition to the basic function of removing pollutants, floating islands also have other functions, which are important in certain places of purification. Similar to natural aquatic ecosystems, vegetation forms a habitat for various animal species (birds, insects, reptiles, fish, etc.). This is especially significant in degraded areas with depleted plant and animal diversity. Also, Systems of floating islands are suitable places to encourage the scientific community to conduct various researches, which can enable a better understanding of the processes that enable the removal of pollutants, facilitate the correct choice of species for a given case of purification, materials and parameters for island construction.

Interview by: Jovana Canić

ENERGY GOALS SET, GREEN RESULTS ARE EXPECTED

Renewable energy sources, environmental protection, and the pursuit of climate change mitigation have long been global goals, the achievement of which should lead to a new, significantly different concept of life on our planet. On the way to a sustainable organization of the economy and society as a whole, there are obstacles, and how Serbia plans to solve some of these problems and what are the plans for the transition to green energy and more comprehensive environmental protection, we spoke with Jovanka Atanacković, State Secretary for Green Energy in the Ministry of Mining and Energy.

EP ***The Ministry formed the Sector for Green Energy. When do you expect the adoption of the National Plan for Climate and Energy expected?***

Jovanka Atanacković Considering the global policies related to the energy transition, it is necessary that Serbia resolutely dedicates the use of green energy and development

Photograph: Ivana Lukic

JOVANKA ATANACKOVIĆ graduated from the Faculty of Law in Belgrade in 2000. She has participated in a number of legislative activities in tourism, housing and maintenance of buildings, public utility services and others. She takes over the Sector for Housing and Architectural Policy, Communal Services and Energy Efficiency, as Acting Assistant Minister in 2015, where she remains until 2017 when she takes over the Assistant Minister position in the Ministry of Construction, Transport and Infrastructure. She began to work as Assistant Minister for energy efficiency and renewable energy sources in the Ministry of Mining and Energy in November 2020.

Regarding the additional mining project to increase the Majdanpek mine's flotation, the Ministry received a decision from the Ministry of Environmental Protection stating that **the project to increase capacity does not require the preparation of an Environmental Impact Assessment Study**

in areas of energy. That is why the Sector for Green Energy has been formed within the Ministry and the administrative capacities for the big job that awaits us have been strengthened. We have already started with the reform of the regulatory framework and the creation of conditions for more intensive investment in this area. The Working Group for drafting the first special law on renewable energy sources was established, and it will regulate this very complex area.

Next year, the Ministry's main focus in the field of green energy will be the adoption of the Law on Renewable Energy Sources, which will lay the foundations for the transition to green energy and more dynamic use of renewable energy sources. The development of an integrated national plan for climate and energy will define Serbia's goals by 2030 in three areas: energy efficiency, renewable energy sources, and reduction of greenhouse gas emissions will also be a great challenge. This plan will concretize measures and activities, including projects in the field of renewable energy sources, which should position the Serbian economy and energy on the European and world market as a sustainable economy that produces goods and services with the greatest possible use of renewable sources. Also, all the procedures will be digitized.

EP ***What are the plans for solving the problem of air pollution?***

Jovanka Atanacković By signing the Declaration on the Green Agenda in November this year, the Republic of Serbia expressed its readiness to decarbonize the electricity sector and to create public policy documents for the period until 2050, with clearly defined goals until 2030, in such a way as to achieve the goals. Decarbonization of the electricity sector will reduce all forms of pollution.

Subsidies for financing energy efficiency technologies in the households are already available under credit lines for financing green GEFF- Green Energy Financing Facility. This credit line is part of the European Bank for Reconstruction and Development (EBRD) program. The program envisages financing on the Western Balkans markets, and

Photograph: (Atanacković) courtesy of Jovanka Atanacković

Decarbonization of the electricity sector will **reduce all forms of pollution**

the total amount of the credit line is 85 million euros. Within this credit line, subsidies in the amount of 15 to 20 per cent of costs are envisaged.

We also plan to reform the system of financing and implementation of projects in the field of energy efficiency by allocating the Energy Efficiency Fund, which will be filled not only with money from the budget but also from international financial institutions, to, among other things, support citizens to replace their windows and doors because we are aware that they cannot do it alone. Our goal is to raise energy efficiency through savings in households, but also public buildings.

EP ***In its report for last year, the Energy Community states that Serbia has made the most progress in energy efficiency. What are the plans for further progress in this field?***

Jovanka Atanacković Serbia continuously since 2013 and since the adoption of the Law on the efficient use of energy transposes and implements legislation in energy efficiency. Energy efficiency regulations are largely in line with European Union directives.

As the EU regulations in this area have been significantly changed in the last two years, the Ministry is working on adopting the New Law on Efficient Use of Energy to fully harmonise with the currently valid EU regulations. It will

Photographs: (top) Nenad Stojanović; (bottom) Stefan Milenković

be especially important that the new Law will enable the application of Eco Design requirements, which will prevent the placing on the market of products that are not sufficiently energy efficient. We expect the new rules on energy labeling of products in the coming period because these labels for certain products in the EU have been amended.

At the end of 2020, a new Public Call for Improving Energy Efficiency in Local Self-Government Units was announced, which will be financed by the Budget Fund for Improving Energy Efficiency in 2021. It is expected that the funds of around 250 million dinars will be allocated to the Local Self-Government Units through a public invitation.

EP ***Serbia has great potential for energy supply from renewable energy sources (RES). What has been achieved in this area, and what are the plans?***

The work of the Ministry and the implementation of the "Jadar" project will be as transparent as possible. **Citizens will be able to have insight into every phase of the project**

Photograph: (top right) TIjana Jevtic

Jovanka Atanacković Serbia indeed has significant potential in this area, and more importantly, the technically usable potential of RES is variable and can be increased. It depends on various factors. For example, the potential for electricity production from the sun and wind depends on the power system's ability to accept that energy. By developing the electricity network, we increase the potential for the use of renewable energy sources. Biomass potential can be increased if fast-growing energy crops are planted in a planned and targeted manner, or if the collection of biodegradable waste, which is also considered a renewable energy source, is encouraged. Perhaps one of the most important results in the previous period is the acquired trust of investors in the legal system of the Republic of Serbia, who invested their money in RES and thus sent a good signal to other potential investors that Serbia is a favorable destination for investment in the energy sector. In relation to the goals until 2020, the most has been achieved in the electricity sector. So far, 265 power plants with a total capacity of 500 MW have been built, and another 300 MW is expected to be built in the coming period. The reason for that is that a regulatory framework has been created in this sector that encourages the construction of power plants that use RES, the so-called model feed-in tariff. This model was introduced following the example of other EU countries in which, as in Serbia, they gave excellent results. There was no obligation in the heat sector in the previous period to use a certain share of RES in heating plants.

Experience in EU countries has shown that without introducing binding targets in certain sectors, ambitious targets in this area are not achieved. Hence, the new RES Directive, the so-called RED II (Renewable Energy Directive), envisages introducing a mandatory share of RES in heating plants. The new regulations will create conditions for greater "greening" of the heat and transport sectors.

EP ***How important is the transition to RES for environmental protection and mitigation of the consequences of climate change in Serbia?***

Jovanka Atanacković The use of renewable energy sources is considered one of the key factors in the fight against climate change, the creation of a sustainable economy, the creation of new jobs, the protection of the environment and the reduction of pollution originating from the energy sector. In that sense, the use of these energy sources is one of the basic measures that contribute to the achievement of goals not only in the field of energy but also the goals of public policies in the field of environmental protection. Biomass is estimated as a resource with the greatest potential for use. However, all forms of renewable energy are available for use. Investors are free to choose the RES that best fits their business ambitions.

EP ***Many European countries are implementing plans that allow the closure of coal plants. What do we take in this regard?***

Jovanka Atanacković By the Conclusion of the Government of the Republic of Serbia on the Acceptance of the Declaration from Sofia on the Green Agenda for the Western Balkans (adopted on November 5, 2020) and the signing of the Declaration at the Summit in Sofia (adopted on November 10, 2020), the Republic of Serbia has expressed its readiness to contribute to the achievement of the

Photographs: (top) Vladimir Marković; (bottom right) Mihailo Rakonjac

The new Directive for RES, the so-called RED II (Renewable Energy Directive) envisages the introduction of a mandatory share of RES in heating plants, which will create conditions for **greater "greening" of the heat and transport sector**

goal of the carbon neutrality of the continent by 2050. Therefore, it will be necessary to establish national energy and climate targets by 2030 and develop a national integrated plan for climate and energy, which will constitute a set of measures and activities for achieving the goals, especially with clear deadlines and measures aimed at reducing emissions of greenhouse gases. The goals will be known by the end of 2021, and the activity of thermal power plants will depend on the value of this goal.

EP ***Company "Serbia Zijin Copper" that operates in Bor and Majdanpek, according to the first instance verdict of the court, responsible for air pollution in Bor. How does the Ministry monitor this city's current situation and what is being done to achieve a lasting solution for better air quality?***

Jovanka Atanacković The Ministry is making great efforts to provide the citizens of Bor with clean air and everyday living conditions. We are in constant contact with local government representatives, representatives of the public and representatives of "Serbia Zijin Copper" Bor. On September 16, the company suspended the smelter's operation with the aim of overhauling, which had an impact on reducing air pollution. After completion of the overhaul, the smelter was again put into operation. At joint meetings with the Ministry of Environment, representatives of the Ministry met with the current activities being undertaken regarding environmental protection, which is primarily related to technical reconstruction and upgrade equipment, process optimization and standardization of work. We are intensively monitoring the situation regarding this issue, and we will certainly, together with the Ministry of Environmental Protection, react to every problem that arises.

EP ***When it comes to Majdanpek, the company "Serbia Zijin Copper" is not obliged to do a study on environmental impact assessment for the additional mining project of increasing the flotation of the Majdanpek mine. How much does that decision affect the protection of the environment in this area, and are you aware of the situation on the ground?***

Jovanka Atanacković Regarding the additional mining project to increase the Majdanpek mine's flotation, the Ministry received a decision from the Ministry of Environmental Protection stating that the project to increase capacity does not require the preparation of a study on environmental impact assessment. As in all major projects relevant to the mining sector, the Ministry of Mining and Energy works closely with the Ministry of Environment. It was agreed that both ministries together and continuously monitor the situation on the ground.

EP ***The announced opening of the lithium mine in Loznica has caused a great deal of furor. How do you comment on the constant remarks of the citizens who claim that the project is environmentally harmful and threatens the existence of the inhabitants of a dozen villages in that area?***

Jovanka Atanacković As the Deputy Prime Minister and Minister Zorana Mihajlović pointed out several times, the "Jadar" project is essential for our country's economy considering that it is a unique Jadarite mineral for which there is a great world demand. For this reason, a new Working Group for the implementation of the "Jadar" project has been formed, which should, with its experience and knowledge, help and contribute to faster and more efficient project implementation. The Ministry believes that environmental protection and the fight for economic development must be a priority and that there are no conflicting goals. There must be no deviations from the required highest standards in environmental protection. The work of the Ministry and the implementation of the "Jadar" project will be as transparent as possible. Citizens will be able to have an insight into each phase of project implementation. The "Jadar" project will be implemented with the application of the most modern technologies in compliance with all European standards in the field of environmental protection. The Ministry of Mining and Energy will closely cooperate with other ministries, local self-government, population and other stakeholders, all with the common goal of sustainable mining in that area while preserving the citizens' health and environmental protection.

Interview by: Milica Radičević

Photographs: (middle left) Boban Kurandic

THE FIRST GREEN GARAGE OPENED IN KRAGUJEVAC

After Belgrade, Kragujevac got an environmental public garage. The works on the construction of this facility lasted for more than a year, and it was done according to all environmental standards. Solar panels have been installed on the roof of the building, which fully supply the garage with electricity

Green Garage is located in Kneza Milosa Street in Kragujevac and covers more than 7,000 square meters. There are 200 parking spaces available to drivers;10 out of them are reserved for people with disabilities, and 12 for motorcycles. Electric car drivers can relax – 3 places in this garage are provided for charging electric cars.

A 74-kW solar power plant is installed on the public garage roof and consists of 260 polycrystalline photovoltaic panels with an individual power of 285 W. The electricity produced by this solar power plant will be used to power the building, while the excess energy will be stored in 100 kWh batteries. A system consisting of 48 batteries has been installed for the purpose of storing excess energy. Thanks to the expert team of the company MT-KOMEX, the public garage in Kragujevac will be fully supplied with its energy, which means that it will use completely free and unlimited solar energy, with zero carbon dioxide emissions.

