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ENERGY PORTAL MAGAZINE

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KOEN ADAM
Ambassador of Belgium

High Ambitions and Search for Compromise

VUK KOSTIC
Actor

Every Man Who Loves Nature Is My Brother

STEVICA DEDJANSKI
State Secretary in the Ministry of Mining and Energy

Renewables at the Service of Nature and Society

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Eco-Photo Contest and Exhibition "Nature in its beauty and distress"

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Flying ladybird, mystical dawns, even more mystical sunsets, animals' natural environments, but also almost usual scenes of human carelessness towards the environment... and the beauty that loses the battle bit by bit.

These are just a few moments skillfully captured on photographs which have been sent to our eco photo competition.

Authors from all over Serbia have documented with their cameras nature in its beauty and distress, and we have put their works into a gallery of amazing photographs.

A platitude that often might be heard at some winner competition announcement that for the jury "it was a tough decision to make", in our case is genuinely more than appropriate. Members of the jury who were faced with a difficult decision were: Bojan Dzodan, photographer, Stanko Kostic, art photographer and member of the National Association of applied art artists and designers, Dusan Milovanovic, art historian, Vuk Kostic, actor and Tamara Zjacic, deputy of editor in chief.

Looking at these pictures, we might be wondering if they have been made on our planet. All of them speak volumes. All participants at this contest have contributed in a unique way to broaden awareness of the need to protect the environment in our country, and some of them have won the prizes.

I prize **and 50.000,00 dinars was awarded to Djurdjina Tomic for the photograph named "Collector of forgotten things"**

II prize **and 25.000,00 dinars was awarded to Milos Karaklic for the photograph named "Nature's gift"**

III prize **and 15.000,00 dinars was awarded to Jan Valo for the photograph named "Icy start"**

The exhibition "Nature in its beauty and distress" at the Serbian Broadcasting Corporation Gallery will provide you with a chance to see award-winning photographs and additional twenty-four pictures which made a huge impression on the jury. The exhibition will be open from 12th to 22nd June.

Until we meet again at a new contest, we would like to thank all the readers who sent their photos. Stay tuned to our website and Magazine for more information on our activities.

Who knows, maybe you will find your photograph illustrating some article on our virtual or in print pages.

The contest was organized by Energy portal and **CEEFOR** ltd, with the Serbian Broadcasting Corporation, Alfa Clima from Knjazevac, and Bee&Well and Fornatura from Belgrade.

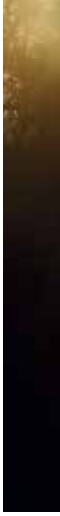
I prize Djurdjina Tomic for the photo “Collector of forgotten things“

II prize Milos Karaklic for the photo "Nature's gift"

III prize Jan Valo for the photo "Icy start"

During the two-month competition, marvelous photographs have arrived by the handful into our virtual mailbox, and among those, some were the alarming ones which show that we don't treat the nature with due respect.

▲ Sinisa Ljubisavljevic



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10 KOEN ADAM

The Ambassador of Belgium

We Developed Model for Efficient Climate Policy Management

In interview for our magazine the ambassador of Belgium to Serbia Koen Adam explained that the distribution of competences to the different layers of authority in their constitutional setup makes policy-making sometimes a bit more cumbersome than in other countries. This system implies intensive consultations and search for compromise, a trademark feature of Belgian politics. "Such a model keeps our climate policy perfectly manageable", says Koen Adam.

18 VUK KOSTIC

The Actor

A Man Who Is Out of Touch with Land and Nature Has No Future

"Every man who likes boats, hunting, fishing and nature in general is my brother. Unfortunately, new age man is driven by a different idea", says Vuk Kostic, who has been into hunting and fishing for decades, and he points out that a hunter doesn't impose a threat to nature, but he takes care of it by feeding game, visiting hunting areas regularly and abiding by the rules. "It is in the hunter's best interest to have does in the woods", says Vuk.

IN THIS ISSUE »»

Photographs: (Koen Adam) Adam Koenraad; (Vuk Kostic) Dragan Mujan

Photographs: (Stevica Dedjanski) courtesy of Stevica Dedjanski; (Zeljko Djurisic) courtesy of Zeljko Djurisic

THE BELGIAN WAY

High Ambitions and Search for Compromise

Belgium has a well-developed institutional and legal system in place to protect the environment. Overlapping responsibilities in environmental matters between the federal and federated authorities are unavoidable given the distribution of competences to the different layers of authority in the Belgian constitutional setup. This does make policy-making sometimes a bit more cumbersome than in other countries. The ambassador of Belgium to Serbia Koen Adam in interview for our magazine explained that the necessary and sophisticated mechanisms for consultation and coordination are in place, also with a view on defending Belgian positions and interests in the multilateral framework.

EP ***What are those mechanisms?***

Koen Adam Just to mention a few of those mechanisms: the almost weekly coordination meetings by the MFA' Directorate General for European Affairs, the National Climate Commission, and the overarching Coordination Committee for International Environmental Policy (CCI EP).

Koen Adam, the Ambassador of Belgium

Photographs: (bottom) Adam Koenraad; (right) Unsplash/Jorge-Fernandez Salas


Taxi

This system implies intensive consultations and search for compromise, a trademark feature of Belgian politics. This is indispensable, especially in this policy area, given the differentiated socio economic and geographical space the authorities are operating in. But eventually such a model keeps our climate policy perfectly manageable. We are of course aware that, as is the case elsewhere in the world, political leaders in Belgium will also have to constantly adapt policy instruments and means to the international reality, in order to reach commonly agreed objectives, with an efficient climate and environment policy.

EP ***Recently, thousands of students have marched not only in Brussels but also in the rest of Europe for action against climate change. Was there any response of your government on these protests?***

Koen Adam The climate marches in Brussels, in other Belgian cities and in the rest of Europe have sent a powerful signal to our decision makers, on the need to protect our planet for the wellbeing of future generations. The Belgian government appreciates that Belgian students have been at the origin of this wake up call, resounding throughout the world. I can assure you that at least in Belgium the message has been heard, with an important impact as well on the recent election campaigns, forcing the political parties to explain to the public how they intend to cope with these challenges.

Belgium fully supports the United Nation Secretary-General in his call for ambition, solutions and actions. The Climate Action Summit in September needs to deliver a clear and unequivocal signal of strengthened political will and renewed multilateral commitment to raise global ambition and accelerate action on sustainable development and climate change in the years to come. Belgium expects also the EU to play a leading role in the September Summits, just like it played a leading role in the negotiations in the run-up to the Paris Agreement and the 2030 Agenda on Sustainable Development.

EP ***Belgium is in the EPI rankings for 2018 on the envious 15th place. How did you manage problems such as air, forestry and fisheries and do these experiences help in supporting Serbia's effort in the field of environmental protection?***

Koen Adam We can rightly say this overall positive result (Environmental Performance Index at 77,38, which puts Belgium at the 15th place in the ranking), is a consequence of the high levels of ambitions we have always set ourselves. We must however not be blind for the shortcomings, in some areas there is absolutely room for improvement. Serbia for instance definitively scores better in the area of 'tree cover loss'. But, this is an exception in the overall somehow gloomier EP I picture, where Serbia stands at the 84th place, with index 57,49. It is evident that within the framework of the accession talks, to allow Serbia to become a full-fledged member of the EU, the Environment and Energy chapters will be one of the hardest to accomplish. There is on the one hand the need to align with the strict and demanding standards and norms of the EU acquis in the area of Environmental protection, which will require important legislative work. But more importantly is to make sure the convergence takes place in the real world, with measures that actually cut down levels of air pollution, for instance. This will require considerable investments, and above all a political focus that translates in priority setting (e.g. with regard to a sustainable energy mix), as well as measures to enhance public awareness on the need to protect the environment.

Belgian companies, with expertise in the area of renewable energy, have been actively engaged in setting up wind farms : over the last year, for instance, Belgian investments in windfarms in Alibunar have helped cut down Serbian CO_2 emissions with 105000 ton, delivering green electricity to 50000 households! There is also a growing interest to assist Serbia with our industrial, technical and engineering know how in activities such as waste water treatment, another area where Serbia lags far behind European standards.

EP ***According to Deloitte research, the Belgians lose more than an entire working week in congestion every year, which is also the problem in Serbia. What can be done about this problem?***

Photographs: (on the previous page at the top) Unsplash/Maria-Teneva; (bottom) Unsplash/Alex Vasey

WHAT IS THE QUALITY OF AIR THAT THE BELGIANS BREATHE?

The sector of transport is responsible for 23% of total CO_2 emissions in Belgium which is not fulfilling European requirements for air quality, especially in terms in nitrous oxide (NO_2), that mainly comes from transport. We asked the Ambassador Koen Adam if there are any drastic measures that you will apply in order to lower the impact of transportation on air quality.

"We recognize there are specific challenges in this area, which are mainly due to the fact that Belgium is one of the main logistic hubs in the whole of Europe: one of the biggest ports in the world, Antwerp, is an entry point for a gigantic stream of goods coming from all over the world, with destinations in Europe. Our roads and waterways struggle to absorb the great amount of transport this generates, and it is obvious this has an impact on CO_2 emissions.

At all levels of government we are aware of the problems and measures are envisaged, and indeed implemented to curb the negative health impact of these economic activities."

Photographs: (top left) Unsplash/Jaaron Staes; (middle) Unsplash/Jonatan Moerman

Koen Adam There is a broad political consensus that we must collectively strive for a reduction of the number of cars on our roads, especially during peak hours, given the economic and environmental costs this entails.

A public and political debate is ongoing about alternatives that could be offered to company car beneficiaries. A big share in the congestion problem is indeed attributable to policies adopted by private companies, who offer cars to their employees as part of their salary-package, given the tax advantages this brings about. Some measures are already implemented or envisaged such as cash for car or Mobility allowance instead of the use of a company car; employees can exchange their company car for i) a more sustainable company car and/or ii) transport alternatives (shared mobility, bike, public transport,...) and/or iii) cash (balance); we will also promote the use of bikes, with more advantageous tax systems. Equally a pilot project is launched for the promotion of carpooling by providing a restricted a lane on the highway for car-poolers.

I see definitively one link with the situation in Serbia, in the sense that car ownership (and the right to use your car at liberty, without undue government interference, seems to be a sacrosanct principle in the head of our citizens. It will require determination and indeed political courage, to explain to the public that this goes together with tremendous costs, now and in the future, for the economy as well for public health. The challenge in Belgium, and certainly in Serbia, is to offer the necessary alternatives (efficient and fast public transport, bike lanes...) that can convince car owners to become more selective in the use of their cars.

EP ***What is the percentage of electric vehicles on Belgian roads, and what kind of incentives do you give to the EV owners?***

Koen Adam In 2017 we registered 10 853 BEV (Battery Electric Vehicle) and 32 828 PHEV (plug-in hybrid electric vehicle) which represents respectively 0,19% and 0,56% of the total

Belgian cars fleet. There is definitively still a lot of room for further expansion.

The incentives for the purchase of new EV's vary from 2000 € to 4000 € depending on the list price. Other incentives (non-exhaustive list) are i) registration/circulation tax reduction/exemption and ii) higher deductibility of the rate for company cars, applicable across the country.

EP ***In Belgium electricity from renewable energy sources is given priority in both connection to and use of the grid. What is the percentage of electricity that comes from renewable energy sources (RES)?***

Koen Adam Belgium's global energy consumption is 420 TWH/year, from which 80 TWH/y comes from electricity. The percentage of electricity that comes from renewable energy sources is 12% (9.6 TWH/y). The rest is spread as follows: 34% from nuclear energy; 27% natural gas used for power generation of which 22% is imported and 5% comes from other sources (among which biomass is the most important). The resource having the biggest share in our energy mix is the wind energy. Belgium's North sea is the 4th biggest producer of electricity among all EU offshore wind energy areas.

Photographs: (bottom) Unsplash/Jay Lee; (right) Unsplash/Alex Vasey

Wind energy in Belgium accounts for 6,4 TWH/y (out of total renewable energy of 9.6 TWH/y); today's installed capacity of wind energy in BE is 1556 MW, delivering electricity to 1.6 million homes. Thanks to the development of two new wind farms in the North sea, this capacity will be brought to 2262 MW in 2020, delivering electricity to 2.3 million homes. This will bring the share of wind energy to 8 TWH/y in the Belgian renewable energy mix and it will cover 50% of Belgium's 2020 renewable energy target.

It is also worth noting that, thanks to the development of wind energy technologies (in which Belgian's innovative firms play an important role), the cost of energy production by offshore wind has fallen from 177 Euros/MWh in 2011 to 65 Euros/MWh in 2017, i.e. a fall of 63%. As a comparison, in 2017, the cost of the energy produced by natural gas is 70 Euros/MWh; the cost of the energy production from coal is 72 Euros/MWh and nuclear energy costs 113 Euros/MWh.

EP ***Belgium boasts the highest recycling rate in Europe. Nearly three fourths of residential waste is reused, recycled, or turned into compost. How did you manage to do this and what were the strategies that you applied?***

Koen Adam Belgium is indeed one of the lead EU countries with regard to the separation, collection and recycling of waste. As a general principle the policies in these areas are based on the idea that the financial burden of waste management shifts from the taxpayer to the producer and the consumer, who are both made accountable for their behavior, that can be adjusted to minimize waste and hence the costs related to waste management.

The regions set the legislative framework, which has a major influence on the distribution of costs amongst the players. In the Walloon Region, the principle of the producer's responsibility is aimed at taking account of the full true cost of collecting and processing the waste in question. Littering costs are also envisaged. The region's subsidies are moreover changing in line with the waste management hierarchy. The same applies to the regional tax scheme, which since 2008 has provided for a gradual increase in the tax on landfilling household waste and

the institution of a progressive tax on incinerating household waste that will be increased if energy is not recovered.

Other initiatives, such as the bans on landfilling, will also shift household waste management patterns and, consequently, their cost for municipalities.

In the Flemish region we achieve high collection and recycling rates of household waste, due to the implementation of a smart mix of various instruments that were introduced in the mid '90. We use economic instruments such as landfill and incineration fees, EP R (Environmental Pricing Reform) systems for quite a few streams, and pay- as- you-throw systems. We also introduced regulatory instruments such as a mandatory separate collection for several streams such as plastic, paper & cardboard, glass, and a ban on landfill and on incineration of recyclable wastes. We invested public money in recycling parks and in reuse centers. Last but not least these measures were introduced in close concertation with the stakeholders and accompanied by intensive communication and public awareness raising campaigns.

EP ***What are the most prominent fields of the cooperation between Belgium and Serbia?***

Koen Adam There is no doubt that the EU accession process of Serbia is the main focus of attention in the coming years, also for Belgium. Together with the EU and its member states, we assist Serbia with designing and implementing these reforms, starting with the fundamental groundwork in the area of the Rule of Law and good governance. These should make Serbia a better country to live in, for its citizens and not merely because of the EU membership objective. The environment and energy sectors are excellent examples of areas where Serbia, by engaging in a reform effort that can sustain its convergence with European standards, will become a healthier and more prosperous country to live in.

The presence of Belgian companies should equally contribute to this endeavor, by bringing know how and expertise to Serbia, accompanied by good labour and environmental ethics and standards. By creating employment they help give a perspective for a better future to the new generation of young Serbians, and thus stem the brain drain this country has been victim of the last couple of years. I am determined to contribute to bringing this positive message, and encourage Belgian companies to come here and discover for themselves the excellent opportunities that Serbia has to offer, thanks, I cannot but underline this, to the quality of its human capital.

Interview by: Nevena Djukic

Photographs: (top left) Unsplash/Jonas Jaeken; (middle right) Unsplash/Kevin Mueller; (on the next page) Unsplash/Baptist Standaert

EVERY MAN WHO LOVES NATURE IS MY BROTHER

He said that Indians are the only people who live in harmony with nature, that we are in desperate need of every grain from the field that we do not leave a furrow after the harvest to feed the pheasant, that a new age man who talks most about the nature conservation is the one who pollutes it... We could expect this kind of attitude from some passionate naturalist or avid fighter for the protection of the planet. Still, in the picture we see Vuk Kostic, an actor, hunter and fisherman, and these are truly his words. In between rehearsals and filming, Vuk took the time to answer our questions about hunting and fishing and whether these activities are contrary to the concept of nature protection. In order not to waste time, we chose in medias res approach.

EP ***People generally have a negative assumption about hunting because their first association is killing innocent animals for fun. Are hunters the enemies of nature?***

Vuk Kostic It's a far cry from the destruction of nature because hunting is the best form of nature protection. People who have never taken a single corn cob into the woods and yet comment hunting should acknowledge that hunters are those who feed animals. When the winter comes with temperatures of – 20 or any other natural disaster, the animals run out of food. Not only do those circumstances starve the ruminants because they cannot reach the food, but predators also decimate them. Here is another example; if one year we do not hunt foxes, they multiply and eat all the rabbits in the hunting area. The following year, the foxes reproduce, but the rabbits are gone, so they have nothing to eat. Man intruded in nature a long time ago. It is easy to illustrate that. Highways crisscrossed the land so the game cannot move freely. Thus, when the man has already interfered with nature, he must regulate it. The fact is that the hunter cannot endanger nature as much as the industry can; the fisherman cannot fish as much as the industry can.

The modern man uses numerous household chemicals and does not think about nature when he enthusiastically says, "I have just sprayed a little bit and it immediately took off the rust". And that went into the water and the packaging to a landfill where it will never decompose. Appealing packaging attracts us while shopping, but it will remain in nature for another three hundred years.

Each hunting association "Srbija sume", every hunting ground, every forest has a game management unit. It means that you approximately know how many animal species there are per species. The aim is that the forest is full of a healthy animal population. One of the ways to maintain the game is preservation and harvesting. Apart from us hunters, mountaineers and mushroom pickers, I do not know who else goes to nature. Admittedly, some people spend one day in nature and leave behind the plastic bags, and the bear can't pick them up. Waste Utility takes care of this in the city, but not in nature. Animals can't deal with it.

EP ***You mentioned fishermen. You also often go to the Adriatic for fishing. Is the situation at sea better than in the forests?***

Vuk Kostic I have travelled from Mexico to Australia, and there is no such beautiful sea as the Adriatic because there are no poisonous fish or sharks. In Mexico and Australia, corals can burn you, and the fish are poisonous. So, one little jellyfish can kill 20 people if they touch it. Not to mention tsetse flies, spiders, poisonous snakes, Anopheles mosquitoes and other insects.

The climate of the Adriatic is so mild, and there is nothing that can endanger and harm you. There is fish, but we should not think that this fish stock is limitless. Fish quotas have been set in Croatia, thus, for example, the period for fishing tuna is known. Still, with that measure, a small fisherman gets the wrong end of the bargain. Those with large ships and large nets catch all the fish and then it is said that one can catch only three more. And only small fishermen depend on what they catch, and they are the only endangered by this measure. The sea is polluted, but when you have protected areas, the fish has a place to circulate and spawn. One must not fish there. Finally, several old boats can be sunk, which are interesting for diving at depths of 30 meters, where fish can reside.