Air pollution and climate change have become part of our daily lives, so every turn towards clean and renewable energy sources is very important. If you are striving for a socially responsible business in achieving your goal, the skillful team of MT-KOMEX can help you.

To keep up with world trends MT-KOMEX engineers and installers have undergone various specialization training for assembly, construction and installation work.

Numerous projects for the construction of small hydropower, gas and solar power plants speak on their behalf. So far, they have built and delivered more than 30 solar power plants, with more than 8 MW of installed capacity.

MT-KOMEX can be said to be a pioneer when it comes to installing chargers for electric cars. MT-KOMEX engineers are trained to install chargers, both in smaller residential and business units and in larger facilities with more demanding infrastructure.

Strategic partnerships with Schneider Electric and ABB, two global leaders in electric car chargers, show that good and quality work is highly valued. But, the expert team of the company MT-KOMEX did not stop only at the installation of the charger, but they also worked on the design of solar canopies with a charger for electric cars. Solar canopies are the ideal solution if you want a fully renewable energy source to power your vehicle. So far, they have been installed in Belgrade, in front of the administrative building of ProCredit Bank, in business parking lots in Pancevo, Kladovo and Stari Banovci.

The leading men of MT-KOMEX realized that electric car chargers must be connected in one integral set for drivers to find a place to recharge their vehicle quickly and easily. As the crown of all their efforts, the charge&GO system was launched this summer, which will be a real synonym for traffic electrification in Serbia in the future. It is already a major help to electric car drivers today. For all those who may not have heard of this platform, the charge&GO system for charging for the use of electric car charging points with its charger network that allows easy access to chargers not only via platform or QR code on the charger but also using the charge&GO mobile app available on Google Play and the Apple Store.

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Photographs: MT-Komex

What do we know about mineral mine that threatens to divide Serbia

JADARITE BETWEEN BUSINESS SECRET AND PUBLIC INTEREST

The American information site Bloomberg published an estimate that lithium demand will increase eight times in the next ten years. This forecast does not seem surprising, since there is already an almost insatiable hunger for batteries that power numerous devices, from iPhones to electric cars, which contain this alkali material.

It is not difficult to conclude where we stand in this frenzy for perhaps the most sought raw material in the world at the moment if we take into account that one of the world's largest jadarite deposits (from which lithium is extracted) is located in the Jadar Basin in Western Serbia. Our reserves of this ore are estimated in the range of 100 to 200 million tones. Although it is popularly called "Serbian oil" because ten per cent of the world's reserves are located on the Serbia's territory, the lithium obtained from jadarite for the inhabitants of the Loznica area is not just a paradigm of the future economic prosperity of this area.

We asked the representatives of this company, which is registered in Serbia as Rio Sava Exploration, and Miroslav Mijatović, the president of the Podrinje Anti-Corruption Team (PAKT) who has been following plans to open the mine from the beginning whether the "treasure of the future" is buried in Serbia and what benefits the local population, the company Rio Tinto that will do the ore exploitation, and the state have.

As you will notice, the answers given to us by the representatives of Rio Sava Exploration are not accompanied by the name and surname of the person who compiled them. It is not common for our Confrontation section, and since we did not want to omit the other side, very important and powerful in this ore exploitation venture such as Rio Tinto, we decided to deviate from the rule, where persons with name and surname confront their views and publish their answers as follows.

EP ***Lithium Mine is declared as a new hope not only for the residents of the Loznica region but also for the whole of Serbia. What is the role of lithium in the future?***

Rio Sava Exploration Lithium owes its importance to the fact that at the global level the so-called the "green agenda" is becoming one of the priorities, which, among other things, means reducing carbon dioxide emissions. In the EU, measures related to CO_2 emissions are constantly being tightened, so the expansion of electric and hybrid cars is expected in the coming years. This is where lithium comes into play because it is primarily used to produce high-density energy batteries for this type of car. It is also used for the temporary storage of electricity obtained from large systems of solar panels and wind generators, which greatly contributes to this goal - reducing CO_2 emissions and the transition to a green economy.

It is important to point out that the green economy plays a role in the design and planning of the future exploitation and processing of jadarite. We are considering the number of measures and investments to ensure the lowest possible direct and indirect emissions of carbon dioxide.

Photograph: Pakt

JADARITE, the mineral that contains a high concentration of lithium and boron, was discovered in Serbia in 2004. This deposit of the mineral called sodium lithium boron silicate is unique in the world, for Serbia is the only place where it was found. Due to the high concentration of lithium and boron per ton of extracted ore, the Jadar region is ranked as one of the most important lithium deposits in the world.

Our team of domestic and foreign experts has improved the current methods of lithium ore processing and lowered the temperature of the process from over 250 to below 100 degrees Celsius, which is a much more environmentally friendly solution

Miroslav Mijatović The role of lithium-ion batteries is already extremely large since these batteries are used in the production of electric cars, and also telephones and many electrical devices of modern technology. However, there is a misconception that lithium batteries for vehicles are an environmentally friendly solution, which is simply not true. Currently, in the most advanced countries in the world, the lithium battery is recycled in an extremely small percentage – from one to three per cent. This can by no means be an acceptable solution from the point of view of environmental protection. As far as I know, science is paving the way for the production of cars that will run on hydrogen, which will be an acceptable environmental solution. Lithium certainly isn't.

EP ***What do the processes of obtaining underground deposits of lithium mineral and its extraction involve? What kind of consequences this procedure has on the local environment and nature protection?***

Rio Sava Exploration Let us first explain the whole process, what will be produced and how. The final products of the Jadar mine will be lithium carbonate, boric acid and sodium sulfate. All three products will be in powder form. We must mention that the lithium carbonate will be of the quality needed to go immediately into the production of batteries, which is not the case with other deposits in the world but also required an intermediate phase in processing.

The three mentioned products will be obtained from jadarite, which will first be exploited in an underground mine, and then go to prepare the mineral raw material you mentioned. That is only the first phase of processing, which involves crushing and wet classification, without flotation. Concentrated jadarite, which results from the first phase, goes immediately further into processing that is, dissolution after which the final products are separated by crystallization. The processing of concentrated jadarite itself will take place in a modern plant with a new, innovative and stable technology that has been tested in a pilot plant in Australia and has undergone many independent audits by relevant experts in various fields. This means that our domestic and foreign experts' team has improved the current lithium ore processing methods and lowered the processing temperature from over 250 to below 100 degrees Celsius, which is a much more environmentally friendly solution.

When we talk about the Environmental Impact Assessment Study, it is being developed during the feasibility study, the development phase of the project, which is exactly the phase in which the "Jadar" project is in from August 2020. This Study is developed for all the project elements and includes an assessment of the cumulative impact, including the landfill.

As for evaporation and deterioration of air quality, that is out of the question. Strict legal frameworks and standards are applied in the process industry, and in accordance with that, we will take all the measures defined by the Study on the Assessment of Environmental Impact by the competent institutions. If there is even the slightest risk to which there is no adequate technological response on our part, we will not be able to obtain the necessary permits to start the construction and use of the mine.

Miroslav Mijatović What we know so far is very little. The plant for the preparation of mineral raw material will be produced concentrated ore of jadarite from the raw ore. On the surface, the ore will be crushed, wet sieved, rinsed and deposited. The crushing process was followed by wet sieving and hydro cyclones. The residue from the phase of preparation or mineral raw materials is fine granulation particles that are transported into precipitator. The processing plant will be located next to the ore beneficiation plant and produce boric acid, lithium carbonate (and/or lithium hydroxide monohydrate) and sodium sulphate. Depending on the production stages, the processing plant will be divided into parts for dissolution and crystallization of boric acid; elimination of impurities and crystallization of sodium sulfate and other objects. Due to strong evaporations in the processing process, it is assumed that it will significantly deteriorate air quality, and it is still unknown exactly on which area. It is also certain that the number of sunny days will decrease in the Jadar valley area, and the wider impact on the environment will be acknowledged when the final location of the tailings is known.

Photograph: Rio Tinto, Oyu Tolgoi, underground project

WHAT ELSE IS THERE TO KNOW ABOUT THE JADAR PROJECT?

Asked about the causes for such strong opposition of the PAKT to the lithium extraction, the Rio Sava Exploration company offered an answer stating that they take this as a genuine concern and therefore they are willing to talk about all the subjects. "On the other hand, we have to point out there is a big misunderstanding of how the whole processing will be run, which is partly understandable since the Jadar mine will be unique in terms of technology and every other aspect - modern underground mine with up-to-date ore processing plant and solution for sustainable waste management. Often, in the public we can hear assumptions that are completely wrong such as that the processing will be based on classic flotation plant, involving working out on high temperatures, or that untreated water will be discharged into the environment. None of these three presumptions is true. The project doesn't involve flotation, the processing temperatures will be below 100°C, and the state-of-the-art treatment plant will be used for the processing the wastewater. We should all know that it entails that the project is safe and sustainable in economic and ecological aspects for all of us – citizens, the Republic of Serbia and our company."

The Jadar project stands for a strategic development chance in Serbia, and naturally, in the region of Loznica too. First of all, the deposits are situated on the doorstep of the European automotive industry, which as we mentioned earlier, is rapidly shifting to electric vehicles within a framework of the EU green agenda. As one of the most substantial deposits of lithium in Europe, the Jadar mine has the potential to supply value chain of electric vehicles with lithium carbonate for batteries.

Also, at the peak of the construction phase, it is expected that the Jadar project provides 2,100 jobs, while throughout its service life, the mine will employ more than 750 highly skilled workers, whereas the number of outsourced jobs will reach 1,500.

„We will employ experts in the fields of process engineering, metallurgy, electrical and mechanical engineering, automatization, geotechnical engineering, hydrology, geology, IT, economy and human resources, and we will also need electricians, welders and other workers.

As for the personnel development, we will work with the universities, high schools and institutions involved in adult education. When it comes to outsourced jobs, we already run the project for the development of potential local suppliers. Concerning this, the special event called 'Open door' was held recently where we discussed the future need of the project", the company communicates.

Photograph: Pakt

Due to strong evaporations in the processing process, it is assumed that it will significantly deteriorate air quality, and it is still unknown exactly on which surface. The wider impact on the environment will be acknowledged when the final location of the tailings is known

EP ***In what way Rio Tinto plans to remediate the potential environmental devastation of the entire area allocated for the mine and how will the land rich in this ore be purchased?***

Rio Sava Exploration Rio Tinto primarily plans to build a mine, refining plant, process plant, industrial waste landfill and all supporting infrastructure following the best available techniques (BAT) as well as to apply all technical and technological measures that reduce the impact on the environment, respecting the legally defined limit values and standards. Thus, there is no ecological devastation of the area and therefore no need to rehabilitate it. We cannot deny the impact of mining, as well as industrial ore processing on the environment. Still it is our legal and any other obligation to apply protective measures approved by the competent institutions and to avoid or reduce the impacts to the legally approved minimum. Otherwise, neither we nor any other investor in the mining industry can obtain a permit for either construction or exploitation.

Currently, the planned investment in the construction of systems and equipment in environmental protection alone amounts to over 100 million dollars. We can expect an increase in planned investments in this segment after completing of conceptual design and project design.

The process of land acquisition is underway and is taking place in accordance with the laws of the Republic of Serbia and the best world practices, which principles have been determined by the International Finance Corporation (a member of the World Bank Group). Our goal is for both parties to be satisfied at the end of the redemption process.

Currently, **the planned investment in the construction of systems and equipment in the field of environmental protection** alone **amounts to over 100 million dollars**

We are aware that this is a sensitive and important issue for families involved in redemption, and that is why we approach this topic in a very transparent, careful and fairway. We are in a a regular communication with the landowners, and we are pleased to point out that in the vast majority of cases, we have developed the relationship of mutual respect and trust.

Miroslav Mijatović We are not familiar with the fact that Rio Tinto completely rehabilitated any area where they mined. These are so far experiences, and the activists around the world are telling us about them. Recently, for example, they left the project on the island of Bougainville in Papua New Guinea, leaving the local population to take care of billion and a half tons of dangerous substances. For Rio Tinto to have an adequate field remediation plan, they would have to do it based on the relevant data on the impact of pollution. However, there is no such data, nor it seems to be of excessive interest to the company.

When it comes to the redemption, Article 4 on the Law of Mining and Geological Research states that lithium ore is of strategic importance for Serbia. In paragraph 3 land expropriation is allowed for such projects. For that and only for that purpose, the Spatial Plan of the special purpose area for the realization of the "Jadar" project was adopted overnight, so that the locals would be informed soon after that their properties were converted from agricultural and forestry to construction land. According to our knowledge, Rio Tinto has hired a law firm, whose lawyers call the locals and arrange land sale.

ABOUT INCOMES, INSPECTORS AND MINERAL RENTS

Miroslav says at the moment there are five active mining inspectors in Serbia. "It is understandable that in this situation the concern of the residents of Western Serbia is great, especially if we know that, concerning the area and the size of the mine, even ten inspectors wouldn't be enough for the mere control of the process and compliance with the obligations deriving from our laws and environmental risk studies they have made themselves. According to current lithium stock price, we have calculated that for the first ten years of mining, Rio Tinto will have a revenue close to 4 billion euros, whereas, in the best scenario that includes this high projected revenue, Serbia would get 300 million euros, namely around 7 million euros from mineral rent, a 23 million euros from profit tax per year. The problem is that we, as a society, haven't built the strong institutions of the system that would be capable of controlling the company's work, so what might happen is that at the end of the year, the company could give documents with break-even point which would further mean no public incomes from exploitation. It is necessary to change the laws so that mineral rent, at least for lithium, goes up by 20 or 30 per cent at the minimum."

EP ***Who finances the infrastructure needed for such an endeavor?***

Rio Sava Exploration When it comes to infrastructure for the needs of the project, it is financed by Rio Tinto. Financing of the public infrastructure is in the competence of the Republic of Serbia, and it is realized in accordance with the law and valid planning Acts.

Miroslav Mijatović Unfortunately, the infrastructure for the mine's needs will be financed by Serbia, that is the citizens. Of course, no one asked us if we have agreed that our money is spent on such things. The state treasury will finance 13.4 km of Loznica-Valjevo road, which passes by the mine itself and should connect it with the fast road Loznica-Šabac and the highway Šabac-Ruma-Novi Sad and Šabac-Belgrade. I think that the Loznica-Valjevo railway construction in the length of about 80 km will be much important for the company. I don't know whether it is a coincidence or not, but on two occasions, the beginning of this railway's construction was interrupted by the world wars.

EP ***What are the state's obligations, and what are Rio Tinto's in the Jadar project?***

Rio Sava Exploration Obligation of the state is primarily reflected in the implementation of all legally required

Photograph: Rio Tinto, Oyu Tolgoi, underground project

procedures for obtaining permits and control, which are the procedures that apply to all investors. Obligations of Rio Tinto are to comply with all laws and regulations of the Republic of Serbia from all relevant areas such as environmental protection, labor legislation and others during the preparation, construction and operation as well as to pay the duties prescribed by the laws and bylaws, like all other companies operating in Serbia.

It is too early to talk about the concrete figures, that is economic benefits for Serbia and this region because the project is currently in the feasibility study phase.

Miroslav Mijatović I would say that the state's primary obligation is to protect the public interest and the health of the citizens, prior to any economic interest. Our authorities must urgently return this process to the legal framework, annul the hastily adopted Spatial Plan of the special purpose area for the implementation of the "Jadar" project and annul all decisions and solutions that arose from it. No profit could compensate for the harm to the environment and human health in western Serbia. Apart from the fact that the "Jadar" project is technically and ecologically impossible, it is also environmentally unacceptable for the citizens of entire western Serbia, and I am afraid even beyond. The potential realization of the "Jadar" project will bring very small economic benefit, and great socio-economic damage, not only due to hidden production parameters but primarily because fact that socio-economic analysis of the project did not take into account the harmful effects of the investment on human health, working capacities and environment. At the same time, more than 2,000 hectares of fertile agricultural and forest land are lost. This project deprives the citizens of western Serbia of two deficient resources in the 21st century – water and agricultural land.

EP ***The Environment Impact Assessment Study has been announced for months. Will it be finished and what do you think it will state?***

Rio Sava Exploration Within the strategic environmental impact assessment, numerous research and analyses of air, soil, water, noise and others have already been done. Specifically, air monitoring, water monitoring and analysis of drinking water from wells, soil analysis, study on wastewater discharge, study of water supply were performed, and noise monitoring and the research of biodiversity.

So far, more than 23,000 parameters have been analyzed within the biological and physicochemical testing of water and air. Everything was done to fully understand the state of the environment before the activity, predict the impact after the start of the activity and define the measures to reduce the impact to a minimum. Relevant institutions and organizations prepared these studies in accordance with the legislation of the Republic of Serbia.

The environmental impact studies are developed based on detailed technical solutions that are currently being developed, and on the basis of a large number of individual studies in which more than 100 external experts in various fields participated, including 40 university professors. Such studies and analyses represent the documentation basis for the preparation of the Environmental Impact Assessment Study. This comprehensive study will be completed during the feasibility study, which is the current phase of the project's development. All recommended protection measures that will be defined based on conducted studies will be fully implemented in the project solutions. The detailed list of over 50 total prepared and planned studies and reports we have submitted to all non-governmental organizations interested in being informed about the project.

Photograph: Pakt

Miroslav Mijatović According to our cognitions, the company has announced two Environmental Impact Assessment Studies, one for mining and other for the chemical part of lithium concentrate processing. Allegedly it is a request of the Ministry of Mining and Energy and Ministry of Construction, Transport and Infrastructure. If that is really the case, we remind them that the whole process is not in their competence, but in the Ministry of Environmental Protection's competence. Namely, it is impossible to divide the treatment of process waters in this way, when it is known that the process water will be collected in several pools, and one of the pools has a volume of 400,000 cubic meters.

EP ***Why are the studies done at the request of the Ministry of Mining and Energy that is the Ministry of Construction, Transport and Infrastructure, and not as it would suppose to be at the request of the Ministry of Environmental Protection since the Study should be their responsibility?***

Rio Sava Exploration It is important to point out that the various ministries' competence is determined by law, and the companies like ours have no influence on the division of those competencies. When it comes to our project, obtaining permits for such a large project is complex, and it involves several different ministries at different stages.

The Environmental Impact Assessment Studies are conducted in accordance with the Law on Environmental Protection, and the competent ministry, the Ministry of Environmental Protection carries out the adoption procedure. This Study is only one of the preconditions for obtaining permits in accordance with the Law on Planning and Construction and the Law on Mining and Geological Research and their implementation is controlled by the Ministry of Construction, Transport and Infrastructure and the Ministry of Mining and Energy.

EP ***The company regularly organizes Open Door Days in Loznica and Brezjak on which everyone can talk directly to the experts about the project. Since 2019, they have held 19 events on the topic and other issues, and it is announced from the company that over 450 citizens have visited them. What has been achieved in these meetings?***

Rio Sava Exploration At these meetings open to the public, our experts from various fields, talk to citizens about all important aspects of the project: environment, water, waste management, spatial plan, land acquisition and more. As there is great interest, we will organize these meetings in the future as well. When it comes to meeting with non-governmental organizations, we believe that a regular and transparent dialogue should be maintained, and we are pleased that many organizations that have so far shown interest in the project are ready to continue the talks. We are currently in contact with over 10 non-governmental organizations. As far as the PAKT is concerned, we have had quality cooperation with this organization in the past. We will state that they attended the Open Door Day on which the topic was the Spatial Plan of Special Purpose. Through its engagement, the PAKT contributes to the development of the civil sector, and we hope to continue the dialogue.

Miroslav Mijatović I have only attended the Open-Door Day once, but in the last two years, we had at least 10 meetings with the representatives of Rio Tinto and their personal staff. We cut off the communication in the summer of 2020 when we established that it was impossible to obtain any relevant information from the company. All "problematic" topics are concealed by intellectual property and business secret. The end of all future conversations was when they told us that the information on the amount of lithium reserves was a business secret.

EP ***the PAKT says that they will defend the land even with bodies. How do you plan to defend your investment?***

Rio Sava Exploration Rio Tinto unreservedly believes that the realization of the "Jadar" project is in the interest of the citizens, the state of Serbia and, of course, of our company and that is the essential answer to your question. We do not expect that the project will need any "defence" because the facts and figures we are talking about and that we will communicate further on, as the next phases continue to flow, will be enough for the citizens to draw their conclusions.

We have another year of the work on the project documentation ahead of us. We are sure that during that time we will be able to acquaint the citizens with all advantages of the project and answer the questions of the concerned parties, primarily about the environmental protection measures.

Interview by: Jovana Canić

Photograph: Rio Tinto, Resolution Copper

Digitalization of Cities and Buildings Will Contribute to Resolving of the Climate Change Problem

We cannot solve the climate change problem without the transformation of cities and buildings. Up to 70 per cent of the global emissions of greenhouse gases come from cities, while the share of buildings within that number is around 40 or even 50 per cent. The issue is becoming even more complicated due to the fact that the urbanization rate till 2050 will reach 68 per cent, and that is a significant raise concerning actual 55 per cent of a total number of people living today in cities worldwide. The digitalization will be the key transformation driver.

According to the Paris Agreement, by 2050, all buildings have to be net zero-carbon emission and to achieve that goal, a few major standards will have to be applied. The buildings ultra-efficiency is attained by reduction of the energy sources consumption by approximately three times, their complete electrification, while the systems in the building must be ready to rely on renewable energy sources and to work with flexible energy sources located in the building and connected with up-to-date and digitalized networks, to increase the total efficiency of the system.

Additionally, the combination of the efficient, completely electrified and digitalized distribution networks, greater usage of distributed energy production, investment in energy storage and electro-mobility, will be accommodating in management and control of energy demands. The grids' complete digitalization will improve the cities' total energy demands through automatization and notification in real time. The digitalized networks will also foster the integration of renewable energy sources into the system and facilitate the transition to electro-mobility and distribution of the batteries for energy storage and EV charging.

The facility that is the symbol of this ultra-efficient electric and digital future of the cities is T-Mobile Arena in Las Vegas, the joint project of the companies AEG and MGM Resorts International, in cooperation with Schneider Electric. Having the LEED Gold certificate, T-Mobile Arena uses the Schneider Electric's EcoStruxure platform in the whole building to establish the complete digital connection and continual control. Having been open for twelve months, T-Mobile Arena has saved 18 per cent of electricity, and this building stands for the sustainability model we should be following.

Photograph: Schneider Electric

Carport with 8 parking lots and solar power plant with 20 kW capacity

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THE PLAN TO MAP EVERY CORAL REEF ON EARTH – FROM SPACE

In October 2020, Australian scientists found a detached coral reef skyscraper on Australia's Great Barrier Reef—nearly 500 meters tall and 1.5 kilometres wide — that exceeds the height of the Eiffel Tower and New York's Empire State Building. This was the first discovery of its kind in 120 years.

It also signals a challenge – that we know relatively little about what lies underwater, given the high costs and still-nascent technology of ocean exploration.

To better understand the mysteries of the world's oceans, a team of scientists is using satellite imaging to map out, in unprecedented detail, one of the planet's most iconic underwater ecosystems: the shallow coral reef.

"The atlas is meant to improve our understanding of our coral reef systems and drive better evidence-based policies to protect corals," says Chuck Cooper, Managing Director of Government and Community Relations at Vulcan.

Coral reefs foster one-quarter of all marine species and provide food, livelihoods, security and recreation for at least a billion people. But, pollution, overfishing and heatwaves due to climate change are threatening their existence.

Most coral reefs are still unmapped. Scientists are aiming to monitor, in real-time, these biodiverse underwater worlds to protect and restore them. Further, they want to identify patches of coral that are naturally more resistant to climate change. These "refugia" may hold secrets to learning how to mitigate the impact of warming seas on coral reefs.

The atlas, available to the public, uses satellite technology to create high-resolution images of corals that are then processed into detailed maps. The maps capture features that will allow scientists and the conservation community to compare coral reef health over time and understand the pressures reefs are facing.

Source: UNEP

SERBIA COMPLETES MODERNISATION OF WATER AND WASTEWATER NETWORK IN SUBOTICA

Serbia's northern city of Subotica is now equipped with a modern water and wastewater network and facilities thanks to a decade-long engineering endeavour supported by the European Bank for Reconstruction and Development (EBRD), the European Union (EU) and bilateral donors under the Western Balkans Investment Framework (WBIF).