EP ***Is there plastic at these depths?***

Vuk Kostic Not in the Adriatic. But if we were to collect all the plastic floating on the seas, we would see an island bigger than Australia. But that's not the only problem. There is also the engine noise, as well as the one from the oil rigs, which confuse fish, mammals, dolphins, whales and it leads them in the wrong direction, so they stray. I recommend everyone to watch a documentary with Leonardo Di Caprio "Before the Flood". Your readers will be much more aware of the problems that animals face.

EP ***Apart from Serbia, is there any other place you would like to live in?***

Vuk Kostic I used to think about Mexico. Australia is beautiful too. However charming these countries are, there is no such beauty as the Adriatic.

Photograph: Dragan Mujan

"The modern man uses numerous household chemicals and does not think about nature when he enthusiastically says, 'I have just sprayed a little bit, and it immediately took off the rust'. **And that went into the water and the packaging to a landfill where it will never decompose"**

EP ***What have we demonstrated as nature guardians?***

Vuk Kostic A modern man is generally not in touch with nature. I remember one nifty anecdote. A friend of mine who is a producer was shooting a commercial in which a child was supposed to pet a cow. They went to a farm in Vojvodina. They took the cow outside, and since it had never come out of the box, it could not walk; its legs were like macaroni. It was out of the question for the child to go and cuddle it. They lost a whole day because they had to find an animal that spends its days in nature.

I believe that it will be even worse even though technology enables us the ability to protect nature. We are not good guardians, except for us hunters. It is in hunters' best interest to have does in the forest, and others do not care if there are any. They have never seen them.

EP ***Since you are often on the river, is there any progress in environmental regulation of river coasts?***

Vuk Kostic It seems tragic to me how many plastic bags there are in some places, even at a depth of ten meters. Wren flash flood comes, it picks up all that and disposes it to the shores. I think we should listen to the people who reside in nature, such as Professor Milutin Djordjevic. He has the knowledge which he can pass both on the faculty and to hunters since hunters are the real nature keepers. I am sure that a man who is out of touch with the land and nature has no future.

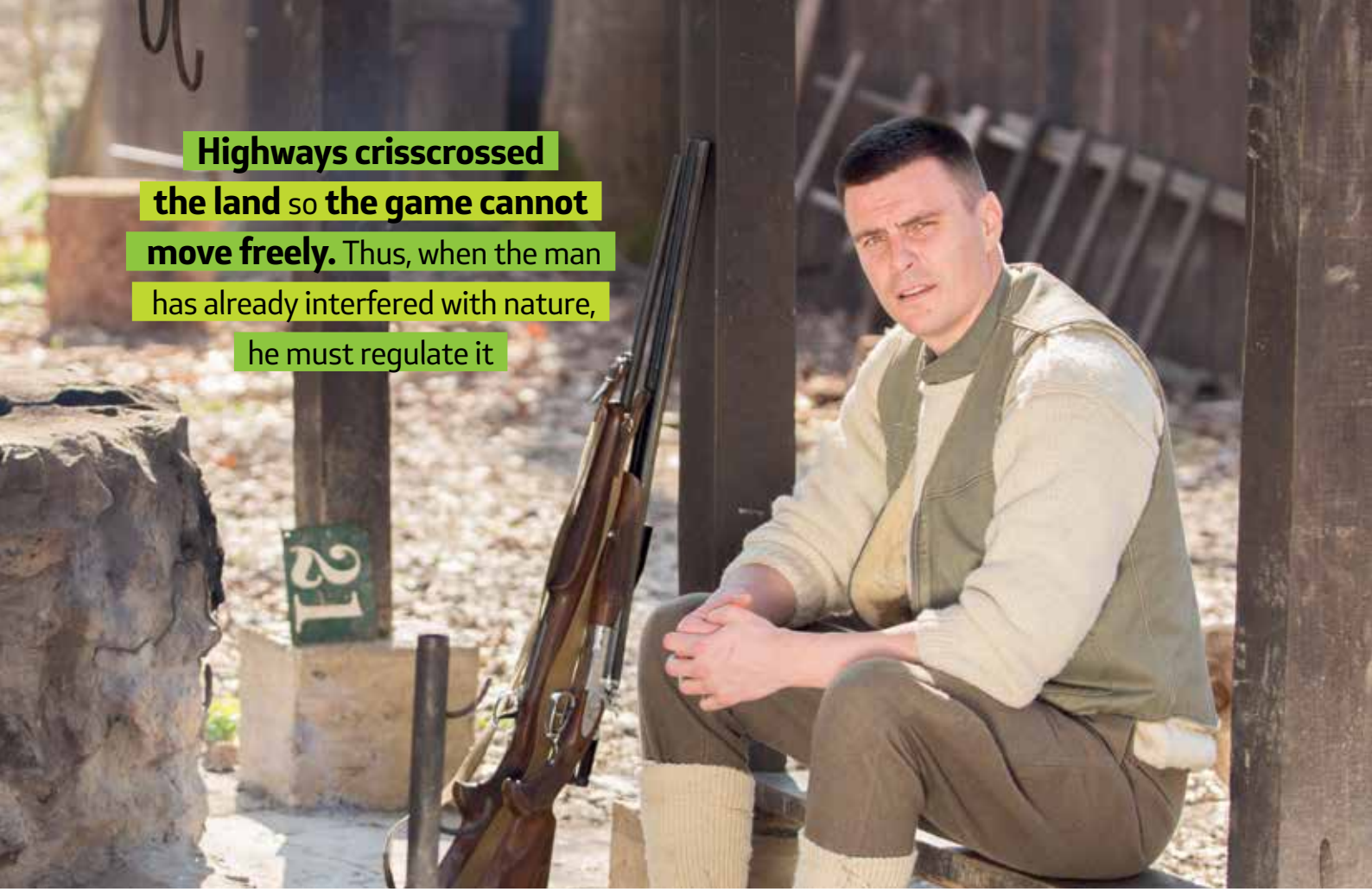
EP ***What kind of punishment should be introduced that would force us to start taking care of nature?***

Vuk Kostic We live in a consumer society, we have to make them pay out of their pocket since that's the only way for a modern man to understand. Poaching has always been present, and it will ever exist. Nowadays people kill 20 specimens of wildlife and sell them to the restaurants, and you equalize that with a man who lives on the top of the mountain and makes ends meet, barely has money to pay the electricity, kills an animal and thus feeds his family. People fish for perch in the middle of spawning, when the fishing of perch is banned. Let it spawn because next year you will not have anything to catch. But I am not talking about fishers, yet about poachers who are selling fish. They are not doing it for their pleasure; it's their source of income.

EP ***What will young generations learn from us?***

Vuk Kostic Every man who loves boats, hunting, fishing and nature in general, is my brother. That is where our matters of interest correspond. Unfortunately, a contemporary man is driven by a different idea. They mostly have "after me, the deluge" attitude. They have no awareness of what they are doing. I wonder how they think to get away with a bad deed or ripping off the country; how they think they won't reap what they sow. Doesn't anyone think about their offspring if they do not think of themselves? There is this cosmic justice

Photograph: Dragan Mujan



Highways crisscrossed the land so **the game cannot move freely.** Thus, when the man has already interfered with nature, he must regulate it

THE MUSSELS ARE NOT THE ALL-MIGHTY WATER PURIFIERS

Today, farmed fish are fed with artificial food granules, says Vuk, and the sea bream in the wilderness, which is one of the cleanest fishes, eats shellfish. These water molluscs filter water, keep it clean. This means that shellfish have the healthiest meat. "However, if you were to take those shellfish from Kotor, it would not work out well for you. But also, the captive sea bream cannot be as healthy as the one who lives in the wild waters, since it's not pure."

that strikes a balance. The forests are being cut frantically, yet people protest at Kalemegdan since a cult tree has been cut down at the promenade. I understand that it bothers them, but they are barking up the wrong tree. One tree isn't the only problem and precisely that one on Kalemegdan. Look what is happening around you.

EP ***What can we do to wake people up and make them see what damage they are doing to the environment?***

Vuk Kostic When we simplify things, the question of why a man wants more than he needs arises. We live in a world full of greed. It's never enough for us. As they say, "the more you get, the more you want". There are many rich people who instead of directing their money to conserve life in nature, they want to gain more treasure since it's never enough.

Some time ago, prominent people in one society were engaged in hunting, both in the world and in our country. The late Misa Janketic was a hunter, as was Pavle Vujisic, who was also a great fisherman. That has gone, now something else is fashionable or maybe available. Who else cares if there is fish in the river? We'll buy it at the market...

The Indians lived in nature and with nature. When the white men came and killed all the buffalo, the Indians were stunned. They could not understand that the white men did not even think about the future. But for the conquerors, there is no tomorrow. And we have long been acting as the first white men on the American continent. It is precisely the field we should be working on.

Interview by: Nevena Djukic

Photograph: (top) Edvard Nalbantjan; (bottom left) Pixabay/Sonja Sonja

PER ASPERA AD SOL

When you crave a cake but do not have any will to make it on your own, you will be going to a pastry shop. In case of experiencing back pain at work, you will be arranging a massage appointment. If you need a new pair of running shoes, you will be visiting the shops with sports equipment. Supposing that you want to improve the energy efficiency of your objects, you will be reaching out to the engineers of the Center for Energy Efficiency and Sustainable Development (**CEEFOR**).

Why choose them over the huge competition? Because when you see only data, they see the opportunity to save energy and money and reduce emissions of harmful gases. By contacting them, many domestic and foreign companies seized the opportunity for both themselves and the environment, while improving their business at the same time.

The team of experts of the Belgrade-based company has top-quality references in designing and implementing measures of energy efficiency and the use of renewable energy sources. The knowledge of twenty engineers is based on the best examples from world practice and is supported by the many years of experience in the development of projects, production of technical and project documentation and the provision of support services.

Whether you are hiring the **CEEFOR** as a reliable consultant for energy efficiency and the use of renewable energy sources or as a direct partner in charge of developing studies, projects and project documentation, you can count on the dedicated work of employees in finding a practical and long-lasting solution, adapted to your capabilities and

Photograph: Unsplash/Laura Pratt

- making feasibility studies for the use of renewable energy sources and the construction of power plants,
- consulting and production of all kinds of project technical documentation (General Projects, Conceptual Designs, As-built designs, Projects for building permit, Detailed-Design Projects etc.),
- consulting in the field of preparation and implementation of the energy management system in industrial enterprises at the local level (municipalities and cities),
- information technology in the field of energy savings and implementation.

It would be surprising finding at one place the Recycling Center "Bozic i sinovi" from Pancevo, producer of confectionery and food products "Swisslion Takovo" from Novi Sad, "Knjaz Milos" from Arandjelovac, Winery "Vino Zupa" from Aleksandrovac and public garage "Obilicev venac" from Belgrade, but the list of the **CEEFOR**'s customers includes even this diverse team.

There are also Elektroprivreda Srbije, Lazarevac heating plant "Kolubara", Municipality of Lapovo, Health Center Kladovo, small hydro power plant Ravni, Novi Sad meat processing company "Neoplanta", cardboard factory "Umka", NIS Gasprom-Njeft and Solaris Energy.

When you place your confidence in the knowledgeable hands, there is no room for fear. Your expectations will be outplayed.

Prepared by: Jelena Kozbasic

The team of experts of the Belgrade-based company has **top-quality references in designing and implementing measures of energy efficiency** and the use of renewable energy sources

needs, in the following areas:

- implementation of preliminary, short and detailed energy audits,
- consulting and engineering for financial institutions and investors in the fields of energy efficiency and renewable energy,
- elaboration of feasibility studies related to energy technologies and technologies related to energy efficiency improvement,

Photograph: Energy portal

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ENERGY EFFICIENT SOLUTION

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RENEWABLES AT THE SERVICE OF NATURE AND SOCIETY

Stevica Dedjanski, Ph.D., The State Secretary in the Ministry of Mining and Energy

When we read the news in the field of energy, often we stumble upon terms such as feed-in tariff, auction, net metering and prosumer. If you are not familiar with them and they make you stop reading the article for a second, you will get a first-hand explanation. Professor Stevica Dedjanski, Ph.D., state secretary in the Ministry of Mining and Energy, has clarified these linguistic dilemmas to us. He explained that biomass is energy source beneficial to both nature and society due to producing green energy and reducing harmful emissions while creating green jobs. We also learned from him how to reduce our electricity bills by investing only a little money or no money at all.

EP ***Was the adoption of the Law on Efficient Use of Energy in 2013 a turning point for more efficient use of energy compared to the previous practice?***

Stevica Dedjanski Its adoption has brought a systematical approach to the field of energy efficiency in the Republic of Serbia and has given a legal framework for transposing European regulations in that field. Until then, ad hoc activities were regulated by law. That is how the energy management

Photographs: (bottom left) courtesy of Stevica Dedjanski; (all others) Pixabay

for large energy consumers and the public sector has been introduced by law and how the budget fund for improving energy efficiency has been established. Besides that, labeling of energy efficient devices has been introduced; new companies have been recognized - ESCO companies that are financing energy-efficient projects on the basis of realized energy savings. For the first time, criteria of energy efficiency that should be included in the requests for public procurement of products have been clearly defined. Also, obligations in the drafting and implementation of the Energy Efficiency Action Plans resulting from the assumed obligations towards the Energy Community have been defined and methodological approach to determining savings has been adopted.

Energy savings are planned, implemented and recorded according to the national action plans for energy efficiency. According to the latest action plan from 2016, Serbia has achieved more than 90 per cent of savings planned for the period from 2010 to 2015, and almost 50 per cent of all the savings planned for the period from 2010 to 2018.

The law introduces the obligation to save one per cent of primary energy in the current year in comparison with the previous year to the system's associates in the industrial sector and the public commercial sector.

EP ***System of energy management has started functioning in 2017. How?***

Stevica Dedjanski According to the Law on Efficient Use of Energy, the system of energy management represents a system of organized energy management. The system's associates accomplish the legally prescribed obligations to achieve rational energy use with as little cost as possible.

According to the law, the system's associates include the enterprises and public companies that use more energy per year than government has prescribed; local self-government units with more than 20 thousands of residents; state administration bodies; other bodies of the Republic of Serbia; the bodies of the autonomous province; and public institutions. They create a program and a plan of energy efficiency for the sake of the achievement of the savings goals prescribed by the government; designate the needed number of energy managers; implement measurement for the efficient energy use; submit an annual report on accomplishing the energy-saving goals; provide regular implementation of energy audits; perform other duties. The Ministry of Mining and Energy has so far identified more than 70 legal entities in the manufacturing sector, such as enterprises and public companies, as well as nine enterprises in the commerce and service sectors, and 79 local self-government units as the system's associates.

In enterprises and public companies at the moment, there are 39 appointed energy managers with a license. A total of 45 local self-government units also have a licensed energy manager.

STEVICA DEDJANSKI was born in 1974 in Vrsac. He graduated in 2005 at the Technical Faculty in Cacak. He received his master's degree at the Faculty of Business Studies in Belgrade in 2008, where he also received his Ph.D. in 2010. Since 2008, he has been teaching at the same faculty. The field of his study is the economy.

He was elected as a deputy of the Assembly of Serbia and AP Vojvodina in the two mandates.

He has been serving as State Secretary of the Ministry of Mining and Energy of the Republic of Serbia since August 2017.

EP ***How many energy managers are there in Serbia and has the system come into life practically speaking?***

Stevica Dedjanski Training of energy managers is carried out by the Faculty of Mechanical Engineering of the University of Belgrade for fields of industrial energy, energy at the municipal level and energy in the building sector. So far, 12 training rounds and 17 energy manager exams have been held. The Ministry has issued 103 licenses for the field of the municipal energy sector, 145 licenses for the field of industrial energy and 42 licenses for the field of energy in the building sector.

System associates continue to learn how to fulfil the legally prescribed obligations and how to achieve energy savings. For now, it is still too early to bring up good examples of energy management. The energy management system is well-conceived, but persistence and support in its implementation are needed.

EP ***Although we legally made the first steps towards the improvement of energy efficiency, energy consumption per unit of GDP is about three times higher in our country than in the European Union. Is investing in energy efficiency measures out of the budget of our citizens, or is this a consequence of their insufficient knowledge of the money savings they would bring to them?***

Stevica Dedjanski According to the Statistical Office of the Republic of Serbia, the share of the household sector in the total final consumption is the highest. It amounts to 35 per cent, the economy 29 per cent, and transport 23 per cent. The analysis of buildings in Serbia has shown that 85 per cent of the building fund does not meet the minimum energy efficiency requirements. The prices of energy and energy will increase in the future, which will increase the cost of living.

Insufficient knowledge of the citizens about the possibilities and potential of energy efficiency, but certainly a limited budget as well, influence the state of energy efficiency in the household sector in our country.

In order to reduce energy consumption, it is necessary to operate in three aspects. In addition to making clear legal regulations and citizens' awareness of the possibilities and potential of energy efficiency, we need a financial

Training of energy managers is carried out by the Faculty of Mechanical Engineering of the University of Belgrade for fields of industrial energy, energy at the municipal level and energy in the building sector

incentive in the form of incentive measures, subsidies and lower interest rates for investments in energy efficiency.

Even though we are behind some of the Western European countries in the fields of energy efficiency and renewable sources, we are heading in the right direction. In comparison to some European countries, we are at a similar level, or we are better. We are giving more and more importance to those fields in every segment of our society.

EP ***PVC windows, air heat pump and wall and roof insulation, are some of the more expensive solutions for improving energy efficiency. Tell us several measures that do not require the investment of substantial funds.***

Stevica Dedjanski The cost-optimal energy rehabilitation of existing buildings, or the definition of a package of energy efficiency measures, is best determined by the characteristics and conditions for a concrete building, depending on its state. Those measures, which bring significant savings over time, are often, at the very beginning, a great investment.

However, there are also low-budget measures of energy efficiency such as replacing old bulbs with wire filaments with new LED lamps, installing sealing gums on exterior joinery, then installing curtains on windows and balconies located on the south and west side of the building due to too much sunshine in summer months, investing in energy efficient home appliances, installing thermostatic heads on radiators to optimize heat in rooms, etc.

Also, besides investment measures, reducing energy consumption is possible by applying measures that affect consumer behavior, for example: controlling if the household appliances are turned on or turned off (boiler, washing machine and oven should not be turned on at the same time), electricity and heating bills control, switching to paying the thermal energy per consumption which is profitable for isolated objects, and so on.

EP ***Which renewables are the investors in Serbia most attracted to and how would you explain that?***

Stevica Dedjanski In Serbia, a package of incentive measures for the production of electricity from renewable sources and high-efficiency combined production of electricity and heat is in force. It is regulated by the Energy Law and the Regulations package.

Investors have shown the greatest interest in solar power plants and wind farms. Besides, the number of new small hydroelectric plants continues to grow, while in the last year the number of new biogas plants has also increased significantly.

EP ***We aspire that 27 per cent of final energy consumption in Serbia comes from renewable sources by 2020. Does this goal seem feasible in the mid-2019 period?***

Stevica Dedjanski Currently, the share of renewable energy sources in final gross consumption is around 22 per cent. Year-on-year renewable energy production is increasing, but due to industrial development, the total final energy consumption is also parallelly increasing. For this reason, it seems that progress is relatively slow.

By implementing specific policies, we are trying to achieve the goals set in the field of renewable sources.

By the end of the year, the majority of the planned 500 MW wind farms, grouped mostly in southern Banat, should be connected to the electricity system. In addition, 17 biogas plants with an average power of around 1 MW are already on the grid at this moment, while the completion of another 23 biogas plants is expected very soon.

Every year, 10 to 15 small hydropower plants are put into operation in Serbia. At the moment there are currently more than 100 small hydropower plants with a total power of 65 MW, while 22 more are under construction.

EP ***Does the state take into consideration that the energy transition to renewable sources should go along with caring about workers in the fossil fuel production sector?***

Stevica Dedjanski he use of renewable sources could have a positive impact through the employment increase as well. Our most important renewable energy source is biomass. Its use requires a huge number of workplaces.

For the use of natural gas, oil and coal derivatives, large systems and relatively little labour force are required. The production of biomass as an energy source, whether agri-

cultural or forestry, requires much more engagement of workers than all types of fossil fuels.

Also, not only low-skilled workers, who would work in fields or in forests to collect biomass, are needed but also specialists who are indispensable for the design, production and installation of high-efficiency biomass furnaces.

EP ***Explain to our readers the difference between feed-in tariffs and auctions. Are there any signs that feed-in tariffs will be replaced with auctions?***

Stevica Dedjanski Subsidized power producers who have gained the right to incentive measures through feed-in tariffs will not move to the auction system but retain their acquired rights until the expiration of twelve-year contracts. The new system recommended by the Energy Community, known as the auction system, only applies to new large power plants. Each country is free to regulate this system itself following its market attributes and strategic commitments. The Ministry of Mining and Energy, in cooperation with the European Investment Bank, is currently working on a study that will help determine which auction model would be most favorable for Serbia.

The key difference between the system of feed-in tariffs and auctions is that with feed-in tariffs, the investors are practically continuously offered the opportunity to compete for an incentive price set by the state. In auctions, as the name implies, the state organizes public bidding for a certain amount of capacity of new power plants. Auction participants submit their offers under pre-determined conditions. The best deals in terms of the lowest price of electricity that the bidders will produce in their power plants will win the auction and get the right to sign an energy purchase contract at a price specified by the auction. The main advantage of the auctions system over feed-in tariffs is in the market competition of the producers, which will positively affect the price of electricity in the incentive system. Practically, the fee paid by end customers, which would cover the difference between the market price of electricity and prices from power plants using renewable sources, will be lower in relation to the fee in the system of fixed feed-in tariffs.

EP ***How the TurkStream will affect the energy security of Serbia?***

Stevica Dedjanski The continuation of the TurkStream passing through Serbia in the length of 403 km is a project of the highest importance for our country. First of all, it will guarantee our energy security, which is essential today. So far, we have had a gas flow from one direction, and that's why we were vulnerable. Serbia needs more and more energy. Every day we are developing economically, and we need more and more energy. Gas is the first topic to be asked by foreign investors when they are planning their investments.

The size of this project should also be taken into account. For example, 180 thousand tonnes of pipes will be installed. Imagine all other accompanying works! To a large extent, they will be performed by domestic companies.

The state is also thinking about new directions of supply. We are working on the interconnection with Bulgaria and Romania, and we plan to get involved in supplying from the LNG terminal in Greece if it ever comes into existence.

Serbia is concerned about its own interests and one of them is energy security. We aim to always have enough energy for the needs of our citizens and economy, in this case, gas, and that the solution is economically most profitable.

EP ***The budget fund for improving energy efficiency has allocated 500 million dinars for 2019. How and where will these funds be spent?***

Stevica Dedjanski In 2019, a public invitation was announced for the allocation of 325 million dinars for co-financing projects for improving energy efficiency in facilities of public importance within the competencies of local

SERBIA'S ENERGY MIX

			Mil ten*
GROSS ELECTRICITY PRODUCTION	GWh	37046	3,185
Thermal power plants	GWh	26415	2,271
Hydroelectric power plants	GWh	9752	0,839
Thermal power plants	GWh	291	0,025
Solar power plants	GWh	13	0,001
Wind power plants	GWh	48	0,004
Other:	GWh	526	0
biogas	GWh	72	0,006
natural gas that produces electricity from highly efficient combined production	GWh	115	0,010
industrial energy	GWh	340	0,029
PARTICIPATION IN GROSS PRODUCTION OF ELECTRIC ENERGY			
Thermal power plants	71,30%		
Hydroelectric power plants	26,32%		
Thermal power plants	0,79%		
Solar power plants	0,04%		
Wind power plants	0,13%		
Other:			
biogas	0,19%		
natural gas that produces electricity from highly efficient combined production	0,31%		
industrial energy	0,92%		

*** million tonnes of oil equivalent**

self-government units and city municipalities and for public lighting systems. The rest of the funds will be used for the completion of projects from the public call for 2018 and the production of technical documentation for individual public buildings.

For public invitation published in 2019, about 70 projects for the rehabilitation of public facilities were reported. The priority is given to school and health facilities, especially in the poorest regions. One of the criteria also refers to the energy efficiency measures that bring the most energy savings.

All users of the funds are obliged to enter data on energy consumption for the facilities registered in the ISEM database (Information System for Energy Management), based on which the realized energy savings in the following period will be monitored.

EP ***Which project do you consider as the most important in the field of energy efficiency in our country?***

Stevica Dedjanski I would like to highlight projects funded by the budget fund for improving energy efficiency, also the Energy Efficiency and Energy Management Project in municipalities in Serbia, implemented by the Government of the Republic of Serbia and the Government of the Swiss Confederation in 4 municipalities with over 20 energy rehabilitation projects and the Program rehabilitation of a district heating system in Serbia in 22 towns, implemented since 2001 in the framework of the Financial Cooperation between the Republic of Serbia and the Federal Republic of Germany, together with the German Development Bank - KFW. Negotiations with the Development Bank of the Council of Europe are also underway regarding taking loans for the implementation of the Energy Efficiency Improvement Program in central government buildings from the loan funds for improving energy efficiency.

In addition to these investment projects, technical assistance projects implemented in cooperation with UNDP and GIZ, as well as projects financed from IPA funds and other donor funds, are also important for us.

A key step in the forthcoming period will be the creation of a new Energy Efficiency Fund, as a separate legal entity, but with ten times more funds available in relation to the budget fund and great assistance from the European Commission, from which we will receive grants in several stages from the IPA funds in the total amount of about 30 million euros. We expect more funds from the funds of the European Union, especially after accession. The establishment of the Energy Efficiency Fund will result in direct investment in energy efficiency, as well as in the possibility of enhancing the capacity to attract money from the European Union Fund for this purpose, and which other countries that have such funds are using extensively.

EP ***The Ministry of Mining and Energy should, by the end of the year, prepare by-laws for introducing net metering. Which novelties would bring the system of measuring electricity established in such a way and what is going to be different compared to the current one?***

Stevica Dedjanski The net metering system implies that consumers of electricity can also be its producers, most often by installing small photovoltaic power plants on their facilities. In the period when electricity production is higher than consumption, the net metering system would allow the produced surplus electricity to be delivered to the distribution network. Later processing, under specially specified conditions, it is possible to make a correction of the account of such a customer or reduce the amount of the account for the value of the amount of energy that is transferred to the system. This method of calculation from a technical point of view requires the installation of smart meters, which enable measuring the energy flow in both directions and a certain revision of the rules for connecting objects to the system. In legal terms, it is necessary to define a new category of buyer-maker, in English terminology known as prosumers.

Interview by: Jelena Kozbasic

ABB ABILITY™ DIGITAL POWERTRAIN

FOR DRIVES AND MOTORS

Electrical powertrains – the motors, generators,drives, converters, bearings and gearboxes that drive pumps, machinery or other process equipment – are particularly critical components of many processes and must be kept running. ABB has now introduced the ABB Ability Digital Powertrain to improve engineering efficiency, safety,

equipment uptime and production output while reducing risks and costs in everyday operations. ABB Ability Digital Powertrain keeps operations running efficiently – and even predicts failures before they happen.

The Digital Powertrain is a suite of digital products, software and services for motors/generators, drives/converters and mechanical powertrain components such as bearings. Surprisingly, over 80 percent of powertrains are currently not monitored. Therefore, providing a simple, costefficient solution like the Digital Powertrain will be a game-changer. Each powertrain can send data to the cloud that is then visible to the operator on a simple dashboard. Data analytics and connectivity with ABB experts make operations efficient, predictable and safe.

Digital Powertrain Internet of Things (IoT) solutions encompass devices, software and services. ABB Ability Condition Monitoring for powertrains, for example, is a service product that visualizes the data of the individual assets of an electric powertrain in a unified monitoring system and, with the help of ABB's expertise, delivers comprehensive insights as to maintenance, repair or replacement needs. Other service products in the ABB Ability Digital Powertrain cover life cycle assessment, virtual commissioning and remote assistance. These products are complemented by physical devices such as ABB Ability Smart Sensors for pumps, mounted bearings and motors, and wireless Internet gateways. The digital powertrain opens up many fields for additional actionable insights, analyses and informed decision making. It shows the way forward so that modern industry can achieve better reliability, uptime and efficiency – and reduce costs. ■

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Photographs: ABB

Photographs: VELUX

WHEN I SAY WINDOW, I MEAN VELUX

Stevan Culibrk, The Project Support at VELUX

Nice weather is coming when we usually renovate spaces where we live, work, and spend pleasant moments with friends and family. Then we change windows, doors, blinds, we paint or replace the façade. When asked who to contact for professional help in the renovation, the first answer and friends' recommendation is usually VELUX. And everyone agrees that there are no better ones in this field. However, few of us know the details that determine this company and provide her with the label "the best in the business"

Just because I like to know what is embedded in the environment I dwell, I addressed top experts – representatives of VELUX Serbia. I asked them questions that I know for sure will be interesting for their new customers and clients.

I was pleased to receive a lot of important information, perhaps even more than I could imagine, from Mina Markovic from the Marketing and Sales Department and Stevan Culibrk from Project Support Department. Their professionalism, expertise, and dedication to help me select the product and provide top-notch service and necessary information cannot leave indifferent even the most demanding customers.

EP ***The company VELUX Serbia was established in 1997 but it is less known that it is just one of the daughter companies. Can you tell us more about the parent company?***

Stevan Culibrk Although materials were hardly available during the Second World War, the Dane, Villum Kann Rasmussen managed to construct the first VELUX roof window that will turn dark, uninhabited attics into bright and inspirational places across the globe. The first VELUX roof window was mounted in one elementary school in 1942, and in the same year, it was registered as a brand. The idea came from an architect who sought a technical solution that would allow the room below the roof to be functional as a classroom. The name VELUX is a two-word coinage: VE from ventilation and LUX from the Latin word for light, which emphasizes the two basic elements that the roof window brings into space, which are fresh air and natural lighting. The VELUX company's headquarters is located in Denmark in Horsholm.

For more than 75 years, VELUX has been creating a better living environment in homes around the world. We have production and sales in more than 40 countries with an extensive distribution network. Our products include roof windows as well as a range of decorative elements: outdoor sun protection, interior blinds, installation products and remote-control products.

EP ***When we say the roof window, we all think of VELUX. However, this is just one type of windows in your company's offer.***

Stevan Culibrk Almost everybody name roof windows as VELUX, which makes us extremely proud, and our brand is

FOR FLAT OR PITCHED ROOF

The roof of inclination from 0° to 15° is considered a flat roof, and in the VELUX production program there is a wide range of products whose technical characteristics allow installation on the mentioned slope. "Here I would emphasize a window with curved glass, which is a top-notch solution for roof slopes from 0° to 15°. The outer glass, scratch-free and 6 mm thick, extends beyond the supporting frame and allows raindrops to run off easily. The black frame discreetly connects the window to the roof. The innovative and unique design of the exterior curved glass called CurveTech ensures optimum functionality and a clear view. The curved glass, as an upper element, can be combined with a fixed or electrical bottom element. The bottom element consists of a PVC insulated frame equipped with two-layer glass. A simple remote control controls the model with the power supply. The built-in rain sensor closes the window with the first drops of rain. A window with a curved glass perfectly isolates the sound of rain drops or sounds of the city," Stevan explained in detail, adding that blinds that provide perfect amount of light are available as well as heat protection awning blinds.

"We consider the roof with the inclination from 15° to 90° pitched roof, and we offer a wide range of products for pitched roofs. In this segment, I would point out a series of Standard Plus products," our interlocutor recommended. This series of products is for homeowners – who live in lofts, houses or apartments who are willing to invest in high energy efficiency and comfort. This includes an extremely energy efficient triple glass with Uw 1.1, which facilitates the maintenance of heat in the home. Stevan draws attention to roof windows with a thermally modified wooden core, coated with a white polyurethane layer that is 100 per cent without additional maintenance and suitable for all rooms, especially for areas with high moisture content. "I would highlight another product, which is a universal connector for combinations with façade elements. Until now, it was not possible to connect other vertical parts with the VELUX roof window, due to the installation challenges and the structure of already existing elements in the house. We are always trying to respond positively to market demands, and now it is very simple," said Stevan proudly. With the help of a universal connector, VELUX experts can help you build a roof window above another façade window or even a door.

* Technical values are a result of calculation models from the international standards EN ISO 12567-2, EN 13363-2 and ISO 15099.

Close your VELUX blinds and open up your life

Enjoy heat protection with VELUX Awning Blinds. They stop the sun's rays before they reach the window pane, reducing the amount of heat that enters your home. And you can still open your window for cool breezes and fresh air circulation.

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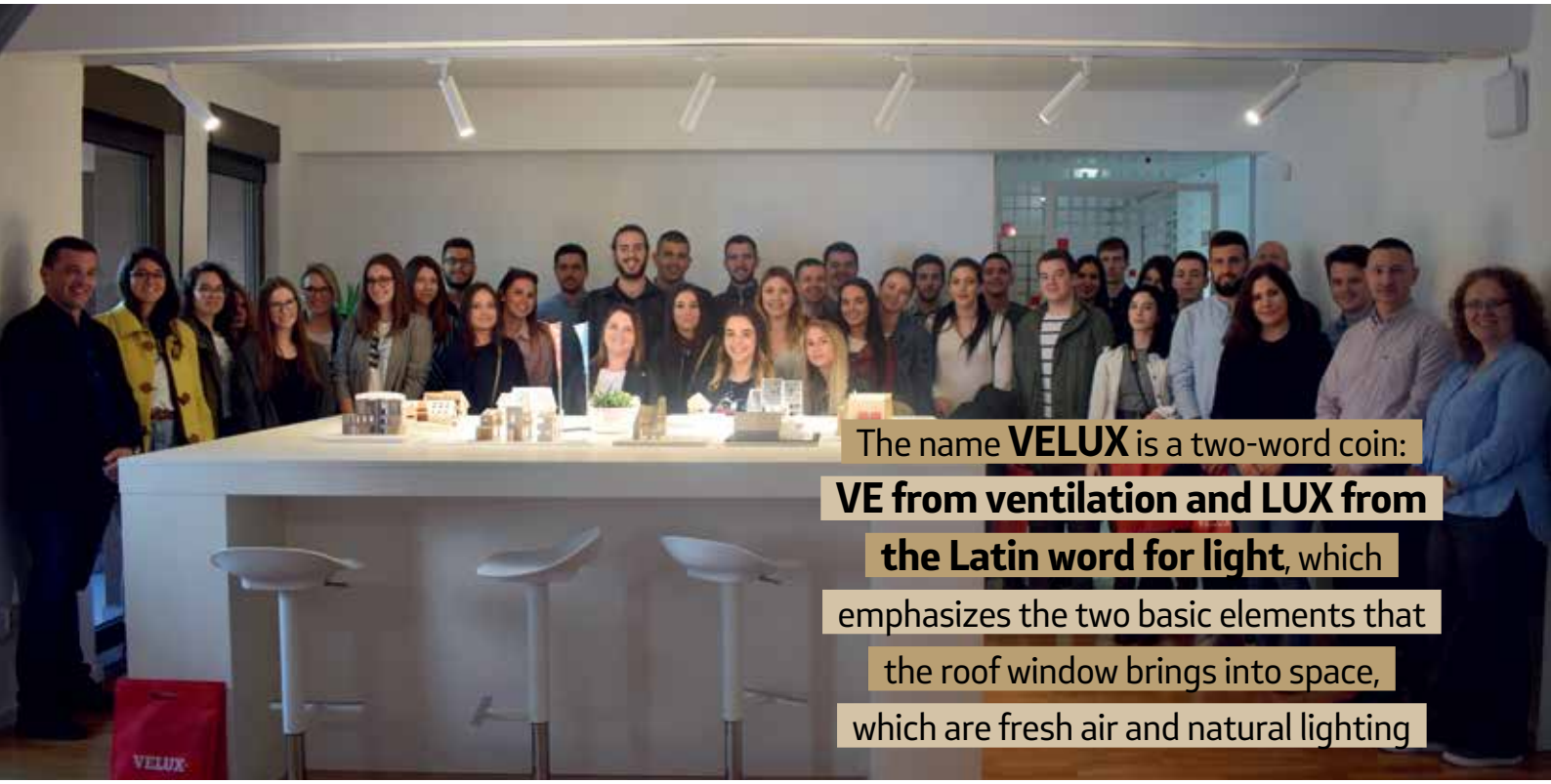


also the first association for roof windows for pitched roof. However, the VELUX product range applies to all types of inclined roofs from 0° to 90°.

If you want superb comfort, the solution is the VELUX INTEGRA® roof window with the remote control. With the remote control, you can control the window, interior and exterior blinds from anywhere in the house. The built-in rain sensor ensures that the window closes automatically with the first drops of rain.

VELUX CABRIO® turns your roof window into a balcony in just a few seconds, so you can enjoy the fresh air without leaving home. Opening the lower part automatically raises an integrated fence that provides the necessary security. We also have a roof terrace that is an excellent solution for the roof inclination from 35° to 53°.