The new network improves the quality of water supply, wastewater disposal and treatment services in Subotica. It also allows the city with a population of 140,000 to connect around 12,000 more citizens to the sewerage network, bringing coverage up to 60 percent of the population.

The improved wastewater treatment system also prevents the pollution of Lake Palić, one of the top five tourist destinations in Serbia and located on the outskirts of Subotica.

In addition, the new system has the technological capacity to produce energy from waste and currently produces 25 to 40 percent of its total energy needs.

The new infrastructure makes Subotica one of the first cities in Serbia with modern water and wastewater infrastructure in line with EU standards. It is estimated that only around 10 percent of wastewater in Serbia is treated and only around 46 percent of the population is connected to the sewerage system. In many cases, the existing infrastructure is also outdated and in need of investment.

The EBRD is a leading institutional investor in Serbia. The Bank has invested more than EUR 6.3 billion across 277 projects in the country to date. The EBRD is focusing on support for private-sector development, the improvement of public utility services and on the overall transition towards a green economy.

Source: EBRD

Photographs: (bottom left) Pixabay; (top right) Unsplash/Milos Prelevic

YOUNG CHAMPIONS OF THE EARTH TURNING PLASTICS INTO PAVING IN KENYA

A Kenyan entrepreneur is being lauded by the UN for developing a machine that recycles discarded plastic into paving stones for use in construction projects.

Nzambi Matee's invention not only keeps plastic out of landfill sites, it also offers a cheaper alternative to conventional concrete paving slabs.

Gjenge Makers Ltd is a sustainable, alternative and affordable, building products manufacturing company. Gjenge Makers has cut a niche as a manufacturing trailblazer in the provision of beautiful and sustainable alternative building materials. Currently we are producing eco-friendly pavers that are made of a composite of recycled waste plastic and sand. We have partnered with different manufacturers of plastic bottle tops and seals in the beverage and pharmaceutical industries here in Kenya, from whom we collect offcuts and scraps. This is amalgamated with discarded single use plastics that our informal waste collectors deliver to us, which we jointly use to produce the pavers, while providing them with a stable income. We have financially empowered over 112 individuals the majority of whom are women and youth groups who are our partners in supplying the waste plastic and the pre-processing stage of our production process.

The alternative building products space is a very new industry and therein exist a myriad of opportunities. At present we have more demand than we can supply and this is the genesis of our biggest challenge, which is low production capacity. To date, we produce about 500-1000 bricks per day, recycling close to 500 kilograms of plastic waste a day.

The UN Environment Programme (UNEP) says every minute, a million plastic bottles are purchased across the world, the majority of which are not recycled.

Source: United Nations

A REBOUND IN GLOBAL COAL DEMAND IN 2021 IS SET TO BE SHORT-LIVED, BUT NO IMMEDIATE DECLINE IN SIGHT

After a major drop in recent years, global coal demand is forecast to rise by 2.6 percent in 2021 before flattening out to 2025.

A global economic recovery in 2021 is expected to drive a short-lived rebound in coal demand following the major drop this year triggered by the Covid-19 crisis, according to a new report from the International Energy Agency.

However, there is little sign that the world's coal consumption is set to decline substantially in the coming years, with rising demand in some Asian economies offsetting declines elsewhere. As coal is by far the single largest source of global energy-related carbon emissions, the trends outlined in the report pose a major challenge to efforts to put those emissions on a path compatible with reaching climate and sustainable energy goals.

"The Covid-19 crisis has completely reshaped global coal markets. Before the pandemic, we expected a small rebound in coal demand in 2020, but we have since witnessed the largest drop in coal consumption since the Second World War," said Keisuke Sadamori, the IEA's Director of Energy Markets and Security. "The decline would have been even steeper without the strong economic rebound in China – the world's largest coal consumer – in the second half of the year."

"Renewables are on track to surpass coal as the largest source of electricity in the world by 2025. And by that time, natural gas will likely have taken over coal as the second largest source of primary energy after oil," said Mr Sadamori. "But with coal demand still expected to remain steady or to grow in key Asian economies, there is no sign that coal is going to fade away quickly."

Source: IEA

Photographs: (middle left) Pixabay; (top right) Unsplash/Brian Yurasits

FOUR LESSONS FROM NATURE TO BUILD A CIRCULAR ECONOMY

The benefits to the planet are clearer than ever: by decoupling economic growth from the use of scarce, natural resources, we can consume without exhausting our planet. The business opportunities are massive. Let's explore four lessons from nature that is already being applied via CE business models and solutions.

1. Renew and regenerate. A classic example of circular economy in nature is the cycling of resources – water, carbon, minerals, etc. – back into new or existing systems.
   The fast fashion industry struggles with waste. Today, less than 1 percent of clothing is recycled at end of use and more than USD 500 billion in value is lost annually.
2. Protect and extend. Plants and animals have long been studied for their ability to protect themselves and their environment.

3. Creating value from thin air. Air plays a critical role in our natural ecosystem, and innovative companies are starting to look at how the air can be a new source of value.
4. Turning even the most challenging waste into value. The concept of "waste" doesn't really exist in nature. Dead leaves and animal droppings, for example, are critical fuel for new life. Innovative businesses are also looking at how we can tackle challenging "waste" at end-of-use.

Solutions inspired by nature are certainly encouraging. They benefit our economy, planet and society. They show us that we can combine nature, technology and human ingenuity to fuel our growing world, while progressing equality and protecting a thriving planet.

Finally, we need people – consumers, innovators, investors, policymakers – that value and demand these circular systems. As with nature, balance can only be achieved when we all work together for a brighter, more prosperous future.

Source: World Economic Forum

THIS ELECTRIC CAR BATTERY TAKES THE SAME TIME TO CHARGE AS FILLING UP WITH GAS

An electric-car battery that can be charged in five minutes, the amount of time it takes to fill up a tank of gas, has been produced for the first time in a factory in China. The new lithium-ion batteries were developed by the Israeli company StoreDot and manufactured by Eve Energy in China. The company has produced 1,000 sample batteries compliant with li-ion battery certifications, StoreDot said.

The samples will be used to showcase the company's technology to prospective buyers and investors looking to get a jump on the electric-vehicle market, including BP, Daimler, Samsung Ventures, and TDK.

For many drivers, electric cars do not cut it for long trips because of the amount of time it takes to charge the vehicles. Electric-car batteries on the market can take anywhere from 30 minutes to 12 hours to charge, though a typical EV takes about eight hours to charge from empty to full, according to Pod Point, a manufacturer of electric-vehicle chargers.

Electric cars average about 250 miles of driving per charge. With a battery that could charge faster, drivers would not be range-bound and could take EVs on longer trips.

While lithium-ion batteries use graphite as an electrode, the StoreDot battery works faster by replacing graphite with semiconductor nanoparticles that allow ions to pass more easily and quickly. The company expects to replace this electrode with silicon, a much cheaper component, by the end of the year.

StoreDot's five-minute battery will likely not enter the mainstream market for many years, as mass production will not be available for quite some time as the company continues to hone its technology.

The startup has experimented with fast-charging batteries in the past for phones, drones, and scooters. In 2014, the company developed a prototype of a charger that could boost your phone's battery from dead to fully charged in 30 seconds.

Source: World Economic Forum

Photographs: Pixabay

NEW YEAR'S RESOLUTION? SLIM YOUR CARBON FOOTPRINT BY A TONNE IN 2021

Get fit, quit smoking, eat healthily. Most years begin with good intentions that often fall by the wayside as life gets busier again.

But how about trying a different challenge for 2021 which goes beyond personal improvement and benefits the planet too?

Endorsed by the United Nations, the campaign 'Cut a Tonne in '21' launched with a report detailing tangible ways to lead a more sustainable life and reduce your personal carbon footprint by one tonne a year, helped by a web-based tool.

Is the goal achievable?

Cutting a tonne of CO_2 over a year can be done by making a few big changes, such as going car-free and installing a heat pump, or with a wider selection of small steps like using lids when cooking and drinking plant-based milk, the report said.

"The first tonne is the easy tonne for most of us – but for some it will be more difficult due to cost and degree of effort," said Tim O'Riordan, professor emeritus of environmental sciences at the University of East Anglia.

Going further gets trickier.

Most users can reach a "Paris-aligned" lifestyle by cutting down on consumption and switching to more sustainable habits.

But reducing your emissions to net zero requires additional steps like paying to plant trees or protect forests – projects often led by green charities, said Hand.

And for individuals' one-tonne-a-year carbon saving to have a real impact, millions of people must get on board over the next decade, she added.

Source: World Economic Forum

THIS ZOO JUST SAVED ONE OF THE WORLD'S RAREST TURTLES FROM EXTINCTION

The Northern River Terrapin (Batagur baska) is a freshwater turtle once common in the waterways of southwest India, Bangladesh and Myanmar. It has been considered a local delicacy, which is what led to them being hunted until only a few individuals remained in captivity.

But ten years ago, a team from Vienna's Schönbrunn Zoo, working with conservation groups and Bangladesh's Forest Department, launched a project which has seen the terrapins successfully reintroduced into the mangrove forests of the Sundarbans on the country's south coast.

The project started when local conservationist Rupali Ghosh bought a terrapin dealer's entire stock to save them from slaughter.

Females are traditionally the most prized for their meat. "Fishermen can get up to $365 for a female – that's twice the average monthly wage in Bangladesh," says the Zoo's turtle project leader Doris Preininger. "They are often kept as talisman's in village ponds. Traders can get three times that amount by selling the meat and the shells on the black market," she adds.

They are believed to live for up to 100 years, grow up to 60 centimetres long, weigh up to 20 kilogrammes and, as one of the most endangered species of turtle in the world, are protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Today, the project is producing 250 hatchlings at its nursery in Bhawal National Park. When the terrapins are old enough, they are taken to the coast and released.

The terrapins now have some unlikely human allies in their fight for survival. Local fishermen, who once hunted the freshwater turtles, are now employed to help protect them. They are part of a team who have helped make this a successful species conservation project.

The good news is the released terrapins are putting on weight – which proves they are feeding successfully – and extending their range. Juveniles have also been found, suggesting they are breeding again in the wild.

Source: World Economic Forum

Photographs: (left) Pixabay; (right) Wikipedia

FOR A QUICK PRINT OF THE NEW HOME, STOP BY ČAČAK

NIKOLA RAKIĆ was born and raised in Switzerland. He returned to Serbia in 2001 to the Faculty of Philology, and then entered the master studies that he partially finished in Zurich. He worked in a Swiss giant until 2014 when he returned to Serbia and continued to improve his knowledge in programming languages and the world of robotics. He founded the company Natura Eco in 2020 and chose the Science and Technology Park in Čačak as his base.

Nowadays, the construction industry must progress rapidly to follow world trends. Constructors and manufacturers of construction machines are constantly working on improving technical capabilities to meet all the requirements in modern facilities construction. This industry is facing significant challenges since it is necessary to protect the environment by reducing non-renewable natural resources. However, the greatest attention is paid to technologies that will enable removing harmful construction materials from use.

Whenever someone mentions construction, the first association is mainly concrete. It is the most commonly used artificial material in the world whose production requires a large amount of energy and is a significant environmental pollution source. Construction waste generated by the construction and demolition of existing buildings is at the very top of today's biggest environmental problems. Currently, there is no solution to the ecological disposal of this waste. It is dumped in landfills. With the increase in the number and size of landfills, most often wild, arable land is almost irretrievably lost.

It is precisely why the construction industry representatives focus on reducing energy consumption and the level of pollution and finding ways to reuse old concrete. Developed countries have been working for years on programs and laws that reduce the relentless depletion of natural resources. Through various projects, they encourage recycling, development of alternative technologies and the use of secondary raw materials.

Creating objects using the 3D printing method is a landmark when it comes to construction. The development of technology in the 21st century surpasses perhaps the boldest forecasts because it sounds almost unbelievable that we will forget about traditional ways of building in the near future. This new way of building is a method of 3D printing of buildings that shortens construction deadlines, reduces the cost of production, and thanks to precise drawings and calculations, and there is simply no construction waste. You read that right - there is no waste.

Add to that the fact that a special mixture that does not emit harmful gases is used in the construction of buildings using this method, and we can freely say that these are projects of the future. And while the news about innovative technologies mostly comes from abroad, the exception that confirms the rule comes to us from Čačak. The invention of Nikola Rakić from the company Natura Eco is a CNC machine that will be able to print a concrete object of 100 square meters in an incredible 15 hours.

This young man became interested in construction very early, and numerous unfinished houses drew his attention throughout Serbia. He says that he has started thinking about how to help those who do not have enough funds to make ends meet since then.

"I have always been interested in artificial intelligence, programming languages and robotics, so I decided to learn more about

According to current calculations, the machine can pour **20 to 40 centimeters of the wall in one second**, which leads us to calculate that in some 15 hours of work, a 100-square-meter building with all the interior walls can be finished

Photograph: Unsplash/Park Troopers

Nikola points out that one of the priorities is **for people who work on construction sites to spend less time in dangerous places**, such as scaffolding, and to perfect themselves as much as possible for new jobs

the 3D printer systems themselves, which include G-code, automation, mechanics, etc. I am not an expert, but I work every day to widen my knowledge. I am currently committed to advancing and developing the largest CNC machine in the Balkans that has advanced software. With its help, we will have the opportunity to print each segment of a given object and also much more than that. Solutions for the extruder will provide both greater efficiency and a greater degree of automation of the printing process of the object", explains our interlocutor.

According to the given design and recipe of a well-known French company (which meets all ISO standards for the mixtures used for construction), the machine can print all the desired objects.

Experts from Natura Eco are working to make all their machines powered by green energy because they believe that this is the only real way to justify their name. Together with experts in this field, they are developing a solution for a special mixture in which cement would not be used, since the process of obtaining it has a detrimental effect on the environment. The production of one ton of cement leads to the emission of one ton of carbon dioxide (CO_2).

"The mixer we are currently working on will enable us to transport the mixture itself, which is necessary for printing objects, to any destination. We analyze processes and test. According to current calculations, the machine can pour 20 to 40 centimeters of the wall in one second, which leads us to calculate that in about 15 hours of work, a 100-square-meter building with all internal walls can be ready", explains Nikola.

The process of building the facility itself will be largely automated, which was the main goal from the start. It is predicted that only a few workers will be needed on the construction site, at least initially. According to estimates, a certain part of the first phase of construction will require two, at most four people who will monitor the work of the machine. Nikola points out that one of the priorities is for people who work on construction sites to spend less time in dangerous places, such as scaffolding, and to perfect themselves as much as possible for new jobs. "We have ambitious plans for the future. As kind of pioneers in this field, we have a responsibility not only to our mission and visio, but also to the citizens of Serbia and the world, because of the trust they have placed in us. We signed a

Memorandum with the city of Čačak on the construction of 150 facilities that will permanently resolve social housing issues for members of the Roma community. It is anticipated that we will start with the realization of this project in the third quarter of 2021. The construction of a solar power plant in Čačak is also planned for next year. The power plant will produce a maximum of 523 MW hours per year, which means that we will no longer produce over 200 tons of carbon dioxide emissions per year, which is like we have planted more than 9,000 tree seedlings. We were pleasantly surprised by the great public interest in our project, although the product has not been launched yet. We are glad that people have recognized the benefits of what we offer. We currently have 12 orders. Some are interested in machines, some in facilities, and we were surprised by the fact that we have demand for more facilities at the same time", says our interlocutor and adds that the support they

have at every step from the Science and Technology Park in Čačak is important to them.

Apart from the speed at which the facilities will be built, another thing that interests everyone is how much the price per square meter will cost. They are working on making the price per square meter for the first phase realistic but competitive with current market prices since clients determine the final price per square meter with their project.

"The main advantage of 3D construction printing is speed and cleanliness: 50 square meters (in the first phase) with current solutions will be ready in a maximum of 20 hours, but we plan not to exceed 10 hours in the future. There is no waste or unused material. We achieve that by knowing in advance what the construction project will look like, and thus how much our concrete mix is necessary", said Rakić.

Natura Eco wants to combine the old with the new, faster, more efficient, more stable and greener construction and for our country and the entire planet, to have a cleaner environment and healthier air. Nikola also wants the traditional construction to be improved, not to be forgotten because it has extremely high-quality aspects. The old houses of our grandmothers and blankets made of straw, reeds and mud still stand today, says Nikola, which speaks volumes about such a construction method.

"Natura Eco machines already have a huge degree of independence; the control logic is very advanced and allows off-grid and off-sight control. Although I would not like to go too far for the Smart City project, I can say that the Natura Eco communes, or Necommunity, have or will have absolute autonomy at some point. Until then, it will take a lot of work and patience", adds Nikola Rakić.

If we take into account that, according to the United Nations, as many as a billion people in the world do not have an adequate place to live, maybe Nikola, thanks to his invention, is on the right path to change that exactly from Serbia.

Milica Radičević

charge&GO PLATFORM

We live in a time when it is necessary to precisely plan every segment of life, going to work, meetings, shopping... For many, the car is not just a means of transportation, but a machine without which it is impossible to do everything that the modern way of life imposes. However, more and more cars on the streets bring increased emission of greenhouse gases.

All photographs: MT-Komex

The platform charge&GO networked electric car drivers and owners of EV chargers, and MT-KOMEX is the operator of the network. By using the platform, one can manage the energy power and consumption on the station systems themselves, and the remote check-up of each charger is also one of the possibilities of the charge&GO system

According to the International Council for Clean Transport (ICCT), road traffic accounts for about 20 per cent of global pollution. Air pollution has become a universal problem, and a growing number of countries are working intensively to reduce it and completely neutralize it.

In aiming to reduce the exhaust gasses coming from traffic, the states pass the laws to limit the purchase of cars with ICE (internal combustion engines). Thus, the United Kingdom, Germany, Ireland, and the Netherlands have devised the strategy to ban the sale of new cars with internal combustion engines by 2030. Norway has a very ambitious plan – to accomplish a full transition to cleaner forms of transportation by 2025, while most is expected from China, which, according to some forecasts, will make a sudden transition to full electrification of traffic by 2035.

Subsidies and many other benefits encourage the purchase of electric and hybrid vehicles. Many governments around the world are trying to improve air quality and protect the environment in this way.

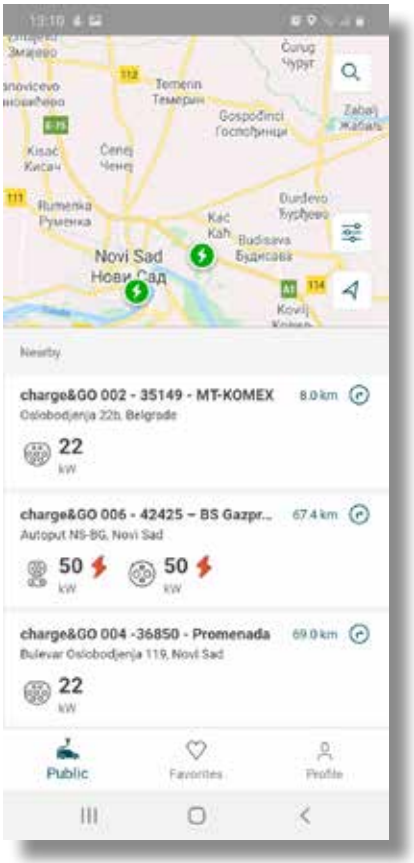
Serbia is slowly beginning to follow world trends. For subsidizing electric and hybrid vehicles' purchase, our Government has set aside 120 million dinars for 2020, and electric vehicles can more often be seen on our streets. It is necessary to provide enough chargers for the drivers of these cars to function smoothly in traffic, without having to worry that they will drive all the way down to an empty battery. The leading men of MT-KOMEX realized that they could offer networked EV chargers as the best service for the drivers to find an ideal place to recharge their cars fast and easy.

Charge&GO platform is everything an electric car owner needs. It is the first regional digital platform and application that remunerates the use of the charging spot for electric vehicles, which arose in partnership with the global Virta system form Finland.

The charge&GO system is designed to give e-powered car drivers the ability to find a charging point fast and easy, authorize themselves, plug in a vehicle when needed, stop charging and continue their journey. Registered and unregistered users can use this platform, and in addition to chargers in Serbia, they have more than 100,000 chargers in 28 countries at their disposal. This system provides the possibility for foreigners to see the chargers in Serbia. At the same time, users registered in our country, through the partner network can find the chargers that are in the system, which includes internal and external roaming network of charging stations.

"The platform charge&GO has networked electric car drivers and owners of EV chargers, and we are the operators of the network. By using the platform, we can manage the energy power and consumption on the station systems themselves, and the remote check-up of each charger is also one of the possibilities of our system", explains Miloš Kostić form MT-KOMEX.

DOWNLOAD THE APPLICATION AND CHARGE YOUR ELECTRIC VEHICLE IN A FEW STEPS



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Platform users can charge their electric vehicles fast and easy while having full control over the entire charging process, whether being a registered or unregistered user. The whole charging system is quite simple – the first step is to find a charging point through the platform or mobile application. At mapa.chargego.rs you immediately get information which station is free to use. At the charging point, it is necessary to authorize by using an RFID card or mobile phone, either by scanning the QR code or entering the charger's ID number. The charging session starts the moment you connect the cable to the selected charging point. You can follow the charging either on the platform or the application, and when you want to end the process, it is necessary to finish

With the charge&GO app on your smartphone, you can find the nearest place to charge your electric car with either slow or fast chargers

the process the same way you started it. The last step is to unplug the cable and to continue your journey.

If you use the system without registration, you need to start charging by scanning the QR code or typing the page ID number on the platform's webpage punjenje.chargo.rs. When you do that, you will get the accurate display of a price per minute and the terms of use. You can change the language, and then it opens the page for entering the information of credit card. In the end, you choose the type of connection. You get the information on the amount of energy used and the duration of the session. Upon finished charging session you receive an email with an electronic invoice.

"The owners of electric vehicles who choose the option to register on the charge&GO system get a number of benefits, such as the better price for charging, both in the country and in the partner network, and can also choose between prepaid and post-paid options. It is usual for individuals to use the prepaid option, while corporate users have the opportunity to pay for our services on a monthly and quarterly basis", adds Kostić.

The registration process on the charge&GO system is very easy and can be done by simply registering on the portal or installing a mobile application. You receive a welcome email in which you get the link to verify your account, and once you confirm it, you can access the following steps. The application or platform will guide you, and once you enter all the required data, your journey into the electric future can begin!

With the charge&GO app on your smartphone, you can find the nearest place to charge your electric car with either slow or fast chargers. You can manage the user account you have created and preview the history of all charging sessions. You can check the charger's status at any time on the charger map, and the app makes all the following steps easier – to start charging, track the charging time on your phone and stop the session when needed.

The platform users can use a roaming network with more than 100,000 chargers. It is important to know that all users of the Virta platform have the right to use intern roaming without additional fees. When it comes to external roaming stations Hubjet and Gireve, charging vehicles can be done smoothly, but at an additional cost.

The partner of the charge&GO system is the company ABB. In front of their headquarters in Belgrade, a 50kW charger is installed, and it is integrated into the charge&GO system. The network also includes charging points at Gazprom gas stations in Stari Banovci, Velika Plana and Novi Sad, and in front of the company Termovent in Kladovo. There are also 5 chargers in Plaza Kragujevac shopping centre at your disposal. The same number of EV chargers are available at Promenada Novi Sad Shopping centre. Very soon, 6 new chargers in LEDI hub in Stari Banovci will be integrated into the charge&GO system.

"Our customers can be completely confident in our services because they have technical assistance, customer service with hotline and mobile teams for urgent technical support at their disposal 24/7. Besides, there is a Support/Frequently Asked Questions page on the charge&GO website where you can find a large amount of useful information, as well as the complete documentation with instructions", adds Kostić.

Prepared by: Milica Radičević

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THERE ARE NO SMART CITIES, JUST MORE OR LESS SMART PEOPLE

People are constantly trying to improve the quality of their lives, and more or less succeed in that. However, as long as there is hope or a feeling that such an effort exists, there is also a social consensus about living together in a city or state, trust in the goodwill of other people around you and in those who decide on various issues.

For a start, it would be very nice to accept that our cities should have a functional sewage system and successfully solve the problem of all types of waste. Most of the earlier civilizations, since ancient times, and even earlier, have tried to solve these problems in various ways. In well-arranged urban systems on both sides of the Atlantic and Pacific Oceans, it is impossible to start building the most ordinary house if there is no clearly defined location with a connection to the sewer, water, electricity, telecommunications, etc. It seems to me that we have not yet taken any place in that "order for development", because we still have doubts whether it suits us or not. I believe that states and civilizations develop only when they realize that the city is more important than the village and that it is completely natural for urban development to be balanced by gradually abandoning and extinguishing the village, at least the idealized and fairytale village we systematically portray, and in which of course there is no sewerage and essential services that enable residents to live a safe and prosperous life.