The VELUX ACTIVE window provides automatic control of the indoor climate, taking into account three parameters: temperature, humidity and CO_2 levels. The system automatically regulates the opening and closing of the roof windows, as well as the interior and exterior blinds providing a healthier indoor climate.

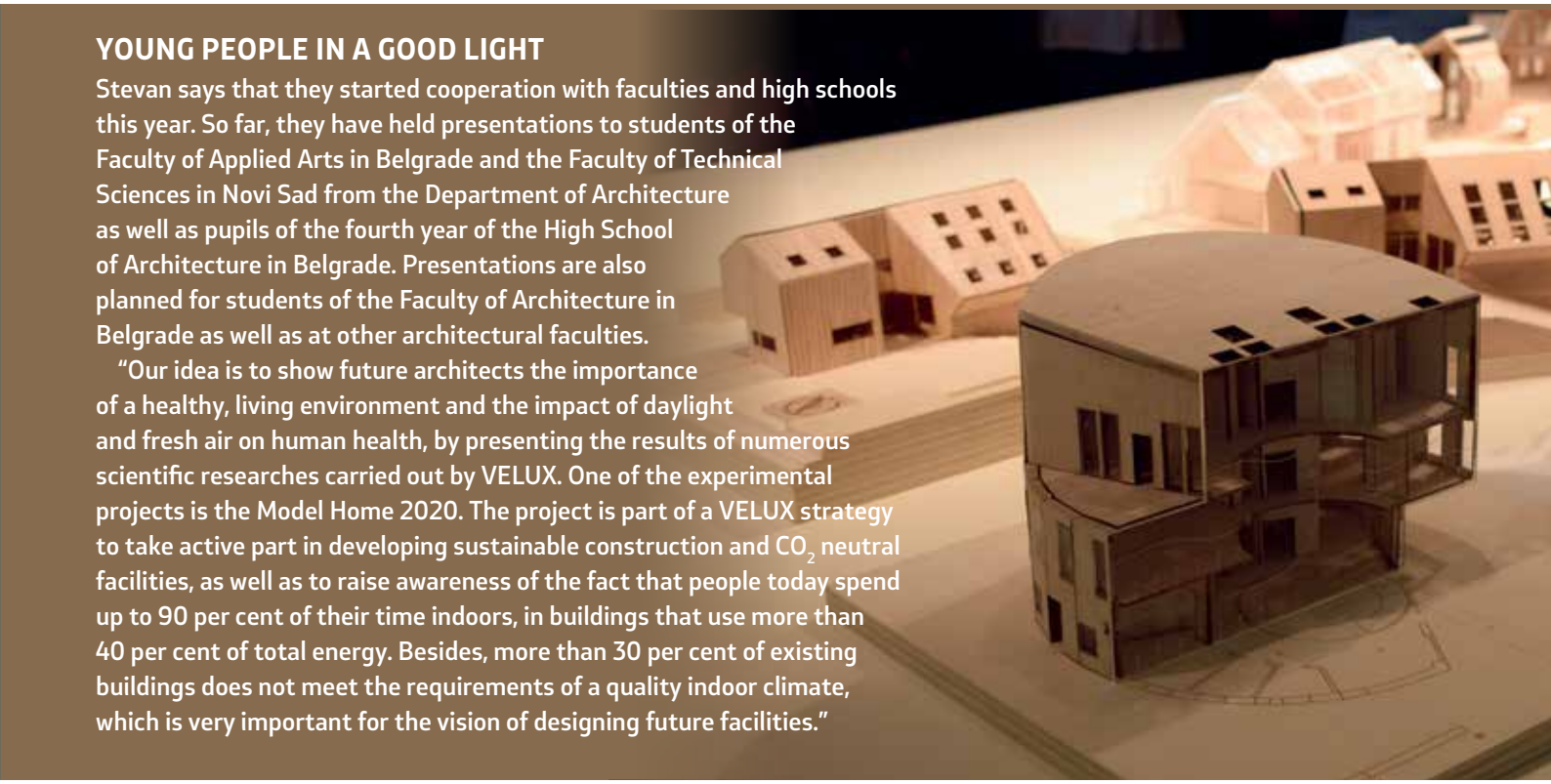
With the VELUX sun tunnel, which can be for flat and pitched roofs, it is possible to get natural light even in the darkest parts of the house. Through a high reflection tube, the light can be transferred from the roof to the ceiling if their distance is up to 6 m. It is deal for small rooms and narrow spaces, such as corridors, bathrooms and rooms without natural light. They are an excellent solution even on cloudy and winter days. The tube is 35 cm in diameter, and it is coated with a super-reflective coating which allows the light transmission to be 98% in the room.

EP ***You mentioned there are windows for flat and pitched roofs. Which are sold more and why?***

Stevan Culibrk VELUX is recognizable for the windows for pitched roofs, and they indeed occupy an important place in our sales. But as the trends in the construction industry are oriented to a flat roof, the windows for flat roofs are becoming increasingly important. Here, I would point out that the flat roof windows give three times more light than the facade windows. The façade window, no matter how big, cannot provide the distribution of light to the depth of the room. This problem is very efficiently resolved with VELUX flat roof windows, which in that way, enable a healthy living environment.

EP ***Do we only buy windows and accessories, or your team of experts assists in assessing, selecting, installing and servicing?***

Stevan Culibrk In VELUX, special attention is paid to customers. We launched free counselling and consultations on the selection and installation of VELUX windows throughout the territory of Serbia. The team of experts contact the customer, arrange the appropriate appointment and on the spot take a look at the attic, the roof construction, the technical possibilities of installation as well as the needs of each customer. Based on this, we propose appropriate models and dimensions, as well as a recommendation for an authorized dealer and installer. What is also very important is to note that our products, if properly installed, have a warranty of up to 10 years. We have technical support in the field and service beyond the warranty period. There is also support for projects and work with architects, so we have encompassed all client groups with our services.



YOUNG PEOPLE IN A GOOD LIGHT

Stevan says that they started cooperation with faculties and high schools this year. So far, they have held presentations to students of the Faculty of Applied Arts in Belgrade and the Faculty of Technical Sciences in Novi Sad from the Department of Architecture as well as pupils of the fourth year of the High School of Architecture in Belgrade. Presentations are also planned for students of the Faculty of Architecture in Belgrade as well as at other architectural faculties.

"Our idea is to show future architects the importance of a healthy, living environment and the impact of daylight and fresh air on human health, by presenting the results of numerous scientific researches carried out by VELUX. One of the experimental projects is the Model Home 2020. The project is part of a VELUX strategy to take active part in developing sustainable construction and CO_2 neutral facilities, as well as to raise awareness of the fact that people today spend up to 90 per cent of their time indoors, in buildings that use more than 40 per cent of total energy. Besides, more than 30 per cent of existing buildings does not meet the requirements of a quality indoor climate, which is very important for the vision of designing future facilities."

EP ***In the world there is a trend of offering discounts. What benefits do you provide to your customers?***

Stevan Culibrk We had a great spring action in May, we wanted to please all our customers. By purchasing a basic and energy-efficient package, customers received free products. Also, very important are the current actions of our distributors throughout the year. We try to ensure that our authorized dealers always have some benefits, discounts and actions that will help end customers.

EP ***Among your products, besides windows, you also have a wide range of blinds. Tell us more about that.***

Stevan Culibrk We have divided this segment into three categories: heat protection, protection from light and insect protection. Most people make a mistake and protect themselves against the heat with the inside blinds. In this case, we allowed the heat to enter the room and accumulate it between the glass and the interior shutter, and we got a darkened room and a hot blind that radiates heat. The VELUX solution is to prevent the heat from entering the room with an outside mesh or aluminium shutter. When using an external mesh, the temperature decreases up to 76 per cent, and light passes into the room. For the protection against light, we use interior blinds. Our recommendation is "SIESTA" shutter for complete darkening. It is a great choice when it comes to bedrooms because daylight can compromise a healthy sleep and rest. We also have a large selection of decorative blinds for directing light in living rooms, studies and children's rooms. For effective insect combat, we have an insect screen that can be stowed neatly away in the casing when not in use.

EP ***Are materials from which your products are made ecological?***

Stevan Culibrk VELUX roof windows are made of Nordic Pine with five laminated glass and coated with low-e coating, and the exterior glass is tempered. The inner glass can be laminated, two layers of glass are joined by foil so that the glass does not fall apart in case of fracture. VELUX windows are Argon or Crypton gas-filled, depending on the model. The windows can be with two glasses (Uw = 1.3 W/m^2 K,) three glasses (Uw = 1.1 W/m^2 K) or with three glasses where the internal lamination with a coefficient Uw = 1.0 W/m^2 K. The flashings are aluminum so that the entire window is made of natural materials. The windows can be coated with two or more layers of water-based acrylic lacquer or coated with polyurethane layer and coated with a white polyurethane paint. The windows with polyurethane have an additional thermally modified wooden core with less than 2 per cent of moisture. All windows have an advanced ThermoTechnology insulation system. Also, all VELUX roof windows have a ventilation opening with a filter, against dust and insects, which allows the entry of fresh air even when the window is closed. The efficiency of the solar gain, depending on the model, ranges from 46 to 55 per cent.

EP ***In the end, if I asked you which product or what you are particularly proud of in your company, the answer would be ...***

Stevan Culibrk We could not specifically pinpoint a product. We are all proud of everything. Nevertheless, we are especially proud of having satisfied customers of VELUX products as a result of the skilled and professional team.

Prepared by: Milica Jordan

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

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Carport with 2 parking lots and solar power plant with 5 kW capacity

Carport for 2 parking lots without footpath is suitable for installation of 15 PV modules

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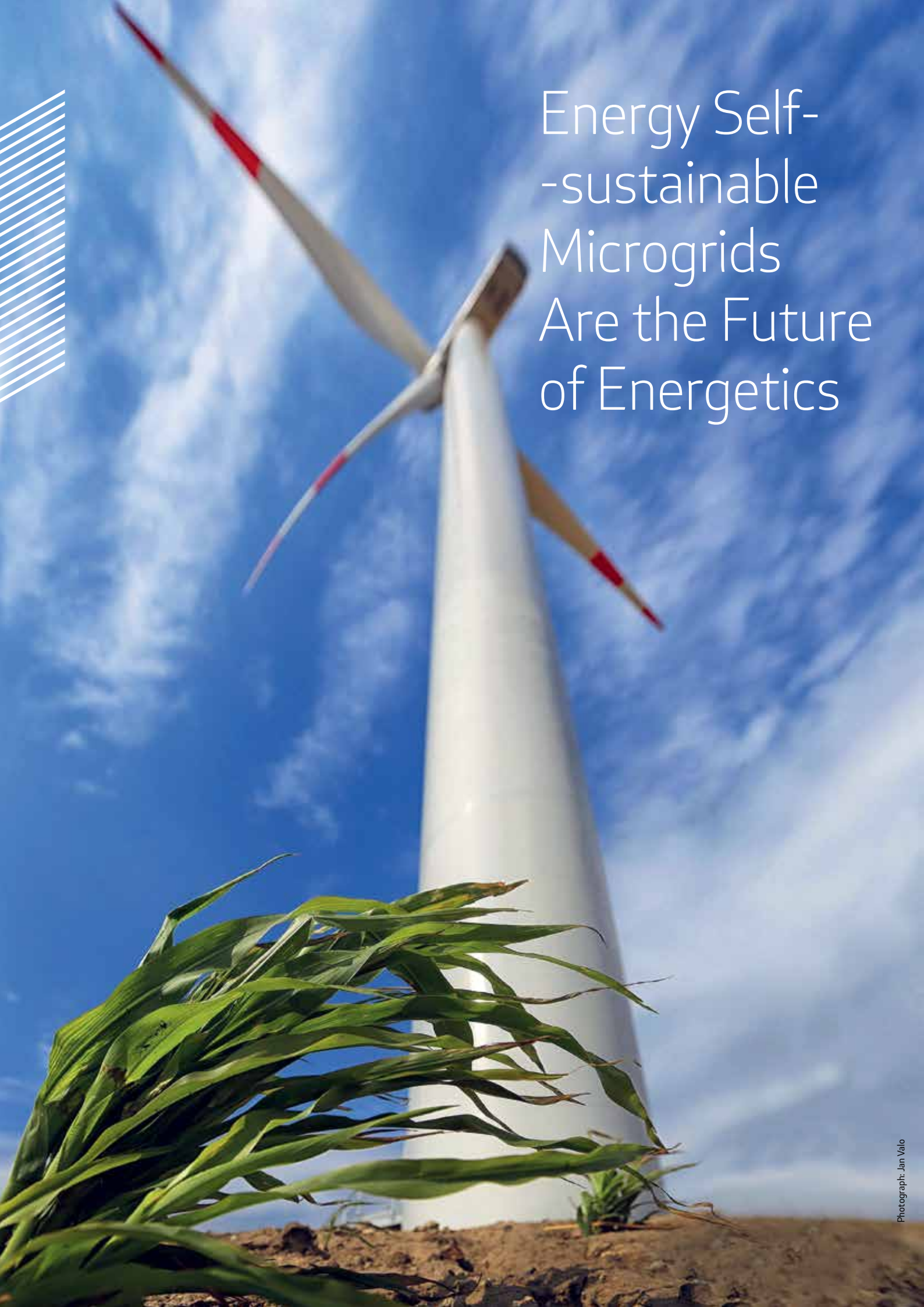


Photograph: Jan Valo

Zeljko Djurisic, The Professor at the Faculty of Electrical Engineering in Belgrade

Zeljko Djurisic completed his first year of studies at the Faculty of Electrical Engineering in Podgorica. Starting from the second year, he studied at the Faculty of Electrical Engineering in Belgrade, at the Department of Power Systems (PS).

He defended his undergraduate dissertation in 1999, and this master's thesis seven years later. In 2013, he defended his PhD dissertation entitled "Modeling and analysis of the influence of spatial and temporal wind power profile on the design and exploitation of wind farms in electric power system" at the Faculty of Electrical Engineering in Belgrade. In 2018, he became Associate Professor.

Renewable energy sources, digital relay protections, electrical machines, electric power quality, plasma thin-film technologies are the fields of his scientific research.

He is the co-author of three books and the author and co-author of around 200 scientific and professional papers, 20 of which have been published in influential international journals from the SCI list (Science Citation Index).

Professor Zeljko Djurisic lectures at the Faculty of Electrical Engineering in Belgrade. According to anonymous claims on the portal "Rate Professor", there were students who would only come to the faculty because of his lecturers. Regardless of whether these statements were given by nerds who once racked up As or laggers who preferred sipping coffee at a nearby café in relation to lectures, the compliment does not lose significance and testifies to Djurisic's pedagogical skills and receptivity.

In an interview we conducted recently, Professor Djurisic showed that extensive professional knowledge, turned into numerous books and research paper can adapt to non-specialists as we are. He revealed to us where the exhaustion of coal reserves and the lack of a strategy for decarbonisation of electricity production could lead Serbia and also why engineers prefer to opt for employment in private companies rather than in the public company "Elektroprivreda Srbije".

EP ***Which course of the master studies is the most sought-after, and which one do you consider the most promising in the current labour market conditions?***

Zeljko Djurisic The labour market influences students when choosing a course at the undergraduate level to a large extent. It was particularly felt when the infrastructure of mobile networks in Serbia was built, and then telecommunications were the most popular. The development of renewable energy sources then brought the popularity of energy, and digitization now brings popularity to computer technology.

The labour market does not have a decisive influence on the choice of course on master studies. Engineers are already formed as well as their affinities toward some of the expert areas they acquired during undergraduate studies which determine their choice of study module. On the module of the Electrical Grids and Systems, where I am engaged, there are three courses of master studies: Grids and Systems, Facilities and Equipment and Renewable Energy Sources. Last two to three years, the students' interest in all three directions is approximately equal. I believe that this is good for the labour market because the projects in the energy sector are complex and cannot be tied exclusively to one segment of the profession.

EP ***One of the subjects taught at the PhD studies is the integration of renewable energy sources into the distribution system. What are the optimal parameters which the grid needs to fulfil so that renewable energy sources can be connected to it?***

Zeljko Djurisic Technical conditions for the connection of renewable resources are mainly defined by the regulations. In our country, those are the Regulations on the operation of the distribution and transmission system. These regulations define measurable criteria that must be met so that a power plant can be connected to a distribution or transmission system. However, the problem of the massive integration of

Photograph: courtesy of Zeljko Djurisic

ELECTRIFICATION OF TRANSPORT IS NOT THE SAME!

A charger for electric vehicles was recently installed at the Faculty of Electrical Engineering thanks to a donation from MT-Komex and Schneider Electric. We used this event as an occasion to talk to Professor Djurisic about electromobility. "On this occasion, I would like to thank MT-Komex and Schneider Electric for the donation. Electrification of transport is a new thing in our country and the world, and it has a significant impact on multiple systems. Among other things, electromobility significantly changes the operating conditions of the power system. Therefore, the development of expert staff in the field of electricity is one of the key prerequisites for successful electrification of transport. In this sense, this donation is of particular value since it will enable the development of new laboratory practical training and the improvement of teaching in the field of integration of electric vehicles in power systems", said the Professor.

It is very important for the state to consult relevant institutions and experts while formatting effective incentive measures in the area, says Djuric emphasising that electrification and decarbonisation of transport are not necessarily synonyms.

"People often put the sign of the equation between electrification and decarbonisation of transport. This sign can only be put there if renewable energy sources are developed in proportion to electrification. In the current regulatory framework, driving of electric cars in Serbia does not mean a reduction of harmful gases, but only their spatial displacement. If we drive an electric car in Belgrade, we have shifted the emission of harmful gases from Belgrade to Obrenovac, since we had to increase the production of electricity in thermal power plants, which would cover the consumption of an electric vehicle in Belgrade. Therefore, the basic task of the state is to ensure equality between electrification and decarbonisation of transport. This can be achieved by integrating subsidy measures for photovoltaic power plants and measures that directly stimulate the purchase of electric cars, such as tax breaks, benefits in traffic, parking benefits, and other", explains the Professor concluding that every kilowatt-hour spent by an electric car should be purposefully produced in some renewable energy source and that in that regard the most suitable are roof-mounted photovoltaic systems.

"According to the study developed by the Faculty of Electrical Engineering in Belgrade, it would be sufficient to install about 4kWp of photovoltaic panels to cover the annual electricity consumption of the average passenger car, and that requires around 25m^2 of roof area and the investment of 4,000 euros," Djurisic argued his viewpoint.

renewable sources is not related to the connection point. It represents a systemic challenge. The main limitation of the connection of renewable sources is to ensure the flexibility of the system. It is necessary so that intermittent energy sources, such as solar and wind, could be integrated into the power grid. Flexibility is the ability of the system to provide, in all real connections of generation and consumption, satisfying technical performances of the system: voltage constraints, power flows, safety principles...