I do not believe that our usual infrastructural problems will be solved with the advancement of technology. Advances in technology will not solve anything on their own if the residents do not want to solve the problem freely and in unison beforehand. For a start, Belgrade should build a sewer at least like the one in ancient Rome, abandon the stinking coal and half-decomposed cars, and discover the beauty of other,

beautiful and enchanting smells of Avala forests, Danube rapids or Srem meadows.

My personal feeling is that the extensive use of the adjective "smart" neglects or diminishes people's role in positioning technology in society. We have cities in the world today that have engaged the most modern technology in various aspects of their operation. Still, we also have cities that function in a seemingly very traditional way, even in the most developed countries. Yet, we can find examples of successful and less successful. In any case, the measure is the degree of satisfaction of the inhabitants with life and the availability of the services they want to use. Decisions are still made by people, and let's not be fooled that buying even the most modern equipment and software will eliminate the risk of harmful decisions.

There are no smart cities, just as there are no smart houses or apartments. There are more or less smart, educated, and responsible people who use the available technology in a better or worse way. However, the biggest advantage of smart cities is that people dream about them. That is their biggest flaw because the illusion is created that someone else will, that is something else, mysterious, technologically complicated, like a miracle, will suddenly appear here and with the swing of a virtual magic wand crush all the problems and make us happy, lazy and carefree. In my visions of the future, at least in this area, there will be no big, busy, sky-high cities, however exceedingly smart they might be. The city, as we imagine it, is slowly and inevitably ceasing to be a point of aggregation of people, culture, science, technology. The future will be surprisingly different from our imaginative drawings in children's notebooks.

But, so that you don't understand me as an anti-technological traditionalist, we have a lot of wonderful, creative, brilliantly educated people whose heads are full of dreams, their eyes are full of visions, and their hands are skilled in creating the beautiful and the impossible. We can do anything, but for a start, it is important to decide and start, and not only to buy and introduce new technologies without

VIGOR MAJIĆ, director of the Petnica Research Station, was born in 1957 in Opatija. He has been at the helm of this unique institution of extracurricular education for almost 40 years. He has published dozens of professional papers in domestic and international journals.

the will and preparation to use them purposefully, but to fight to serve us effectively to solve problems and eliminate troubles.

For young people in our country to have the knowledge and opportunity to contribute to the development of smart cities, it is best to be educated at good, modern, future-oriented universities, as there are dozens across Europe and even more in America and East Asia. There, they will meet a positive, stimulating and creative mix of cultures and styles, an atmosphere of searching for the new, and the knowledge and skills needed to create, develop and nurture that new actuality. Somehow it seems to me that we do not

Photographs: (on the previous side and left) Pixabay; (Majić) courtesy of Vigor Majić; (right middle and bottom) Unsplash/Jeswin Thomas

have a critical amount of people in our education system that could impose such an approach as dominant. We have brilliant individuals, supreme minds, but somehow lonely, few in number, unconnected, detached by vanities and discouraged. It is by no means the best place for new generations to get the necessary impulse of energy and space for their creative enthusiasm.

Many people are indeed leaving. The successful ones can be followed. Their traces are dazzling, projects and results are visible, echoing. Some turn to some other areas of creativity and achieve success there, at least on the level that they are satisfied with that, which is the most important thing. Unfortunately, some of them do not manage to cope in a world full of energy and challenges and, after a lot of torment and wandering, they settle down in some modest and quiet place where their existence is most secure. Those who stay also show a lot of initiative and desire to create something significant. However, there is not enough desire to start one's own business in our country, at least in relation to the developed countries of Europe. My impression is that they are discouraged during school. The school, whether teachers want it or not, suppresses confidence in one's strength and entrepreneurial spirit, while at the same time quietly glorifying occupations in the public service. This petty-bourgeois culture, which is very dominant in the school system, obsessed with titles, academic titles, and state functions, does not recognize courageous entrepreneurship, innovation, and vision for the future.

On the other hand, it seems that young people who come to Petnica are more fascinated by smart people than smart machines or cities. If the entire social framework was positive, we would not need a single Petnica. Simply, where there are good and quality schools, independent, flexible, capable and willing to constantly change and innovate their programs and activities, schools with modern teaching aids, rich libraries and dedicated teachers - there

ABOUT THE CAUSE OF AIR POLLUTION

"I have been talking about pollution and my assessment of the causes for several years, the last time I talked about was before the appearance of coronavirus in our country, so it is painful for me to talk about it again. I hand over the microphone to local experts, waiting for them to say something, to confute me, or add something new. They receive a nice salary at universities for God's sake, so I rightly expect that doctors, engineers, experts in heating, electricity, air conditioning, and who knows what else, say something about what I, a sad provincial layman, said. Despite everything, whatever they say, I firmly believe and think that lignite mines should be closed, horrible excavations should be buried and greened."

is no need for Petnica. Petnica is a substitute, a prosthesis, an auxiliary tool for impoverished and forgotten education, for a society that does not have museums of science and nature, where there is no free and competitive flow of ideas and cultures of discussion and exchange of thoughts, where miracles and processes that happen worldwide are not recognized. As long as we have poor results in PISA tests, as long as the education budget is smaller than the military budget, as long as our priorities are luxury stadiums and not high-tech universities, as long as 80 per cent of the best students pack their bags, we simply have to try to cure the situation, at least on a small scale, at least very modestly, at least with something like Petnica.

Petnica is currently struggling to survive. This year we worked in impossible conditions. We have lost all international programs; we have not found understanding and support from the state. I think we did a lot of very good courses, seminars, workshops, live, not online, in a normal way and how it should be done. We are now working on the design of activities for the next year, for which no one can predict with certainty what it will be like. We are encouraged by the constant great interest of students to come and participate in one of our programs and the great enthusiasm of colleagues prepared for many risks and difficulties to organize the best possible activities.

Vigor Majić

Photographs: Petnica

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SMART TECHNOLOGIES IN THE SERVICE OF YOUR COMFORT

There is no doubt that we will remember the passing year for a long time, and among the numerous consequences caused by the Covid-19 virus pandemic is the global economic downturn. Although many branches of the industry suffered huge losses, the construction industry was working at full speed. Residential and business buildings were built all over Serbia. And that's not all! Modern characteristics characterize the buildings that have sprung up, and many have been labeled "smart" buildings.

The Law on Housing and Maintenance of Buildings determines that energy efficiency improvement is in the public interest. Still, the research data shows that as many as 85 per cent of residential buildings in Serbia do not meet the minimum requirements for energy efficiency.

If we talk about the impact on the environment, carbon

dioxide emissions remain the biggest problem, and cities are considered the main culprits. Although urban areas globally occupy only 2 per cent of the planet's surface, as much as 70 per cent of carbon dioxide emissions and two-thirds of the world's energy demand come from cities, states C40.org[1]. Buildings cause nearly a fifth of global energy-related greenhouse gas emissions, according to the Intergovernmental Panel on Climate Change (IPCC). The question is, what can be done to maintain comfort while reducing energy consumption.

With its solutions, and especially with home automation technology, ABB helps us in our efforts to achieve comfort and savings as if we were sustainably developing our cities.

When it comes to houses, ABB's free@home® solutions are used to transform houses or apartments into smart homes, which contributes to making everyday life easier and safer, as well as reducing energy consumption in the building by up to 30 per cent. ABB-free@home® combines all the useful functions of comfortable home automation and intercom communication system into a single system that is easy to understand and manage.

With ABB-free@home®, you can control the entire home, as usual, with a switch. It's even more convenient to do it using a smartphone, tablet, or computer, via touch or voice control. Thanks to cooperation with ABB partners, homeowners can also control applications such as Amazon's Alex, Philips Hu or Sonos speakers via the ABB-free@home® solution.

Blinds, lights, heating, air conditioning and intercom communication system can be operated separately or together. Blinds throughout the home can be programmed to activate automatically according to the positions of the Sun. The lights in the bathroom and the radio in the kitchen can be turned on at the push of a button and all the lights and devices that are deactivated via a switch when leaving the house.

For more efficient energy management, individual room temperatures can be fully automated depending on the owner's daily routine. The heating can be turned off or adjusted if the window is opened or if no one is at home. Each room can be programmed according to certain wishes, thus providing optimal comfort.

Whether you are equipping a new building or renovating an old property, installing the system is flexible and easy. With wired or wireless sensors, actuators and sensor-actuator units and configuration and operation via the application, the system is futureproof protected, thus providing electricians with the easier installation of the system, and end-users with easier use. The intuitive user guide for the application allows the ABB-free@home® configuration to be done very quickly via a tablet or computer. With

Photographs: ABB

the app, configuring and working with the ABB-free@home® system is as easy as surfing the Internet. To begin with, a draft is created for floors and rooms. Then all available devices in the rooms are activated and arranged on the appropriate floors and rooms.

Today, ABB's free@home® solution has more than five million components installed worldwide. As the global smart home market is expected to grow to $ 135.3 billion by 2025 from $ 78.3 billion in 2020, according to Research and Markets2, a smart home is indeed a key element in the development of a smart, green city.

As far as Serbia is concerned, in early December 2017, the innovative home automation system ABB-free@home® was presented, which offers endless possibilities for creativity. The system allows the user a large number of functions and options, as well as upgrading the system through use. It is the only solution to the home automation market.

ABB is enrolling the Novi Dorćol residential and business complex project in its portfolio, which is currently in the first construction phase of construction. About 220 housing units will be equipped with smart home automation.

Thanks to regular updates, the ABB-free@home® system is getting better over time. Comfort and simplicity are the basis of this technology, so you can prepare in advance a pleasant atmosphere for your return home by adjusting the level of brightness and temperature in the environment.

Preparing or modifying via the ABB-free@home® system is as easy as child's play. The optimal room temperature can be adjusted according to the user's individual wishes, depending on the time of day and the function of the room - and all this even before you step into the room. It is important to mention the ECO function that enables the entire system's economical and environmentally friendly operation. During the winter, with the help of this system, the heating can be switched off automatically when the window is open, resulting in a reduction in energy consumption, and lower bills.

Installation of ABB-free@home® is very simple and takes an incredibly short time, saving money for the homeowner and making the job easier for the electrician. Once the system is installed, the user can change the settings himself, using a computer or tablet at no extra cost. So installation and programming have never been easier. The price of the application? Another convenience. The application is entirely free. Getting to know the system does not take too much time, it comes down to simple videos that are available to watch on the ABB-free@home® website.