EP ***What is the general state of our grid? What are the losses of the active power which incurred in the transmission of electricity?***

Zeljko Djurisic: The Serbian Electric Power System did not follow world trends, especially in terms of the development of the distribution network. Technical power losses in the distribution network are significantly higher than in the European electricity system and range up to 10 per cent, which indicates the underdevelopment of the network. "Elektroprivreda Srbije" must make an effort to change the existing situation and make the system more flexible. It includes strengthening of critical transmission lines, automation of distribution facilities and installation of advanced relay protection systems, switchgear and measuring equipment. Unfortunately, Elektroprivreda Srbije is an inert system that does not show visible signs for the improvement of the system. Today, there are no jobs in Elektroprivreda Srbije on which young engineers could affirm their knowledge of modern energy. Therefore, they are looking for jobs in private companies rather than in the power utility. That has to change if we want to create an electric distribution system that will keep pace with world trends.

The transmission network is much more developed, and the losses are on the average level of European operators' networks. Several projects which are in the implementation phase will significantly improve the transmission system. First of all, it is a Trans-Balkan corridor that will represent the main power exchange between eastern and western Europe. The strong interconnection is crucial for the increase of the conditions for the construction of renewable energy sources in our region. Of course, there is still plenty of room for the improvement of the transmission grid, both through the construction of new transmission lines, especially in the regions with good wind sources, and trough the construction of advanced systems for grid monitoring and real-time management. It can provide better capacity utilization and more reliable work in extreme meteorological and other complex conditions.

An essential aspect of improving flexibility is the cooperation between transmission and distribution network operators. It is crucial for the development of auxiliary service market in the new environment in which there is no

Serbia is strategically still orientated towards coal exploitation. Who gave the right to this generation to spend all the coal in Serbia?

clear boundary between the producers and the consumers of electricity.

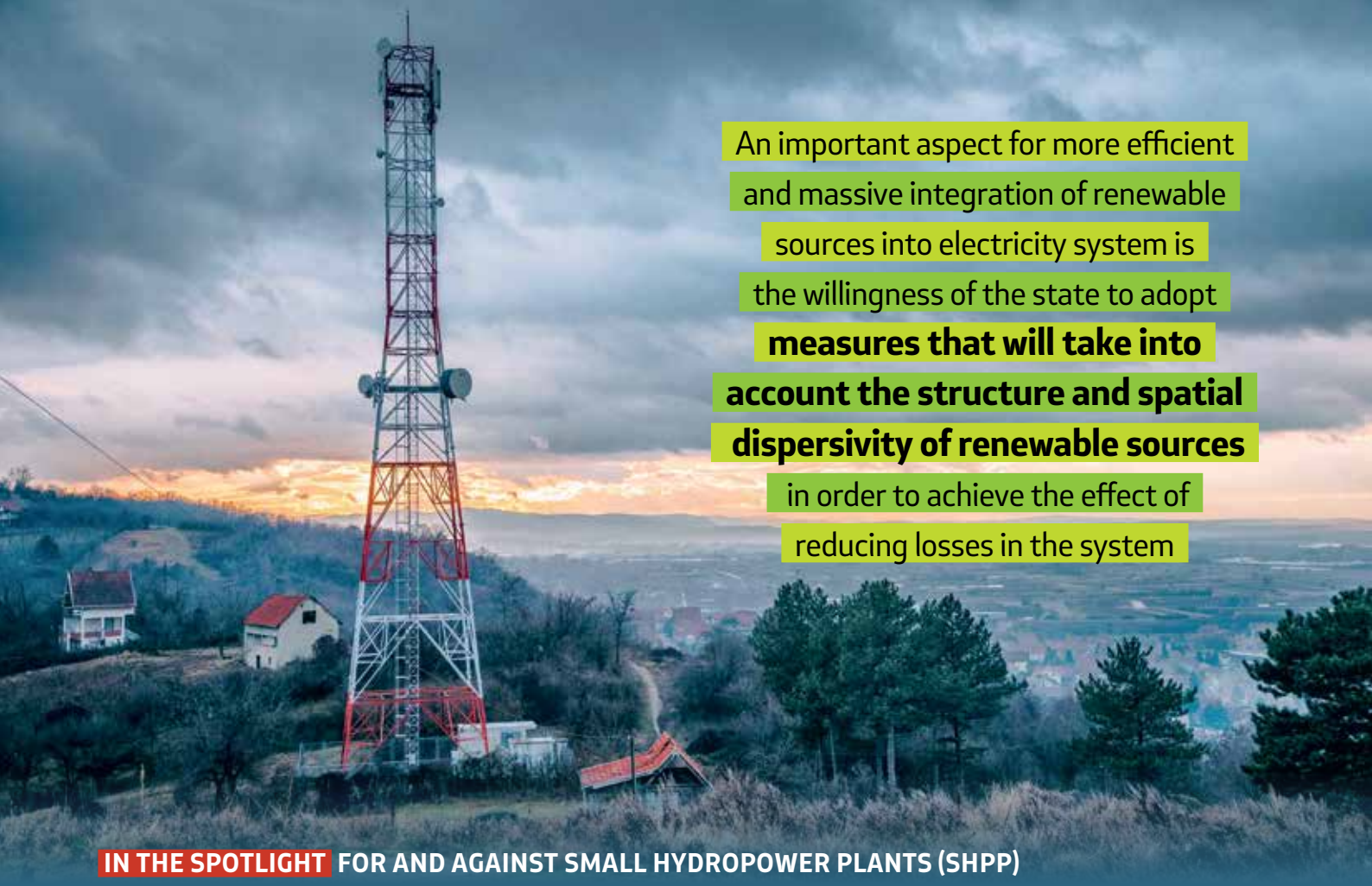
EP ***How is the power plant which uses renewable energy sources connected to the grid? Are the costs borne by the investor or the Elektroprivreda Srbije and what does that depend on?***

Zeljko Djurisic When it comes to connecting to the distribution grid in a technical sense, small power plants can be divided into those that connect via energy converters and those that are connected directly. The first group includes photovoltaic power plants and modern wind power plants, while biomass power plants and small hydropower plants mainly use synchronous and rarely asynchronous generators that are directly connected to the grid. Technical conditions, which power plants must meet to be connected to a certain point in the power system, are defined for both categories. Often, preferred connection point does not meet the Regulations on the operation of the distribution, and Elektroprivreda requires a connection at remote locations, which further requires the construction of transmission lines, and that represents significant costs for the investor, and it also has a negative effect on the environment. In Europe, it is harder to get a license to build a transmission line than to build a power plant. If it is necessary to build 20 km of transmission in order to connect a power plant of several megawatts, it is not just an issue of the economy. At the Faculty, we have done a lot of research into the effects of the connection of renewable sources and conducted analyses. These research showed that the conditions of connecting could be improved with the use of modern power electronic devices which contribute that both the electric distribution and the investor have benefit from the operation of a small power plant. In this regard, I believe that there is room for the improvement of the existing Regulations and Operation Management of Distribution Networks. Conditions and alternative solutions for the connection must take wider aspects of the plant's impact on the distribution system. For example, the existing Regulation did not take into consideration the impact which connection of a small power plant has on electricity losses in the distribution system. It is precisely this factor that should define the choice of connection point and also the split of costs between the investor and Elektroprivreda.

EP ***Which renewable energy source in Serbia has the most significant potential, and which is the most cost-effective when it comes to the return of the investment?***

Zeljko Djurisic When it comes to the production of electricity, I would place the potential of wind and sun in the first place. In terms of the wind potential, Serbia is on the average level of the European Union and the sun potential is even above the European average. Biomass and geothermal energy have good potential in certain areas, and their most effi-

Photograph: Nenad Stojanovic



An important aspect for more efficient and massive integration of renewable sources into electricity system is the willingness of the state to adopt **measures that will take into account the structure and spatial dispersivity of renewable sources** in order to achieve the effect of reducing losses in the system

IN THE SPOTLIGHT FOR AND AGAINST SMALL HYDROPOWER PLANTS (SHPP)

Two blocks representing different positions regarding small hydropower plants are activists and the association "Let's Defend the Rivers of Stara Planina" and their sympathisers and the National Association of Small Hydropower plants which argues the opposite position. We asked Professor Djurisic to give us his view on this issue.

"Water potential of small river flows must be observed from many aspects", replies Djurisicm "and one of them is energy potential". The Professor emphasised that hydropower plants have the longest life expectancy and the highest degree of efficiency because they convert the hydraulic energy of water into electric power with a utilisation rate greater than 80 per cent, which no other power plant can. "However, harnessing the hydropower potential is not a priority. Any other demand for water, such as water supply, irrigation, tourism, and alike, has an advantage over the construction of a small hydropower plant. This means that some watercourses or parts of watercourses should be excluded as potential locations for the construction of SHPP", he said. Unfortunately, a few bad examples of environmental violence have created a global revolt, and SHPPs have been labelled as an unacceptable source of energy. This can only be changed by good examples and the implementation of stringent measures to comply with minimum biological flows that will ensure river basins won't become dry after the construction of hydropower plants", added Djurisic and recalling that Serbia was among the pioneers of electrification in the world and that the attitude of the population towards hydropower in its beginnings was radically different.

"Small hydropower plant on Djetinja was put into operation in 1900, just 4 years after the Niagra's power plant. After that one, SHPPs were built on Vucjanka, Nisava, Timok, Moravica... They were well designed and built and are still operating today after more than 100 years of exploitation. Then, people assisted with the construction because they saw the benefit and interest of such facilities. Today, unfortunately, the local community is often unavailable to find interest in supporting such projects, and in such conditions, even the smallest negative impacts become unacceptable. It should be borne in mind that every power plant must have a positive environmental impact assessment, as well as a social impact assessment, which involves the presentation of the project and conversation with residents even in the planning stage of the power plant", he emphasised.

"The state must take actions, instead of the current passive role against opposing views for and against small hydropower plants", says the Professor.

If the action fails, Djurisic fears that the effects of the rebellion against small hydropower plants will be transferred to the other renewable energy sources: "An irritating detail is that household electricity bills contain an item for financing electricity production from renewable sources. It turns out that the citizens are financing the profits of those who have built a power plant on their water, wind or sun, which can really seem unacceptable." According to the Professor, the only healthy and fair way for financing the development of renewable energy is to impose external costs on polluters in the processes of production and consumption of electricity, which would replenish green energy subsidy funds.

Photograph: Stefan Milenkovic

cient use is the production of heat energy. The production of heat from renewable sources is highly suppressed, and it must be a priority in future strategies for the development of renewable energy sources in Serbia.

The investment repayment rate depends on subsidy, which the state should define only for the upcoming period. The current model of the feed-in tariff is overdated, but it played a role in developing renewable energy technology. Today, the technologies of wind turbines and photovoltaic systems are developed. New subsidy measures are expected to be largely market-oriented. In the free electricity market, the return on the investment is defined by the costs of the production. The investment costs have fallen both for wind farms and solar systems. Thus, the costs of wind power generation at favourable locations in Serbia can be below 50 euros/MWh, while for photovoltaic power plants is somewhat higher. However, it should be kept in mind that the price in the electricity market is significantly variable during the day, thus the profit which power plant gains is influenced by the daily production diagram dictated by wind and sun. It is not the same whether a power plant produces energy in the early morning hours or in the afternoon, so in the future, the systems for energy storage will be developed, and they will provide better economy for wind and solar power plants in the free market conditions.

EP ***Which areas of our country, based on physical and geographical characteristics, are the best for the construction of solar power plants and which are the best for wind power plants?***

Zeljko Djurisic The entire Banat and Backa region, as well as some regions in eastern Serbia, have favourable winds and a relatively well-developed infrastructure for the construction of wind power plants. Solar potential is available on the territory of entire Serbia with relatively small spatial variation so the construction of solar power plants will mainly be defined by the available space and conditions of connecting to the electricity grid.

An important aspect for more efficient and massive integration of renewable sources into electricity system is the willingness of the state to adopt measures that will take into account the structure and spatial dispersivity of renewable sources in order to achieve the effect of reducing losses in the system.

EP ***The experts point to negative aspects of each renewable source. According to your opinion, which is least harmful to the environment and why?***

Zeljko Djurisic Photovoltaic power plants on roofs of the facilities are undoubtedly the most suitable in terms of environmental impact because they practically do not have a negative impact. As an example of such a project, I can state the conceptual design for the construction of photovoltaic power plant on the canopy of the Red Star stadium. The installation of photovoltaic panels on the construction of the canopy would not harm the environment or the functionality of the facility in any way. On the other hand, a large passive area of over 2 hectares would get energy value which would provide 2.8MWp of production capacity in the centre of Belgrade where the need for electricity is the highest. Having implemented this project, the biggest stadium in Serbia would become energy self-sufficiency. Energy self-sustainable microgrids are the future of energetics. The roofs of schools, kindergartens, gyms and other public facilities are also a significant resource. Of course, there are also the roofs of private houses, big shopping malls and warehouses.

EP ***Serbia set a goal for renewable energy sources to amount to 27 per cent in final energy consumption by 2020. Is this goal achievable in these circumstances?***

Zeljko Djurisic I do not know whether this goal is achievable. I have never considered the goals and percentages imposed on us by politicians without consulting the experts. Let us look at our resources and needs and define goals and dynamics according to them. Unfortunately, that has never been properly done in Serbia.

We must embrace the process of decarbonization of energy production primarily due to sustainable development of our country. Sustainable development implies the development that meets the needs of the present without compromising the chances of future generations to meet their future needs. Our energy policy does not comply with the principles of the sustainable development, which is a prerequisite for all European countries. At the end of 2018, about 30 per cent of Europe's total installed electricity generation capacity came from wind and solar power plants. If we were to map that percentage to our system, we should have 1,000 MW in solar energy and 1,500 MW in wind energy by now and the reality is that we have 10 MW in solar and about 250 MW in wind!

Serbia is strategically still orientated towards coal exploitation, and today more than 70 per cent of electricity is generated from coal-fired power plants. Who gave the right to this generation to spend all the coal in Serbia? How will we replace energy produced from coal when all coal is gone, and we are not far away if we continue to consume it at this intensity? We might already be late to answer these questions. The lack of strategy for decarbonization of electricity production and depletion of coal reserves may lead to certain "forced solutions" such as the construction of a nuclear power plant or the import of coal.

Interview by: Jelena Kozbasic

Photograph: Jan Valo

UP TO HALF OF THE CONSUMED ENERGY SAVED THANKS TO SOLAR PANELS

One production plant has saved almost half of the electricity consumption in the day of the largest production thanks to the solar power plant on the roof of the facility. Out of 950 kWh consumed, it saved about 450.

The construction of a small solar power plant with the installed capacity of 50 kW in Simanovci with the connection to the cabinet for consumption was entrusted to the Belgrade-based company MT-Komex. The amount of produced energy from accumulated solar radiation is used exclusively for their own consumption. The photovoltaic power plant in Simanovci supplies the user with clean energy, and at the same time reduces the monthly electricity bill.

The rooftop structure carries 180 panels of 275 Wp which are set at an angle of 10 °. In order to transform the DC to AC, three Fronius inverters were installed: two of 20 kW and one of 8.2 kW.

Experienced installers of MT-Komex have mounted a system of aluminium construction of the K2 Systems manufacturer from Germany, one of the leaders in the production of aluminium systems for rooftop structures. Due to the specificity of the location, they chose a system that

Photographs: MT-Komex

reduces the influence of wind, thus reducing the need to use additional load in the form of concrete slabs which make the construction of solar panels and aluminium rails heavier. In this way, the risk of wind pushing the structure along on the roof and taking it off the roof with all the panels was averted.

The solar power plant was put into operation in mid-March. Even though April was marked by bad weather and abundant precipitation which are not characteristic for this time of year, the solar power plant has produced enough electrical energy to reduce almost 30 per cent of the electricity consumption to the cabinet for consumption in the production plant on whose roof a solar power plant is installed. In some cases, when days are sunny, no precipitation, this amount of reduction of electricity consumption has reached as much as 50 per cent. One of the sunniest days in the fourth month was April 26th and then the factory had the highest consumption in the facility, given that they had the highest production capacity, which resulted in a total consumption of 950 kWh on that day, and the solar the power plant gave almost 440 hours.

Thanks to solar power plants, MT-Komex customers receive clean and cheaper electricity. Certified engineers and electrical fitters are trained to mount solar power plants almost on any land and any facility, whether it's a house, a factory, a parking lot or a canopy. So far, they have built 16 solar plants with 10 thousand solar panels with a total installed capacity of 2.6 MW. Behind every project of the power plant construction is 25 years of experience. ■

IN BRIEF ABOUT SOLAR POWER PLANTS

Solar power plants produce "clean" electricity, and they can be rooftop or ground-mounted. The generated electricity from a solar power plant can be used to satisfy own consumption. This clean energy reduces the energy you would pay by taking it from the distribution network, which generates significant savings. Solar power plants can provide 15 to 70 per cent of the electricity of their consumption when there is constant electricity consumption throughout the day. Energy production depends mostly on how to install panels and equipment selection.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ALL SET FOR ENTERING NEW MARKETS

In an old wine cellar, in the middle of rolling vineyards at the bottom of the massif of Stara Planina, two brothers were thinking on how to make a course of making excellent wine from a good grape harvest more certain. It was their turn to take care of this family heritage. In little wineries, fine grapes don't necessarily make superb wine. It was obvious that they can't rely any more on a technique which their ancestors used to sustain the temperature in barrels in cold or warm nights. The Jovic brothers have already had substantial engineering experience, and it was pointing them to find a solution in close vicinity. At the desk in the R&D office of their own company for ventilation and heating which they founded in 1995 in Knjazevac. So that is how the Alfa Clima company has become a link between thermodynamics and winemaking.

Having implemented the temperature control process in wine fermentation, they have achieved quality, but also different wine character. It hasn't lost its acids nor drinkability, let alone freshness of its aroma. The wines from the Jovic winery have gain distinctiveness, and the word has been spread – about their wines much as about an air-to-water type cooling system with freon which the Jovics designed and installed in their Alfa Clima company. Little wineries from across Serbia have got a chance to take a

ENGINEERS' SIEVE FOR IDEAS

Among the experts at the Alfa Clima company, there has been from early days a rule of internal control: Try as hard as you can to disprove your coworker's idea. When someone brings forward a proposition, it is subjected to the scrutinized analysis by engineers in their attempt to find its flaws. In case they don't achieve that, it means that the idea is good. Sasa admits his ideas are rather unusual and mostly go beyond what is possible. "When I sketch design, I let my coworkers check it. Naturally, they come up with thousands of questions, but unless I can provide an answer to only one of them, the designed solution goes to rack and ruin. "

He recalls that once he wanted to solve the problem with how to cool beverages faster in hot summer days. So, he got an idea to make a beverage refrigerator for fast wine and beer bottles chilling with water vapour. When exposed to airflow, the temperature of beverages would decrease from 20 degrees to start with down to 10 degrees in 5 or 6 minutes. In ten minutes chilled wine would be ready to enjoy in – it is how much it takes for the energy to go through the glass – so they calculated, designed, looked for rubber gasket for the refrigerator... It seemed like they got it all right, that the innovative solution was emerging until Sasa heard the question – what about the label?