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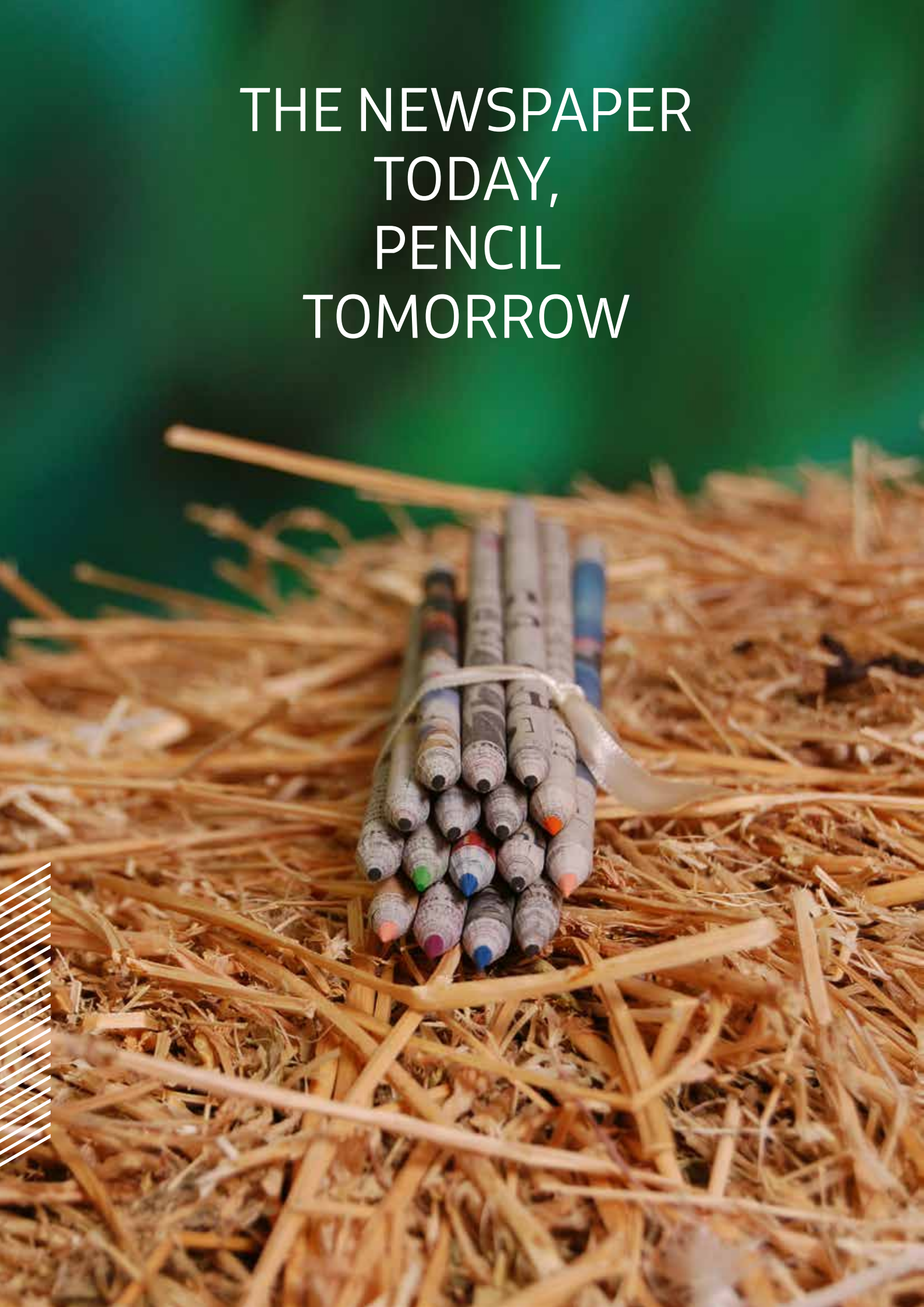
THE NEWSPAPER TODAY, PENCIL TOMORROW



One film encouraged a married couple from Smederevska Palanka to change their business. It gave them the idea to step out of the hospitality industry into production based on the principles of the circular economy, in the very branch of production where there is no competition at all. This is a story about the NewPen company, an unusual story about pens and crayons that, as things stand, will be in the hands of children around the world.

Dragan Marković is a co-owner of the NewPen company, which creates stationery from recycled materials and old newspapers. His business beginnings are not at all reminiscent of the direction in which his career is currently moving. After ten years of working in the hospitality industry, he and his wife decided to dedicate the future to production.

"We did not want to start one of the businesses that there are too many on the Serbian market. We were waiting for the right idea to implement. One night we watched the movie 'The Strange Life of Timothy Green', and that was it! In the film, one of the main characters works in a pencil factory that is slowly shutting down. However, he comes up with the fantastic idea of making pencils from leaves instead of wood. It soon dawned on me that no one in our country produces pens. There used to be a Pencil Factory Zagreb (TOZ), but no one has been interested in this type of production since then. The question just came up: why not give it a try? That's how we created Newspaper Pencils or NewPen for short", explains Dragan.

The first step involved analysis. Dragan researched what kind of machines and accompanying equipment are needed to make classic wooden pencils. During that research, he came across a story about pens from old newspapers and recycled paper in China. That was a crucial moment. "The very idea of producing something new on the European market, with the added convenience of meeting environmental standards, was enough to start the process of procuring the equipment and raw materials needed to start the business. It took us more than a year to find a good supplier of machinery and graphite. The first samples we received from China discouraged us a little because the pens were wrapped in cellophane, which would automatically mean that the product is not 100 per cent environmentally friendly. However, through daily conversations, we managed to reach a solution that would meet our criteria", Dragan remembers the beginnings and adds that one company sent them quality testing of laboratory products and laboratory tests of their products together with the necessary certificates - such as EN71 (European standard for the safety of toys, because crayons belong to toys) and REACH (European Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals) which are required both in our country and the countries of the European Union for the safety of being an organic product.

When you see **pens from old newspapers and recycled paper**, you will know that they **are our products**, because no company in Europe produces them

When asked how their company differs from others in this branch, Dragan said they are the only ones who produce graphite pencils and crayons in Serbia. Everyone else imports them. "When you see pens made of old newspapers and recycled paper, you know that they are our products because no company in Europe

Photographs: (on the previous page and top) Irena Stevanović; (bottom middle) Ana Radojković

The three-member team of NewPen offered a quality product at an affordable price, achieving environmental standards. **Everything they use in production** - from packaging to transport packaging - **is either already recycled or can be recycled**

produces them. This way of producing pencils and crayons puts the protection of the environment in the forefront by preserving forests (no wood is used, no trees are cut down, which slows down the global warming process and no waste is created), recycling material (recycled material is used in the production process) and re-using recycled newsprint, which is now re-used in pencil", Dragan introduces us to the applied principles of circular economy and points out that each pen is handmade. "It's a little unique, and when you add to that the fact that each ton of recycled paper saves 24 trees from being cut down, then the pen has even bigger value."

The entire process production of pencils and crayons production is done manually in combination with semi-automated machines. Every graffiti has to be glued to paper by hand, and that is what takes the most time, apart from hand packaging. On the other hand, it provides the possibility for each pen to be checked before it goes on the market. The process of making such pencils is not completely precise, says Dragan. They managed to organize production to produce from six to eight thousand pieces of pencils and crayons per day. In terms of quality, for the time being, they cannot compete with renowned European manufacturers. Still, on the other hand, they firmly believe that the quality of their products is at a high level compared to other products in the same price range. "Our pens are very interesting, they are high quality and last longer than ordinary wooden pens", claims Dragan and states that the impressions of the users are very positive.

Initially, they considered the possibility of obtaining subsidies. However, in the end, they decided to try everything on their own with their means. Dragan leaves the possibility of applying for some of the subsidies (from state and EU funds) in the future, but those are just plans for now. It was important for them not to borrow at the very beginning, not to take a loan to develop faster. That is why their company has only three workers, and they are all co-own-

ers. "We are aware that if we want to grow, we have to hire more workers but above all, we have to position ourselves on the market, to make our product recognizable and for people to want to buy it", explains our interlocutor.

We asked Dragan how many people show interest in recycled pencils and crayons. "Pens and crayons are school supplies, so our primary customers are children, i.e. parents who buy their children school supplies. As far as exports are concerned, back in March 2020, we signed a contract with KALLILA Sales Innovation KG from Germany, run by Karl Karlinger, the former long-time CEO of Pelican. They will represent us in the markets of several European countries. Unfortunately, the situation with the coronavirus slowed down the realization of that plan a bit. We sincerely hope that the first contingents of our pencils and crayons will soon be on the shelves in stores in Germany, Austria and the Netherlands, and then who knows - the world is the limit!"

NewPen's three-member team offered a quality product at an affordable price, achieving environmental standards. Everything they use in production - from packaging to transport packaging - is either already recycled or can be recycled. Dragan warned his customers not to be surprised if they get their products in the transport boxes of some other companies because they collect them and then use them to pack the goods. "Our idea is that the packaging is made of recycled cardboard and must be FSC certified (FSC certificate is a guarantee that the wood reaches the end-user through a strictly monitored chain: from a certified forest, through processing and production). During production, we have little waste, mostly excess newspapers that we cut. We collect all the waste and, in agreement with the companies from which we procure old newspapers, we either exchange it for what we need, or give them the surplus. Waste is almost non-existent. We asked the local utility company for a special container for waste that is created by cutting pencils. However, since that waste is also small in quantity, they are still considering our request. We are currently disposing of it in special boxes, with the request that in the further process that waste is disposed of in an environmentally friendly way", Dragan is detailed to show us how much they take care of resources.

Each pen is a little unique, and when you add to that the fact that **one ton of recycled paper saves 24 trees from being cut down**, then the pen has an even greater value

The plan is to expand the range, but Dragan is cautious in his forecasts since they need more people. In December, they released a coloring book complete with six crayons with the idea of bringing the environmental problems we face closer to children through play.

It is not difficult to conclude how customers react to unusual pens. "First comes the surprise because they can't believe that something like that exists in our country. The next reaction is to be delighted with our products when you realize how interesting and different they are from everything they have had the opportunity to see so far. If you buy our pen today, there are very small chances (almost none!) to buy the same one in a month", says Dragan, explaining that the design of their pencils and crayons depends on what is printed in the newspaper.

Prepared by: Jovana Canić

Photographs: Ana Radojković

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Photograph: CEEFOR

THE WESTERN BALKANS ON THE ROAD TO CLEAN ENERGY WITH THE STRONG SUPPORT OF THE EBRD

The Platform to Support Energy Transition in the Coal Regions of the Western Balkans and Ukraine was launched by the European Bank for Reconstruction and Development (EBRD), the World Bank, the European College, the Energy Community Secretariat, the European Commission and the Polish government. At the first meeting of the Platform, it was agreed that they would join efforts to enable the transition from coal to a low-carbon and climate-resistant future in the Western Balkans and Ukraine.

The Platform initiative was launched in September 2019, after the Western Balkans' countries committed to increasing the share of clean energy in the Joint Declaration from Podgorica adopted in February 2019. In November 2017, Ukraine expressed a similar wish through its Strategy for the Development of Low Emissions until 2050. The EBRD's Green Economy Transition (GET) Strategy 2021-2025 aims to increase the Bank's green funding to more than half of its annual business by 2020 while striving to help the countries in which it operates building low-carbon economies.

In line with the Paris Agreement and the GET approach, the EBRD's Fair Transition Initiative, launched this year, with the idea of ensuring that the benefits of the transition to a green economy are available to all while protecting vulnerable countries, regions and people. It is based on the EBRD's expertise on investing in a green economy focusing on economic inclusion.

The reason for the conversation with Harry Boyd-Carpenter, Director and Head of Energy of the Sustainable Infrastructure Group (EMEA) at the EBRD was the above-mentioned, the first meeting of the Platform where many questions were raised, but also many answers that give us

Photographs: EBRD

hope major changes in the coming years in the Western Balkans.

EP ***How will the EBRD, the World Bank, the Secretariat of the European Community, and the European Commission support the Western Balkans and Ukraine's energy transition?***

Harry Boyd-Carpenter Together we have launched a Platform that should help develop strategies and projects to initiate a timely transition in regions currently heavily dependent on coal. Participants in this Platform will work together to provide knowledge on transition planning and preparation. The Platform will also make it easier to find financial funds for projects and help identify and implement pilot projects that support these regions' decarbonization goals. The EBRD will coordinate funding, including securing its funding, as needed, for transition projects and programs. The initiative is based on the concepts of inclusion, stakeholder engagement and equitable transition. It seeks to encourage broad consultation and dialogue between groups from the state, regional and local authorities, the coal industry, civil society, trade unions and social partners, and academic institutions.

EP ***What does the transition process look like and which countries should we look up to?***

Harry Boyd-Carpenter From our experience, we have identified several key lessons to support countries transitioning from coal to cleaner fuels. Activities that precede any shutdown of the coal industry must be strategically planned with all stakeholder's engagement and dialogue. Local engagement in activities and projects should be promoted in cooperation with the state level of government and the

Harry Boyd-Carpenter,
Director and Head of Energy, Sustainable Infrastructure Group (EMEA) at the EBRD

The EBRD has financed almost 500 MW of wind and solar capacity in the Western Balkans region over the past three years. In Serbia, they financed the two largest wind farms in the Balkans, Dolovo and Kovacica

private sector. Efficient public institutions with strong capacities are key to the successful implementation of the transition, then new economic opportunities and opportunities that are likely to come from the developing sector, including but not limited to those related to the green economy, and new jobs in tourism and agriculture. It is also necessary to implement programs for retraining workers and to strengthen new skills to be able to find new jobs, while taking care to ensure equal opportunities for all, including women and vulnerable groups. Finally, investments that contribute to building sustainable physical and digital infrastructure are important for fostering economic opportunities.