"It all went down like a huge lead balloon because labels would surely go off of the bottles of wines and beer having been exposed to airflow. So much for this nice idea that I have been developing for months", says the manager of the company.

The famous American company Emerson Electric, the leader of innovations in process management, **praised the Alfa Clima company for their heat pumps**

Photographs: Alfa Clima

Sasa Jovic, the General Manager at Alfa Clima

turn in technology and instead of using enological chemistry, to install this device for fermentation control and cold stabilization of the wine. Thanks to this solution, almost 30 local wineries hitherto can be proud of having "healthy", clean wines in their offer.

Meanwhile, the brothers Sasa and Jovan Jovic have come up with the idea to design a device for quick and thorough cleaning of wine barrels and tanks. Soon the Parko unit was born in the Alfa Clima facilities. It is now indispensable in the inventory of small local cellars, which uses water vapour to efficiently clean and sterilize containers. Although it is quite obvious that twosome Jovic doesn't lack innovation, we were curious to find out how they intend to solve the problem with Freon. Freon is the primary cooling liquid in most systems in our country, whose withdrawal is just a matter of time. We got an impression that Sasa Jovic, the general manager at Alfa Clima, couldn't wait for someone to show up and ask this question.

"No doubt that the death knell for freon has been tolled, but there are options such as ammonium, carbon dioxide and propane. In the field of ventilation and technological processes in positive temperatures, or slightly negative, propane behaves well – and if there wasn't for its flammability, it would be the perfect solution. Still, that is where our creativity has stood out. We have come up with a technical solution and registered a patent since we have reduced the risk of flammability and fire to a minimum. This invention, named Propsafe, was granted by the Innovation fund and currently, we are in a testing process. By the end of the year, we will have final prototypes."

To say that propane usage in small domestic appliances isn't a novelty is something that Sasa confirms too. However, there is no refrigerant grade propane R290 at our market, nor has been its usage regulated by law. Without this refrigerant, the whole Propsafe project could come to a dead end. The manager at Alfa Clima says that this type of fluid is imported with a permit granted by the government. Hitherto, there hasn't been any demand, so the permits haven't been issued. Until the problem is solved, they keep testing the prototype which is filled with Freon since that is a simpler and more available option.

"It is not only the question of importing propane, but also about handling, storing and licensing the workers who will be using it. The regulations are needed, and their lack is imposing a problem for engineers, clients and service providers. For the record, we are just now trying to license service providers for Freon usage, whereas it is slowly going out of use. The system is slow and inert, so it is important we animate it", explains Sasa having mentioned that there is a great demand for propane chillers. "Croatian companies make bigger, purpose-built chillers with propane for Nordic market and their production is sold for a year or two in advance. Although the propane usage hasn't been regulated there either, they overcame the problem by delivering the device that isn't filled. In our case, that is rather complicated, since we oriented future production range towards households and low-power devices. "

Their efforts in making a request more striking to institutions are backed up by the Union of mechanical and electrical engineers and technicians of Serbia. Therefore, Sasa and Jovan are hoping that the problem of propane importing and handling too will be solved sooner. While waiting for a favourable outcome, there are no delays in the realiza-

WHERE DO WE STAND FREON

Upon keeping maintenance or replacing the device, Freon should be "caught" in a bottle and kept in a specialized bank. At the recycling company, Freon is being recovered and used to fill new bottles. It is well known that in Serbia there is no recycling company or bank for Freon. What consequences will that have on economics, we asked Sasa. "Huge problems lay ahead of us. When we got to the point to withdraw Freon, as a refrigerant, from use due to its detrimental effects to the atmosphere, just as Chapter 27 requires, how would we keep maintenance of older devices? Imagine it was already in force, and you want to have your device refilled with this gas, which is no more available on the market. You would have to buy it from the Freon bank abroad. Surely, they know you are in a plight, so the price will be high. For a country with technology like ours, that is an additional problem because we have plenty of these devices. You can't just stop using chillers and heat pumps with Freon or to just shut down the factories. How much of this equipment there is today, no one can tell."

Countries that have their banks of Freon are in advantage. A long time ago "Alfa Clima" got a permit to open a bank and recycling company for Freon in Nis. Still, it couldn't have come at a worse time. "Country had fallen apart, and subsequently it just disappeared as a contracting party. So the chance was missed. When we hear that country should be thinking about its resources, I can't escape thinking about this sad example", Sasa Jovic says.

tion of other plans. Along with two production lines, which include heat pumps as standard devices for ventilation and with a range of purpose-built devices, Alfa Clima is today a heartbeat away from introducing the mass production of standard heat pumps for smaller buildings and households. Proud-hearted, Sasa points out this to be a turning point for the company as the realization of this goal leads to conquering markets which hitherto haven't been within their reach. On their way to new clients, one of the very important steps was establishing a testing station where prototypes of devices are checked in a quick and precise manner. "When you are offering pump 300 kW, it must have the exact power, and not being able to achieve it in ideal conditions. In the testing station it is what we check precisely", confirms Sasa.

Significant savings thanks to heat pumps

Production at this company in Knjazevac was focused from the early days on heat pumps whose main purpose was energy savings. Back then, the price of electric energy was pretty low, so only a few were considering energy savings. Sasa says in hindsight it seems unbelievable that they were able to get clients at all. "Today, although the electric energy we use still comes at a price lower than the European average, people think that this situation at the energy market won't last too long and wonder about the future. Therefore, clients install our air-to-water and water-to-water types of pumps, namely two basic types we have been making from the start, which are even today in demand. We are particularly proud of the fact that some of the pumps are still in use even though they were installed more than twenty years ago."

Now they make the fourth generation of heat pumps, which means that they have implemented four considerable changes in the construction and concept of those devices. The pump's power ranges from 5-6 kW to 500 kW. All inovative solutions have been made in their R&D office where the team of engineers assemble each time they face a production challenge. "When it comes to pumps water-to-water, we use the energy of groundwater in wells. We have made a new design of heat pump with a different type of heat exchanger which we produce. That way we have made shorter and cheaper not only installation but also the pump. At the same time we raised the degree of heating since we don't have the interchanger", says the Alfa Clima manager. He emphasizes benefit not only from reducing the costs but also from better heat pump efficiency.

„Groundwaters that are not too 'aggressive' or murky we can use directly in heat pumps. But with aggressive water which happens to be loaded with Sulphur and metal resi-

dues such as manganese or iron, we put the interchanger into the pumps. River and lake water we can also use – where in the coldest days the water temperature doesn't exceed 1°C or the water even gets frozen. In those pumps, we utilize different exchangers, and that is a nice and appealing solution. Anyway, there is a solution to every type of water. Still, we might say that heat pump water-to-water is the most efficient", explains Sasa adding that there is also a subtype of this pump. "The most interesting is wastewater, and the Germans are the first who started using it for generating electricity. In two buildings we installed pumps which use waste water. In the spa centre in Mladenovac we built in a system for the use of wastewater coming from showers and other sanitary ware. The pump capacity is 300 kW, and this energy is used for heating the sanitary water for the whole building, so ten times less energy is consumed in comparison with other energy sources. That way, the users can pay off the investment faster."

Another pump was built in the Tornik hotel at the Zlatibor mountain which covers up to 36.000 m^2. The project also involved the construction of the separate sewage system which allowed the installation of the pump that would use waste water from sanitary wear. According to some estimates, pump repayment period in hotels can be reduced to up to one year based only on the savings of the sanitary water. Sasa says that realistic expectations are to pay off the investment in several years. "It's a common knowledge that in hotels, no one thinks about saving hot water. Therefore, it is indispensable to plan the savings from the early stage of the project development for the hotel."

Pump implementation in diverse industries

Bakery technology has developed in line with the changes in lifestyle. It was required to produce pastry in large quantities for a growing number of buyers, and the new generation bakery machinery has enabled that. Still, it was necessary to restrict too fast raising of a dough. For that purpose, cold water is mainly used, but small bakeries had a huge problem to place any machine for getting cold water in their rather cramped premises. There, the Alfa Clima team saw another niche market. "We have adjusted our machinery for the bakery industry. The pump is in split version – in the premises, there is a reservoir for cold water with integrated adapter", says Sasa claiming that only when you are familiar with the technology that client uses, you can truly help him solve the problem in production. These small devices have reached many bakeries, and some of them are in use for almost ten years. The Alfa Clima sale team is contacted by new clients, but also by their old customers whenever they open a new bakery facility.

For clients who need to dry products on low temperatures such as medicine, cheese, fruits, candied fruits, heavy liquids and explosive powder, in the Alfa Clima company they have come up with a condensation dryer which brings great energy savings. How important it is to maintain default temperature and moisture degree becomes crystal clear on the example of drying the candied fruits. Sasa says: "Sugar is caramelized on approximately 50 degrees getting a coating that prevents air diffusion, so fruits can't get dried enough. Therefore, it is essential to keep the temperature between 40 and 45 degrees. It does make the drying process longer, but with our device, it doesn't increase the energy consumption – quite the contrary. The savings are bigger than in the drying process provided in any other way. The client can be sure that no deterioration whatsoever will occur when it comes to the quality of the raw material and dried products."

APPLY ANY TIME

There are twenty employees at the Alfa Clima company, five of them are engineers. The company year growth rate is 20% which is achieved in not that favourable time or encouraging environment, says Sasa. Despite that, there is a need for growth. He says that right now they need engineers, but once the custom-made industry is secured, they are going to need more workforce. "We should renew our workforce, so we have open job positions all the time. It takes time for engineers to be trained properly since they need to acquire experience with a mentor's help. In a few years, they could become great experts and work independently. However, today, mechanical engineers generally choose easy solutions – taking a job at foreign companies where they don't get expertise and experience or leaving the country."

After they had received a request from a renowned company, which buys up honey on our market, for a dryer which might be used for keeping the moisture of this bee product steady, they made that device in ideal proportion for small producers, where 3 t of honey can be dried in 24 hours. Sasa says that the problem is in the fact that honey is very absorbent. When it is full of moisture, it becomes thin and as a result not valued at foreign markets. Honey driers are costly and bulky on a large scale; specifically, the entire new facility is needed. It is something that small local producers can't provide. "Our drier is 2 m wide and long, whereas the height reaches 2,5m. So, it doesn't require a huge space. Still, its energy effectiveness is essential. It takes 200 kW per hour to dry 3 t of honey. Whatever the price of energy may be, you have to admit that per kilo it is not a great expense", Sasa proudly points out the results of the pumps use in custom-made industry. And he adds: "All custom-made products inevitably come with a high price, but ours are surely more affordable. When it comes to technical solutions and implementation, we can even match up to numerous renowned companies. Besides, we make components, so our water-water type heat pumps can operate with high temperature water that is, beyond the limits of the typical usage or even in technological processes with specific demands. Simply put, in the custom-made industry, we offer companies better quality on affordable prices."

Today, the polyvalent pumps are growingly in demand throughout the world, especially the air-water variant. In our new law, they are addressed in a single sentence. Our interviewee stresses that answers to questions on whether there is a need to install water-gauge or obtain the permit, also to pay a fee possibly, this law fails to provide. "Chillers cool air in facilities and release the energy out. We have a solution that has been already applied. This kind of heat pump is in use in a few hotels such as Amsterdam in Belgrade. We can use heat pump regardless of the fact it is with air on both sides. Our solution is unique and simple. The additional capacitor in the pump, in split version, doesn't have glycol, and when we need heat energy, in order not to waste it, we can transform it in water. Also, we add superheater, which is important for hotels, since we can achieve the temperature of sanitary water up to 70 degrees. It's needless to emphasize that with this device we make marvellous savings in energy."

As their best reference, they mention hotels which use water as the energy source for the water-water type heat pumps. Among them, the prominent one is the Sloboda hotel in Sabac, which covers 13.000 m^2, where the investor installed highly accurate measuring equipment in power station. They managed to measure that in these facilities, which includes a spa centre and generally falls into the category of big energy consumers even in the summer, there is ten times less consumption of energy in relation to other hotels of the same capacities that use a different source of energy.

Plenty of good practice examples

Recently, a special and very demanding request has come from the pharmaceutical company from Nis. They needed a solution which would keep a low level of relative moisture on 24% in the factory, although it would be ideal if it doesn't exceed 22%. The hydrometers were installed in the factory, and they halt the production if the moisture goes beyond this standard. It isn't cheap or simple to achieve, Sasa explains. "We designed heat pump in the air-water-water variant which is similar to pumps for four-pipe systems where at the same time and throughout the year you get cooling of one reservoir to temperature -2 to -3 degrees and heating of the second reservoir in winter to 45 or 46 degrees, whereas in summer we decrease the temperature to 35 degrees. With one device, the company got the relative moisture, cooling and heating being completely maintained. They accomplished remarkable energy savings", Sasa confirms and says that the famous American company Emerson Electric, the leader of innovations in process management, praised the Alfa Clima company for their heat pumps.

Their technology solutions have been implemented in the companies in the region. Almost 40 % of the products made in this facility in Knjazevac is exported to Bosnia and Herzegovina and Montenegro where Alfa Clima has established logistics services - from engineering to maintenance. Occasionally they get clients from Croatia or Romania asking for smaller devices. However, Sasa says those are dear but exceptional cases.

It takes a lot of effort to bring products to the foreign market. The first steps for conquering Romanian market has been made. Now, the Alfa Clima is in the middle of the negotiation with one Romanian company about establishing logistics services, import company, presentation and maintenance. Sasa says that they try to break into the market with their propane pumps – there is no much competition, and on the other hand, the marketing possibilities are bigger.

Prepared by: Tamara Zjacic

DECONSTRUCTING MYTHS ABOUT WASTE MANAGEMENT TRANSITION

Photograph: Unsplash/Noah Buscher

The main task for the future of waste management in Serbia is to debunk the waste management goals. So, where are we heading to as a society when it comes to this sector? As in all other fields, we simply follow global trends, and we try to give the meaning to different interests by using fashionable phrasing about the transition. As a result, we participate in public opinion about the waste treatment in Serbia being misshaped. At the same time, as the government administration is making an effort to provide development for 26 regions and implementation of Chapter 27, the expectations of our citizens and all the parties involved in waste management are being shaped by incomplete information in relation to few essential facts about waste management.

Before we set about demystifying the goals, it is necessary to bust the myth about current treatments (recycling and incineration). First of all, the primary separation, that is separated gathering of recyclable waste fraction, and secondary separation in separation facility are not recycling. These activities are the preparation of the material from waste for the process of recycling or reuse. This straw man argument is ever so present as much among the experts as it is with the broader audience, and it partakes in an already somewhat confusing situation in this sector. Second, and maybe more importantly, "recycling" won't save the waste management system in Serbia nor will save the economy of our country. Why? That is because empirical data show that there isn't an example of waste management in the world that generates profit without investment and operational costs (by default higher than incomes). In other words, waste management isn't "Perpetuum mobile" as many would think. Waste route starting from collected materials to entering a recycling facility or becoming reused is technologically demanding and costly. Also, having increased the criteria of the required quality of material, its usable mass is decreased, and subsequently, the waste gathered this way isn't completely usable as a resource or free for that matter. As this fact is valid for any country in the world, it goes for Serbia too. Third, it's vital to stress that the key benefit for the society in terms of recycling materials is lowering greenhouse gas emissions in air, water and soil due to the reduction of primary resources exploitation, and not the profit and development!

It doesn't mean whatsoever that Serbia shouldn't recycle and undertake activities in this field. Quite the contrary. Still, it should be singled out that after many decades of passive watching by and brushing under the carpet the facts about the need and importance of system solutions in the waste management field, the rescue isn't solely in

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recycling but in system approach. In all countries with developed recycling system, there are no landfills where you could dispose of your waste without any charge as it is the case in Serbia. All those countries developed their recycling industry having built sanitary landfills first where it is compulsory to pay for waste disposal. That was followed by raising the prices for waste disposal, which led directly to rerouting the waste to other waste treatments (recycling, biological treatments, incineration et). In order to move things in the right direction, we have to be realistic and accept the fact that neither public consciousness nor public opinion nor individual activities, which are noteworthy, are going to spark this process – but the information/fact that if you recycle or incinerate waste you spend less money than in the case of its disposal. As long as any of us has an option not to pay at all for waste disposal, the development of recycling industry and waste management in Serbia is doomed to sheer populism and an attempt to create an image of fake waste management development.

Here is where the paradox comes forth. All the people who profess an idea that we shouldn't dispose but exclusively recycle and incinerate waste, with an explanation that waste in the Western world doesn't end at landfills, are actually failing the industry of waste treatment. However contrary it may seem, urgent construction and implementation of sanitary landfills in the Republic of Serbia are exactly the one and only thing that will instigate the development of the recycling industry. Serbia mustn't democ-

Photograph: Unsplash/Martijn Baudoin

The prime goals are the protection of human health and environment, resources conservation and sustainable waste management, while the treatment, the EU waste treatment hierarchy, the production of recyclables and energy are solely the instruments for reaching the stated goals

sanitary landfills. Thus, it appears to be vital for the further development of this system what order and functional segments we are going to put our energy in. Finally, it mustn't slip our mind that waste management is a compound system and all functional segments (generating, collecting, separation, treatment, disposal, etc.) are interwoven and mutually dependent.

Therefore it is required to show waste management goals realistically. They have nothing to do with recycling, disposing of, composting, nor incineration of waste. It is a fact that by building the facility for waste management, we achieve the quantity goals imposed by the EU. However, the real question now revolves around whether we treat waste to "use energy" from waste, or to prevent its negative effect on human health and environment which arises from bad waste management? The example of incineration shows that only 5 per cent of total energy consumption can be compensated by waste incineration on the national level. On the other hand, incineration helps prevent uncontrolled dispersion of mercury and cadmium flows on the national level (those are two highly toxic metals), whereas 40 to 50 per cent of those metals in national flows end up precisely in the waste management system. So, the technologically advanced incinerators have a greater impact in the sector of human health protection than in energy production. The prime goals of waste management aren't the treatments by themselves, or reusage and resource production, namely energy production. The prime goals are the protection of human health and environment, resources conservation and sustainable waste management, while the treatment, the EU waste treatment hierarchy, the production of recyclables and energy are solely the instruments for reaching the stated goals.

In other words, the only right way of development is the systematic one that aims to reach a higher level of fulfilment of real waste management goals – protection of health and environment. We need our own genuine ideas that correspond to our local conditions and not only sheer duplication of the solutions from other countries. ■

ratize the choice of diverse options for waste disposal, but those options should be based on the system approach. Being one of the indispensable goals of the popular circular economy package, it is high time to introduce taxes and fees for waste disposal, which actually means establishing regional centres and sanitary landfills. We mustn't forget that the circular economy package comes from the societies which have implemented long time ago fees for waste disposal, so the option of not having fee is rather inconceivable there. If we try to merely replicate specified requirements brushing under the carpet the importance of proper landfills, we are going to come to a dead-end, having implemented system which won't have circular economy principles integrated, nor proper, technologically suitable

Photograph (bottom right) Unsplash/Bas Emmen

RESALTA AND EIF DEVELOPING ENERGY-EFFICIENT EUROPE

The European Investment Fund (EIF) will provide EUR 6 million of new equity capital to the innovative Slovenian provider of energy efficiency solutions Resalta. This capital increase will help Resalta evolve from being a start-up and implement a business plan to become a major provider of independent energy services and renewable energy solutions, making a positive impact on Slovene and EU economy and environment alike.

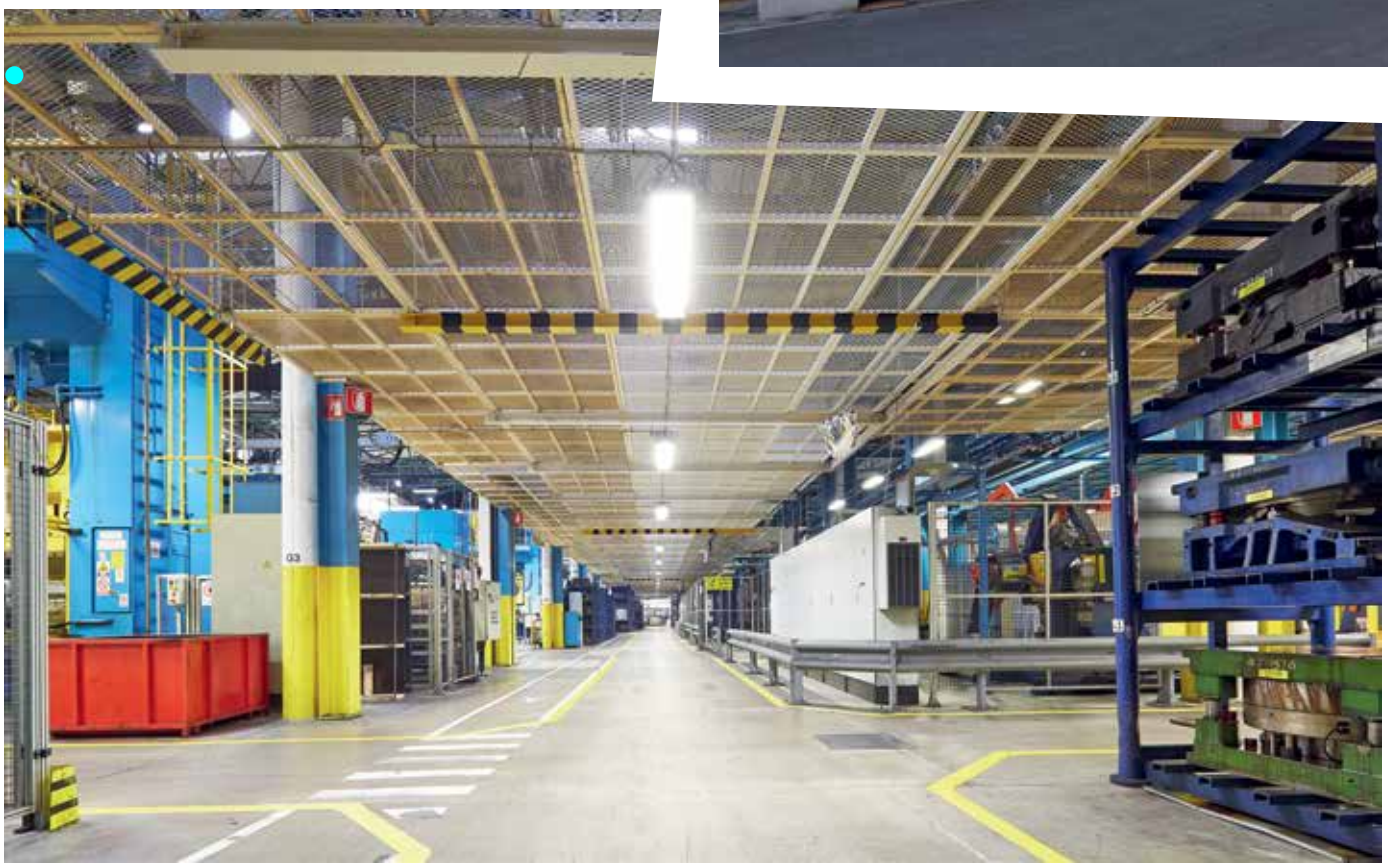
The company currently works with individual clients, companies and municipalities in Slovenia, Bulgaria, Croatia, Czech Republic, Italy, Macedonia, Montenegro, Serbia, helping them lower CO_2 emissions, energy consumption and save on energy-related costs.

Enabled by a guarantee from the EU budget, under the Investment plan for Europe, or Juncker Plan, the capital enables Resalta to continue contributing towards an energy efficient and environment-friendly Europe. To date, the company developed and implemented solutions saving 300GWH of electric energy and reducing CO_2 emissions by 30000 tons a year – equal to planting 3400 ha of forest.

Resalta, founded by Slovenian industry heavyweights – Gorenje, Geoplin and Energetika Ljubljana – will also develop its renewables pipeline while growing its energy services portfolio. Company`s contribution to CO_2 emissions reduction through the City of Ljubljana energy retrofit project has been recognized by the European Commission as the best energy service project, awarded with the European Energy Service Award.

ABOUT THE EUROPEAN INVESTMENT FUND (EIF)

EIF's central mission is to support Europe's small and medium-sized businesses (SMEs) by helping them to access finance. EIF aims at satisfying existing and future market needs by designing innovative financial products addressed to different partners (banks, guarantee, leasing and microfinance institutions, private equity and venture capital funds, among others), acting as our financial intermediaries. By offering an Integrated Risk Finance Product Range of SME finance to our intermediaries, we complement the products offered by the European Investment Bank (EIB) with which we form the EIB Group.



Photographs: (on the previous page) Unsplash/Lemur; (on this page) Gorenje

ABOUT RESALTA

Resalta is a leading independent energy services provider in SEE. Present in eight markets, Resalta offers public and private clients alike carefully tailored energy efficiency solutions through the ESCO model. Its turnkey solutions cover everything from project design, implementation, operations and maintenance to financing, allowing clients to renovate their energy systems and save money with no own investment. One of Resalta's benchmark projects is the energy retrofit of 48 municipal buildings in the City of Ljubljana, which won the European Energy Service Award given by the European Commission for best energy service project in 2019. In addition to energy efficiency, Resalta also develops renewable energy projects and power plants throughout SEE. Through its work with municipalities and private clients, Resalta's impact on raising awareness and promoting energy efficiency and renewables has resulted in lowering CO_2 emissions and energy intensity in the region.

Photographs: Resalta

Half of the recapitalisation amount comes from a joint instrument developed by EIF and the Slovene Development Bank (SID), while the other half comes from Bulgarian BlackPeak Capital investment fund and private investors.

Chief Executive of the European Investment Fund (EIF) Pier Luigi Gilbert said: "Companies like Resalta are proof that businesses can be successful and environmentally conscious at the same time. There is a business opportunity in making Europe a better place for generations to come and Resalta has benefitted Slovenia and the EU by seizing that opportunity. The EIF is proud to support Resalta, who shares our vision of Europe as a place where business and environment work with, rather than against, one another. I would also like to thank SID Banka for being our reliable partner in Slovenia."

European Commissioner for Climate action and Energy Miguel Arias Cañete said: "With its investment power, the Juncker Plan is helping us reach our EU-wide goals of clean energy use. Today, the Juncker Plan is supporting Resalta, a very promising Slovenian start up, to grow, innovate and develop renewable energy solutions. I congratulate Resalta on seizing the opportunity offered by the Juncker Plan and I hope more Slovenian innovative company will follow suit."

CEO of Resalta Luka Komazec said: "The investment from EIF is a major step in Resalta's development, and the trust placed in us attests to the important role independent companies play in developing energy efficiency and renewables. Thanks to this investment we will be able to develop many new projects in our pipeline and are eager to enter the next phase of Resalta's growth, which we are confident will have a profound and lasting impact on the region's energy landscape." ■

INVESTMENT PLAN FOR EUROPE

The Investment Plan for Europe, known as the Juncker Plan, is one of the European Commission's top priorities. It focuses on boosting investment to generate jobs and growth by making smarter use of new and existing financial resources, removing obstacles to investment, and providing visibility and technical assistance to investment projects.

The European Fund for Strategic Investments (EFSI) is the main pillar of the Juncker Plan and provides first loss guarantees, enabling the EIB to invest in more projects that often come with greater risks. EFSI has already yielded tangible results. The projects and agreements approved for financing under EFSI are expected to mobilise more than EUR 390 billion in investments, including EUR 903 million in Croatia, and support almost 929 000 SMEs in the 28 Member States.

Photographs: (top) Pixabay/Iva Balk; (bottom right Unsplash/Rok Zabukovec

EXTREME WATER STRESS AFFECTS A QUARTER OF THE WORLD'S POPULATION

Experts at the World Resources Institute (WRI) warned that increasing water stress could lead to more "day zeroes" – a term that gained popularity in 2018 as Cape Town in South Africa came dangerously close to running out of water.

Qatar, Israel and Lebanon were ranked as the most water stressed countries in the world, with Badghis in Afghanistan and Gaborone and Jwaneng in Botswana the world's most water-stressed regions.

WRI said the data reveals a global water crisis that will require better information, planning and water management.

The global research organisation compared the water available to the amount withdrawn for homes, industries, irrigation and livestock.

In the 17 countries facing extremely high water stress, agriculture, industry, and municipalities were found to be using up to 80% of available surface and groundwater in an average year. When demand rivals supply, even small dry spells, which are set to increase because of the climate crisis, can produce dire consequences.

Twelve of the 17 high-risk countries were in the Middle East and North Africa.

The level of water stress in India, a country of more than 1.3 billion people, was striking, experts noted. India ranked 13th in the report.

In July, taps in the southern city of Chennai ran dry and satellite photographs showing an empty lake in the city went viral on social media.

"The recent water crisis in Chennai gained global attention, but various areas in India are experiencing chronic water stress as well," said Shashi Shekhar, former secretary of India's ministry of water resources, and senior WRI fellow.

World Bank research has emphasised that "while the consequences of drought are often invisible, they are significant and cause 'misery in slow motion".

The report paints a worrying image of water risk and warns of other social and political problems attached to water shortages.

Around the world, stress on water supplies can exacerbate conflict and migration, threaten food supplies and pose risks for water-dependent industries, including mining and manufacturing, WRI notes.

Source: Guardian

YOUR NEXT PAIR OF SNEAKERS COULD BE MADE FROM COFFEE

Coffee is a big deal. While just a handful of countries dominate production, it's consumed in vast amounts almost everywhere on the planet: around 2 billion cups are drunk every day.

All that coffee produces a lot of waste. Coffee grounds often end up in landfill or being washed into sinks and drains, contributing to the food waste problem – around a third of all food produced is thrown away.

Now two entrepreneurs in Helsinki have started making sneakers from used coffee grounds.

Son Chu and Jesse Tran are self-confessed sneaker obsessives. But, concerned about their environmental impact, they couldn't find sustainably made sneakers they found stylish and affordable. So they made some.

Their business, Rens, combines fabric made from coffee grounds with recycled plastic waste to create a material light and durable enough to use for footwear. A pair of their sneakers weighs 460g – 300g of that is coffee. The equivalent of six discarded plastic bottles is also used in each pair.

One of the natural properties of coffee grounds is that they help eliminate odours – good news for anyone familiar with the smell of well-worn sneakers. And Rens says its shoes are vegan, too.

With customers in 57 countries, the firm is about to ramp up production after a successful fundraising campaign. Its coffee collection and shoe-making processes are currently handled in China, but it says it has ambitions to move manufacturing to its founders' home country of Vietnam.

"We just wanted to make the best sneakers, something that was technically advanced and sustainable," says Tran. "We both came to Finland to study. But it's important to us that our manufacturing eventually moves to our home country – there's a huge growth in manufacturing and investment in Vietnam and we want to be part of that."

Source: World Economic Forum

Photographs: (top) Unsplash/Ken Treloar

ABB DELIVERING DIGITAL SOLUTIONS FOR CHINA TO HARNESS MAXIMUM HEAT FROM THE SUN

ABB is supporting the Chinese government in its efforts to produce emissions-free electricity, delivering automation control solutions at the country's first two concentrated solar power (CSP) plants.

Building on the successful delivery of power at the first 50 megawatt CSP in Delingha with China General Nuclear Power Group in late 2018, ABB has been awarded a second contract to deliver an integrated automation solution for a 100MW Urat solar energy project in Inner Mongolia province, China.

"We are delighted to have been awarded a second project to deliver our digital solutions as part of the 20 pilot CSP solar program, aimed at boosting China's efforts to meet the 2030 target of producing 20 per cent of its overall electricity from renewable sources," said Kevin Kosisko, Managing Director, Energy Industries, ABB.

"As a digital leader in the energy transition, ABB offers innovative digital solutions that are future-focused. This is complemented by our customer focus and heritage in intelligent project delivery, ensuring confidence in ABB as an automation provider."

The plant is the first of its kind in Inner Mongolia, and one of the largest capacity solar parabolic projects in China's 20 pilot plant initiative at 500 hectares. It is set to save approximately 90,000 tons of coal per year.

ABB will deploy its flagship ABB Ability™ Symphony® Plus distributed control system (DCS), incorporating a power island, heat storage and transfer, as well as auxiliary controls, and coordination control of solar fields.

The distributed control system (DCS) will unify all the plant's production processes into a single user-friendly system, including the heat transfer system, which transports the heat to molten salt tanks where it is stored, and the power block where the electricity is generated and fed into the transmission grid. ABB Ability™ Symphony® Plus is the world's market-leading distributed control and SCADA system for the power generation and water industries.

"We chose ABB to deliver this project because of their expertise as a world-leading supplier of integrated electrical and automation systems for CSP plants, with demonstrable experience that extends across Asia, North and South America, Europe and North Africa," said a spokesperson of China Shipbuilding New Power Co. Ltd.

With over 174GW solar power generation capacity in 2018, China is the leading producer of solar power globally. With more than $430 million in subsidies provided by the Chinese government for new solar power projects in a recent year, China is considering various efficient technologies to harness energy from the sun. CSP technology, unlike Photovoltaics (PV), concentrates radiation from the sun, and converts light into heat, which drives an engine that connects to an electric generator. Whereas PV does not store heat, thermal energy from CSP can be stored to help overcome intermittency issues, due to the availability of sun or environmental fluctuation.

With over USD 368 million total investment, this greenfield project led by China Shipbuilding New Power Co. Ltd is anticipated to be delivered soon.

ABB Energy Industries ABB is writing the future of safe and smart operations for industry, with ABB Ability™ delivering integrated and secure digital solutions that deliver value for customers with increasing autonomy, sustainability and optimized performance. ABB Energy Industries brings deep domain knowledge and technical expertise in energy and water, oil and gas, specialty chemicals and primary pharmaceutical industries. Building on our heritage, a spirit of collaboration and innovation inspires our digital leadership as we engineer and provide products, services and solutions that support our partners for success, both today and tomorrow as we look ahead to a new energy future.

ABB (ABBN: SIX Swiss Ex) is a pioneering technology leader with a comprehensive offering for digital industries. With a history of innovation spanning more than 130 years, ABB is today a leader in digital industries with four customer- focused, globally leading businesses: Electrification, Industrial Automation, Motion, and Robotics & Discrete Automation, supported by its common ABB Ability™ digital platform. ABB's market leading Power Grids business will be divested to Hitachi in 2020. ABB operates in more than 100 countries with about 147,000 employees.

Source: ABB

Photographs: (top) ABB; (bottom) Unsplash/Thom Holmes

WORLD HUNGER IS STILL NOT GOING DOWN AND OBESITY IS STILL GROWING

An estimated 820 million people did not have enough to eat in 2018, up from 811 million in the previous year, which is the third year of increase in a row. This underscores the immense challenge of achieving the Sustainable Development Goal of Zero Hunger by 2030, says a new edition of the annual The State of Food Security and Nutrition in the World report.

The pace of progress in halving the number of children who are stunted and in reducing the number of babies born with low birth weight is too slow, which also puts the SDG 2 nutrition targets further out of reach, according to the report.

At the same time, adding to these challenges, overweight and obesity continue to increase in all regions, particularly among school-age children and adults.

The chances of being food insecure are higher for women than men in every continent, with the largest gap in Latin America.

"Our actions to tackle these troubling trends will have to be bolder, not only in scale but also in terms of multisectoral collaboration," the heads of the United Nations' Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), the UN Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO) urged in their joint foreword to the report.

Hunger is increasing in many countries where economic growth is lagging, particularly in middle-income countries and those that rely heavily on international primary commodity trade. The annual UN report also found that income inequality is rising in many of the countries where hunger is on the rise, making it even more difficult for the poor, vulnerable or marginalized to cope with economic slowdowns and downturns.

"We must foster pro-poor and inclusive structural transformation focusing on people and placing communities at the centre to reduce economic vulnerabilities and set ourselves on track to ending hunger, food insecurity and all forms of malnutrition," the UN leaders said.

Source: FAO

20 MILLION CHILDREN MISS OUT ON LIFESAVING VACCINES IN 2018

20 million children worldwide – more than 1 in 10 – missed out on lifesaving vaccines such as measles, diphtheria and tetanus in 2018, according to new data from WHO and UNICEF.

Globally, since 2010, vaccination coverage with three doses of diphtheria, tetanus and pertussis (DTP3) and one dose of the measles vaccine has stalled at around 86 per cent. While high, this is not sufficient. 95 percent coverage is needed – globally, across countries, and communities – to protect against outbreaks of vaccine-preventable diseases.

"Vaccines are one of our most important tools for preventing outbreaks and keeping the world safe," said Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization. "While most children today are being vaccinated, far too many are left behind. Unacceptably, it's often those who are most at risk– the poorest, the most marginalized, those touched by conflict or forced from their homes – who are persistently missed."

Most unvaccinated children live in the poorest countries, and are disproportionately in fragile or conflict-affected states. Almost half are in just 16 countries – Afghanistan, the Central African Republic, Chad, Democratic Republic of the Congo (DRC), Ethiopia, Haiti, Iraq, Mali, Niger, Nigeria, Pakistan, Somalia, South Sudan, Sudan, Syria and Yemen.