EP ***What does your five-year plan to make most EBRD financing green investments bring?***

Harry Boyd-Carpenter Building on the good results of financing green economy projects and implementing green policies, the new Approach to Green Economy Transition (GET) for 2021-2025 will support accelerating the transition to a green, low-carbon and resilient economy by aligning its activities with principles of international climate agreements, including mainly the Paris Agreement. It will then strengthen political engagement to develop long-term strategies to reduce carbon emissions and green financial systems by increasing investment in areas such as creating innovative green digital solutions, equitable transition, circular economy, natural resources and green value chain financing. This new approach will include activities to reduce energy consumption and strengthen resilience to climate risks, and environmental actions to reduce air pollution, address water problems and protect natural resources.

EP ***What does your energy system reform mean?***

Harry Boyd-Carpenter The energy sector is key to economic stability and inclusive growth. The EBRD's energy sector strategy promotes secure, affordable and sustainable energy through the transition to a market-oriented sector with low CO_2 emissions. The most important thing for this is to increase the share of renewable energy. The strategy emphasizes increasing investment in renewables, supporting the integration of energy systems, promoting the transition to cleaner and more resilient energy sources and facilitating electrification as a means of cleansing the economies in which the Bank invests, including some of the least energy-efficient and most polluted economies and cities in the world. In line with this direction, the strategy confirms that the Bank will no longer finance the coal industry or the production of electricity from coal. The Bank will also suspend funding for any oil exploration and oil development projects, except in rare and exceptional circumstances, when such investments reduce greenhouse gas emissions.

FIVE GUIDELINES FOR THE TRANSITION FROM COAL TO LOW CARBON AND CLIMATE-RESISTANT FUTURE IN THE WESTERN BALKANS:

1. **Set a clear long-term goal for the low carbon electricity sector and define key achievements towards that goal. The electricity sector is based on long-term capital investments, so investors and representatives of regulatory bodies must know in which direction the sector is going in the long run, to make plans.**
2. Set the electricity strategy into a broader decarbonization strategy for the whole economy. The electricity sector is one part of the integrated economic system and, as mentioned above, we expect increasing integration of electricity into other sectors such as transport, heating, etc. It is crucial to think holistically and take into account the system as a whole. Therefore, traffic strategy plans for the electrification of road transport must be integrated into the electricity sector.
3. Establish competitive tender mechanisms to support renewable energy. The EBRD supports the development of this type of mechanism in Albania, Kosovo, northern Macedonia, Serbia and Ukraine, and in many other countries. Once established, such a mechanism is a powerful tool for the government to quickly deliver renewable energy, cheaply and in a controlled manner.
4. Invest large funds in transmission and distribution networks. At a time when interest rates are very low, and governments are looking for the right places to invest to stimulate recovery after a coronavirus, investing in the network is the perfect investment opportunity.
5. Reform the structure of the electricity market to reflect the changing nature of the sector. It is especially important to make sure there are strong market signals that encourage a balance between capacity and flexibility.

EP ***What is carbon neutrality and is there a real possibility that the Balkan countries will achieve it by 2050?***

Harry Boyd-Carpenter Carbon neutrality means that CO_2 emissions in the economy (from heating, lighting, transport, industry, etc.) are no greater than removing or "capturing" those emissions, such as by planting more trees or storing them. Since it is very difficult to remove or capture CO_2 emissions, in practice this means that emissions must be reduced to almost zero by 2050. There will be only a few industrial sectors, in which it is very difficult to reduce emissions to zero, and they will continue to emit little CO_2, which must be captured or removed in some way. But the main focus is the reduction, reaching a point where almost all economic activities are carbon-free.

There are some clear guidelines on how the economy is coming to carbon neutrality. The first step is to reduce resource use. So, that means using significantly less energy for a given activity, reducing the use of materials and drastically increasing recycling. After that, you switch as much economic activity as possible to electricity, so that heating, transport and industry, which currently mainly burn hydrocarbons directly, use electricity instead. At the same time, you transfer all electricity production to low-carbon sources, primarily wind and solar energy. With these steps, you can achieve significant success on the path to carbon neutrality. You can certainly reach the EU 2030 target quickly, which is to reduce CO_2 emissions by 55 per cent. As you approach the zero rate, it becomes more difficult because some activities (for example, aviation) are quite difficult to electrify and because the 100 per cent representation of wind and solar electricity systems is a challenge. At that moment, we will need some other technological solutions. For now, it seems to be most likely green hydrogen, because it is an efficient way to convert sporadic wind and solar energy and for storage into a portable fuel that does not emit CO_2. But those are the problems we will look at after 2030. For now, the message is clear - make the economy very efficient and energy-efficient, switch activity to electricity and decarbonize electricity.

It is absolutely achievable for the Balkan countries as well. There are more and more studies showing that carbon neutrality is feasible and affordable. Especially considering that wind and solar energy are becoming cheaper, they are now the cheapest way to produce electricity in most countries. That certainly applies to the Balkans, which have very good sun and wind resources. For example, the EBRD helped the Albanian government announce a tender for solar power plants in 2020, resulting in a price below 25 euros per MWh. Another great advantage that the Balkans have are large hydropower plants. They are the perfect partner for wind and solar energy. It is also very important to keep in mind that decarbonization has many other advantages - the economy powered by wind and solar is characterized by clean air and water. Such an economy does not have to worry about fluctuating oil or gas prices and provides the right incentive to create jobs because of all investments.

EP ***What are the recommendations for the transition from coal to clean energy production in the Western Balkans case?***

Harry Boyd-Carpenter We believe that all countries should switch to a power sector dominated by clean energy for several reasons. Above all, it is necessary to avoid catastrophic climate change and meet the global goal of reducing CO_2 emissions. It is the most prudent economic strategy because it ensures the operation of the electricity sector with low, stable costs without any exposure to carbon costs. It is also the cheapest way to produce electricity. Finally, it brings other benefits, including new jobs, investments and clean air and water.

Interview by: Jovana Canic

WHEN MUSHROOMS AND PACKAGING CROSS PATHS

They had originally planned their main business to be the mushroom supplement production, when suddenly they noticed that a certain kind of waste, from the mushroom processing, appeared to have features of packaging such as polystyrene - by far, the most prevalent material for single-use packaging. The Biosporin was born, and these days its creators are trying to develop the technology for its mass production and usage. If they succeed, polystyrene might be the history. The vast damage this non-degradable and non-recyclable material has been doing to us and the environment could have the same fate.

To the discovery of this material that riveted attention, the team of the White Lemur company has taken the back road. Before plunging themselves into innovations, they had been designing solutions for promotional products and packaging. They realized there was a need for green materials, especially for those that can replace plastic and polystyrene in its many variants. Independently, at the same time, they had started another project of mushroom production that has pharmaceutical effects. Among the team who was developing a new product made from mushroom, was Nikola Stanojević, already experienced young man in the world of start-ups who graduated from the Biological Faculty in Belgrade. He says that in that process of the IMUMIN supplement production they came upon a certain form of "waste" which, having been treated under specific conditions and in a particular way, can have identical performances as expanded polystyrene, e.g. Styrofoam. That result was the beginning of the SOMA project, developed in the White Lemur company, and the aim was to create technology for the production of that material, to check if some other material has similar qualities, as well as to find and test all possible uses and set up products made of this material.

While Nikola was attending the Academy for the circular economy at the Serbian Chamber of Commerce, the instructor helped them analyze the matter stream and pollution source. Therefore, they realized that the use of Styrofoam, as a single-use packaging material, is one of the main sources of microplastics, due to the fact that Styrofoam is

not degradable and recyclable. It is either burnt that causes green gas emission or disposed at landfills, where it decays leaving plenty of microplastic. Putting this information into perspective along with the fact that agricultural waste is also burnt every year, which causes enormous pollution especially in the autumn, the team decided that their first goal would be to make an efficient, cheap and green replacement for single-use packaging made from Styrofoam. It seems like the support they got at the Academy for the circular economy was very important for their future growth. They managed to give the form and purpose to their idea in terms of what exactly their products could be, where and how these products could have the biggest and most significant effect on environment, and how to fit them into complex industry and systems that are already in operation. To sum up, they used the agricultural waste and biological organism to produce new biotic material, and, according to Nikola, to "grow" products which will be natural and won't make waste or pollution.

The White Lemur company team used **the agricultural waste and biological organism to produce new biotic material, and to "grow" products which will be natural** and won't make waste or pollution

NIKOLA STANOJEVIĆ was born in 1990 in Knjaževac. He graduated from the Faculty of Biology in Belgrade, and soon after that, he was given a chance to set out his first start-up in London. The Project was in a completely different industry, and Nikola was engaged in biomedical data. Still, he learned some basic principles, and also found out what starting a new business really means. After a few years, upon finishing that Project, he decided to live in Serbia and to start a local project that could have a global effect.

The White Lemur company was founded by Aleksandra Đorđevic, now the CEO of the company. With two partners Marko Cvetković and Danilo Živković, Nikola joined the company, and together they started the SOMA project, the rootage of Biosporin.

"Biosporin is a fascinating and versatile material. Essentially, it is biotic material, namely material of biological origin, which makes it fall into the same category as wood, leather and rubber, and has an equally wide range of potential uses. It comprises of cellulose and lignin fibers from agricultural and industrial waste, and chitin fibers produced by mushrooms", explains Nikola and adds that depending on the raw material (kinds of waste) that goes in, and conditions of growth or processing after production, Biosporin can have a broad range of properties such as softness-hardness, roughness-smoothness, shock absorption, visual quality, whereas the range of quality almost the same as in plastic materials can be attained by manipulating the density of chitin fiber.

They have drawn attention to their invention, and there is no doubt. It is enough to know that at the moment, they have as much as ten pilot projects with various clients, where they test the sustainability of different uses. Nikola says that this kind of interest and business opportunities is due to the Biosporin amazing properties. "Material is also totally non-flammable; it falls into A0 material category, which gives him additional benefits in relation to Styrofoam. It is completely degradable in natural surroundings. In contact with the soil and moisture for more than six months, and using soil bacteria, Biosporin decays, we might say even dissolves, and through the process, it enriches at the same time the soil with mineral salts which in return makes the land more fertile", affirms our interlocutor providing us with the additional proof that originated at the Faculty of Agriculture in Belgrade where it was confirmed that Biosporin could be used as partially organic manure. Also, in cooperation with the Faculty of Technology and Metallurgy in Belgrade, they have been working on several projects, and one of them deals with the impregnation of Biosporin with ecological organic polymers so that it becomes completely hydrophobic which would prevent decaying until it is physically damaged.

Global Styrofoam consumption in 2018 was around 7,500 kilotons, namely 7,500,000 tons. This number could be easily doubled this year, Nikola assumes, as the crisis caused by Covid19 epidemic has had very large beneficial influence over freight forwarding sector, online shopping and delivery that have been using more Styrofoam for single-use packaging than ever before. "It is going to make unequivocal and vast damage on the environment. However, at the same time, it puts the unquestionable need for

Material is also totally non-flammable; it falls into A0 material category, which gives him additional benefits in relation to Styrofoam. It is **completely degradable in natural surroundings**

improvement at the agenda, as much as the opportunities for its solution. Especially when we take into consideration the regulations adopted last year that will completely ban the use of Styrofoam for single-use packaging, even in Serbia", says Nikola. At the moment, there is no effective replacement for Styrofoam at the market. All available solutions either don't meet the technical requirements and performances or their prices are unacceptable for the product class. Nikola, together with the whole team that assists in this project, tries to provide a chance for green transition at prices that are in line with the current Styrofoam prices.

Biosporin is already entering the market. For the time being, the White lemur company makes it to orders. Asked about how much struggle they have been through turning an idea into a business, Nikola replies that the endeavor was even more challenging when you have an innovative product. "In Serbia, there isn't much of an investment culture when it comes to innovative and risky ideas. Neither investors nor banks are willing to embark on financing innovations. So the support by Innovation Fund was of great importance. Such a form of institutional help is one of the crucial instruments that could help to introduce innovations at the Serbian market", explains Nikola the deep water of innovations.

All **available solutions** either **don't meet the technical requirements and performances** or their prices are unacceptable for the product class

Through Innovation Fund they acquired finances for the equipment needed for fitting out the laboratory, without which they wouldn't be able to develop the technology and new material, as well as finances for the actual development of the technology and bridging the transitional period. During the Fund's support and teaching program, they have also learned a lot about intellectual property and project management.

Nikola underlines especially the fact that Biosporin enriches the soil and increases its fertility after being decomposed. "This is a real organic manure! After the bio decomposition of Biosporin, only mineral salts remain, which serve as nutrients for plants' growth."

Prepared by Tamara Zjačić

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