If these children do get sick, they are at risk of the severest health consequences, and least likely to access lifesaving treatment and care.

Source: WHO

Photographs: Pixabay

IUCN ADVISES "IN DANGER" STATUS FOR THREE WORLD HERITAGE SITES

IUCN, the official advisor on natural World Heritage, recommends for three natural sites to be listed as "World Heritage in danger": the Sundarbans in Bangladesh, Mexico's Islands and Protected Areas of the Gulf of California and the Ohrid region in North Macedonia.

1. POWER PLANTS PUT THE SUNDARBANS IN DANGER

IUCN recommends placing the Sundarbans in Bangladesh on the List of World Heritage in Danger, due to severe threats from coal-fired power plants and numerous industrial activities in close proximity. The site is part of the world's largest mangrove forest, home to the royal Bengal tiger.

Following a joint IUCN-UNESCO mission in 2016, the World Heritage Committee called for the large Rampal power plant project, planned 65km from the site, to be cancelled and relocated. Despite this, its construction has continued without any assessment of its impact on the Sundarbans' World Heritage values.

Two additional coal-fired power plants are being constructed on the Payra River, which flows into the same bay as the Sundarbans. Over 150 industrial projects are also active upstream of the site.

2. ILLEGAL WILDLIFE TRADE PUSHES THE VAQUITA TO EXTINCTION

In Mexico's Islands and Protected Areas of the Gulf of California, the vaquita – the smallest and most endangered species of porpoise – faces imminent extinction. The porpoise gets entangled in gillnets used to illegally fish the Critically Endangered totoaba, whose swim bladder fetches high prices in Asian markets.

Alarmingly it is estimated only 10 individual vaquitas are left, compared to 30 in 2017. The site is the only place on Earth where the species exists, which is one of the reasons for its World Heritage status.

Despite Mexico's extensive efforts to ban gillnets and combat illegal international trafficking of totoaba products, illegal fishing within the site has further escalated in the past two years. IUCN recommends placing the site on the List of World Heritage in Danger to mobilise urgent action to protect the site's unique marine life and ensure the area with the last remaining vaquitas stays gillnet-free.

3. SITE EXTENSION AND DANGER-LISTING RECOMMENDED FOR OHRID REGION

IUCN recommends simultaneously approving the extension of the Natural and Cultural Heritage of the Ohrid region, and inscribing it on the List of World Heritage in Danger.

The site is currently listed in North Macedonia for its "mixed" natural and cultural values. Its extension into Albania would ensure the entire Lake Ohrid is included in the World Heritage site. It is the oldest lake in Europe surviving from pre-glacial times, and provides refuge for many birds and over 200 species of unique plants and animals.

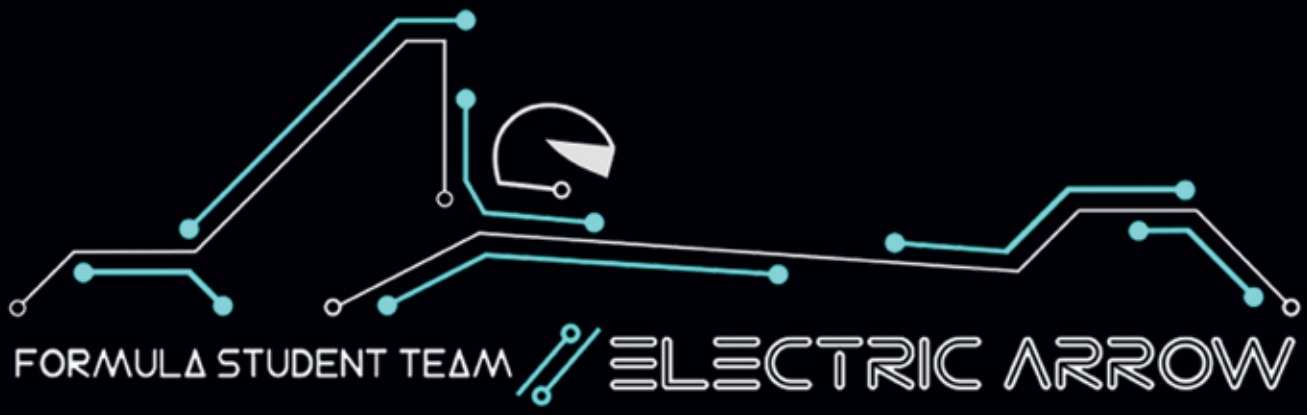
For years now, the site has been under unrelenting pressure from multiple threats. These range from large-scale infrastructure projects, increased pollution, and uncontrolled urban development and coastal exploitation.

Today, 16 natural World Heritage sites are listed as in danger. For this year's World Heritage Committee meeting, IUCN has provided recommendations for about 60 natural World Heritage sites facing threats, and has evaluated 10 sites nominated as potential new sites.

Source: IUCN

Photograph: Pixabay (top) Unsplash/Mamun Srizon; (middle) Unsplash/Francisco Jesus Navarro Hernandez; (bottom) Unsplash/Gorjan Ivanovski

WE GONNA ROCK DOWN TO ELECTRIC AVENUE!



What is the connection between 54 students of nine different faculties of the University of Belgrade – Faculty of Mechanical Engineering, Faculty of Electrical Engineering, Faculty of Mathematics, Faculty of Technology and Metallurgy, Faculty of Economics, Faculty of Law, Faculty of Architecture, Faculty of Organizational Sciences and Military Academy? Even though finding a common interest of people with seemingly radically different professional orientations is hard, this diverse crew gathered to design and construct an electric formula.

In October 2018, a few former members of the Tenfore Road Arrow started the Electric Arrow. They strengthened the capacities of their team with some fresh ideas and people. And then, by clubbing together, they made a shift that humanity is striving for in the era of fight against climate change – from the internal combustion engine to electrodrive. They decided to put the knowledge that they collected in the previous team towards the realization of the most ambitious project so far. They faced a challenge to develop and construct a prototype of an electric racing car to be able to participate in the world's most prestigious

engineering contest Formula Student. The team's leader Nikola Novakovic has presented the Electric Arrow to us, as well as its past and future targets.

At the beginning of the conversation, Novakovic has mentioned that the Electric Arrow is closely cooperating with the Road Arrow. "Essentially, we are functioning as one big team whose work is well shared", he said.

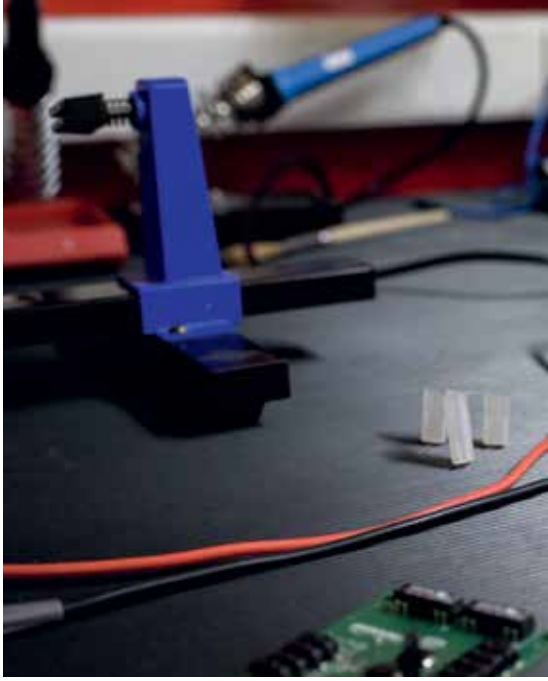
Curiosity led us to learn more about the Formula Student contest. "Teams are designing and constructing a vehicle leaning onto a rule book that was brought by the best engineers from the car industry. For each part of the formula, each system, each discipline, and each document, some requirements must be met. Otherwise, the team is disqualified and has no right to further participation. Inspection of vehicles is carried out by engineers employed in the largest automotive companies, therefore there is no way for an irregularity to pass unnoticed", explained Novakovic, giving us insights into the events outside the Formula Student circuits.

In 2008, the trend of reducing fossil fuels use had led to the emergence of the first electric formulas within the competition. Since 2012, these formulas have been given the chance to show off their performances side by side with the formulas with an internal combustion engine.

Who is believed to be the fiercest competition to the Electric Arrow within the contest and whose students are the most innovative in the field of electromobility? "German teams are the leading ones within the contest, as well as in the automotive industry," Novakovic revealed to us. He added "that industrial branch has somehow become a part of their culture and that is why the teams also have the help of large companies and the state. In addition to the Germans, there are the Dutch, the Swedes, the English and others." According to him, the Delft team started working on the autonomous vehicle with the Massachusetts Institute of Technology in the United States, and a large number of innovations that will emerge from this cooperation could help other contestants in the future. "We can certainly not expect that with our first constructed electric formula we will be able to compete with the teams that have years of experience and large companies supporting them, but we are heading in that direction regardless," Novakovic concluded.

At the beginning of the next year, the team will be finishing developing the formula. With the advent of spring and nicer weather, it will be tested to the limit on the circuit. "The 2016 vehicle design represents a custom version

Photographs: Electric Arrow



Students are facing the challenge of developing an electro formula because the world is quickly revolving to electromobility

of the Road Arrow vehicle from the same year. The drive of the vehicle, as well as other necessary systems, have been changed, while the chassis, suspension and aerodynamics have stayed unchanged or slightly modified to meet the rules of the competition. This year's concept of a vehicle will contain a large number of innovations and will almost certainly not have a similarity to the design from the 2016 year. Each vehicle system has been drastically improved to allow students to learn about new things. A four-wheel-drive that allows the vehicle to have better dynamic characteristics and the first monocoque that will replace the tubular chassis and reduce the mass of the vehicle are the main innovations. Also, a battery that powers the engines tested in detail and adapted to meet requirements of the contest and safety requirements. It is necessary to project a battery management system with it. According to calculations, the new vehicle will have an acceleration of 0 to 100 km/h in 3 seconds and will be powered by a battery of nearly 600 V and a capacity of 7.7 kWh. Given that the team has already won the third place with the previous design in Italy, we expect to be placed among the first three with the improved concept, although the competition in the United Kingdom, where we are going this year, is stricter and more serious," said Novakovic.

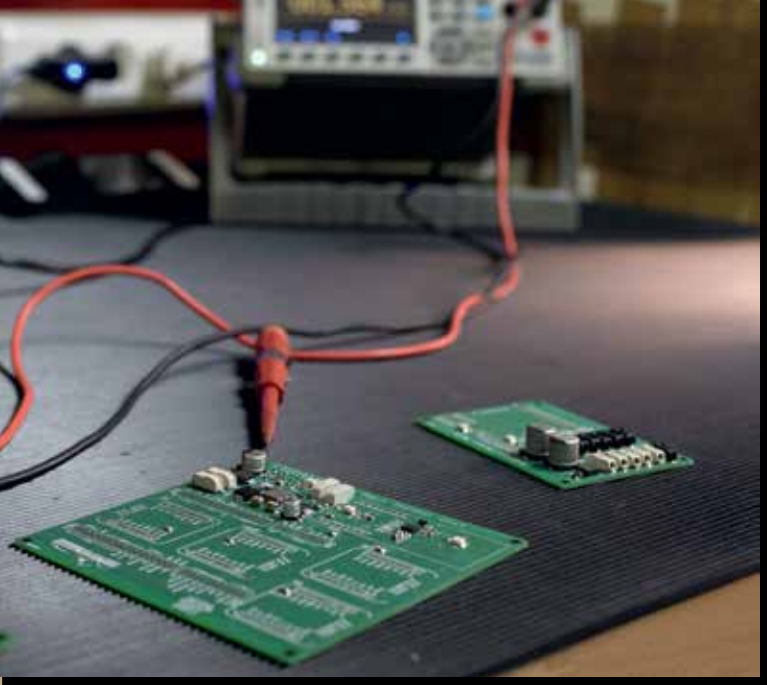
Students are facing the challenge of developing an electro formula because the world is quickly revolving to electro mobilty. They are striving to show that it is possible to make a fully-electric vehicle in Serbia. Knowledge in this area is "imported".

"Unfortunately, there are not many people in our country who can teach us about electric vehicles. We also learn from foreign books and visits to factories abroad," the Electric Arrow leader described one of the obstacles to which they came across in the process of developing an electric formula.

The team members believe that the youth has the highest desire to initiate changes and that they lack the support of the competent institutions and companies. Their existence is confirming this thesis.

"Formula Student contests are organized around the globe – from America, through Germany, Italy, the Czech

Photograph: (on the next page down) Road Arrow



Republic, Hungary, Austria, the Netherlands, Great Britain and Spain to China, Japan and Australia. Due to the high financial cost of the trips, we visited only contests held on our continent. The circuits we have visited so far are the circuit Ricardo Paleti in Italy, the Autodrom Most in the Czech Republic and the circuit near the Hungarian town Győr. We tried ourselves out at three Formula 1 circuits: Silverstone in the United Kingdom, Hockenheim in Germany and the Red Bull Ring in Austria. This year, the Tenfore Drum Arrow team will have the opportunity to ride on the Asen circuit in the Netherlands and the circuit Zala in Hungary for the first time, while Electric Strela will be defending the concept on the legendary, already mentioned, Silverstone circuit," said Nikola Novakovic.

"We expect to be placed among the first three with the improved concept, although the competition in the United Kingdom, where we are going this year, is stricter and more serious"

Apart from the circuits, the teams presented their formulas at several fairs, arousing the interest of the general public for electromobility and sustainable development. Novakovic illustrated their experiences from fair halls. "Many citizens are suspicious when they hear that students are constructing a formula on their own. However, those who stay a little longer at our booth realize that what we are doing is really incredible and they mostly leave saying that investing in teams like ours is needed. One of the aims of the Electric Arrow is also raising people's awareness of why it is important to think about electromobiles and the possibilities of alternative energy sources. Serbia has great potential in renewable sources, from biomass, through hydroelectric power, to the energy of the sun and the wind. The problem is that those continue to be used in a small percentage or in the wrong way. We believe that we will awaken people and show them what the world could be like if each of us thought about green energy. After all, nature does not need people, but people need nature," Novakovic said at the end of the conversation.

Prepared by: Jelena Kozbasic

HOME SWEET HOME

For thousands of years, people have used straw to build their homes. According to scientific knowledge, even African tribes from the Stone Age made houses of this material. The most significant advance in the mentioned type of construction was made in the mid 19th century when the inventors developed the straw-bale technique. The invention of special machines enabled the production of light, biodegradable blocks of exceptional isolation capacity.

One of the first buildings of straw was the school in the federal US state of Nebraska that suffered an ignominious fate. In 1902, the school walls were eaten by cows. Although the animals browsed this educational institution, the builders of that time learned a valuable lesson. Since then, builders have begun to cover objects made of straw, with cement, mortar or mud.

With the advent of rapid industrialization and new building materials, the trend of straw-bale construction disappeared in order to experience a rapid boom in the early twenties of the last century. Thanks to the significant savings achieved with the use of baled straw, this construction technique attracted the attention of architect Goran Milenkovic. He wrote a book "Straw-bale construction" together with professor Slobodan Krnjetin from the Faculty of Technical Sciences in Novi Sad.

"In the nineties of the 20th century, by developing global awareness of environmental pollution and awakening concern because the construction sector in the total global energy consumption has a share of as much as 40 per cent, as well as transport and industry, the construction of baled straw got into stride in The United States, Europe and Australia", said Goran.

The book describes different construction methods, and each of them provides longevity and stability, provided that walls are well insulated from moisture and other harmful external conditions. Even though the straw decays in the soil in 6 months, in optimal circumstances – on dry, it subsists up to three thousand years.

What is it like to live between "four straw walls"?

Under appropriate conditions that are not difficult to provide, facilities made of straw provide their customers with many benefits. Goran stressed out that excellent thermal insulation properties of straw provide 70 to 90 per cent lower energy consumption for space heating compared to classical buildings. "Heat comfort and energy efficiency meet standards three times more than prescribed. The price of a building per square meter is between 20 and 30 per cent lower compared to classical construction. It is important to note that the wall of baled straw covered with the finishing layer of lime mortar is characterised by excellent sound insulation and fire resistance in the duration of 90 to 120 minutes and the achieved temperature of 1,000 °C. In addition, air quality is better because there is no emission of harmful gases from the walls. The process of material production requires a small amount of energy, which greatly contributes to the energy efficiency of the constructed facilities. Due to its high elastic properties, the material behaves like a "silencer" gives great resistance to earthquakes," our interlocutor pointed out, adding that the straw bale has an incredibly low price of around 60 dinars.

"Houses of baled straw *breathe* and are pleasant to live in. Materials in nature best regulate the reception and release of moisture, so they mitigate sudden temperature changes.

Photograph: Pixabay

"Straw bale construction is an adequate means for **reducing carbon dioxide emissions and increasing energy efficiency**"

"Everything that involves the **use of natural materials** for construction, **energy efficiency** and the **use of renewable energy sources** for the functioning of the facilities helps our environment"

Straw reduces electromagnetic smog due to the long stems pressed in all directions. After the installation and plastering, it becomes inert and the possibility of developing any allergic reactions to the material disappears. Such houses have excellent sound insulation, because the straw bales are elastic, allowing them to absorb sound vibrations. Most people say their sounds are louder in the interior of the building, which is due to better isolation of the sounds from the background noise coming from the environment," Goran explained to us and mentioned examples where in addition to private houses, kindergartens, and even churches are built of straw around the world.

We took the opportunity to check the accuracy of the entrenched statement that the straw represents hotbed for pests. Goran denied these claims by the following arguments: "This thesis does hold water. Rodents do not eat straw, and hard-pressed bales with a density of 90 to 100 kg/m^3 are *strong* more than enough to resist their attack. Straw, unlike hay, does not contain nutrients, so it does not attract insects either. Parasites are mainly looking for openings, nesting areas and food, and the properly dislocated wall of baled straw does not offer any of it." As a

DO WE HAVE ENOUGH WORKFORCE WITH SKILLS FOR THE CONSTRUCTION WITH STRAW?

"In Serbia, this construction technique is in its infancy, and the builders have so far been enthusiastic individuals who are also investors", said Goran Milenkovic, explaining that people without building experience can use straw for construction precisely because of features of the material in numerous aspects. This does not apply to foundations, structures and roofs, which must be professionally built.

"One of the simplest building techniques is the construction of buildings with prefabricated straw panels. They are laid down on a concrete foundation and joined together. Roof construction is mounted on them, then the interior and exterior finish. It takes up to 2 weeks for the production of panels for a house of 140 m^2 and installation of panels 4 workers in the range of 2 to 5 days. Due to the simplicity of the work, no special equipment and tools are required, "explained Goran.

Photographs: (top) Pixabay; (middle right) Wikipedia / Ammodramus

GORAN MILENKOVIC lives in Novi Sad. He graduated from the Department of Architecture and Urbanism at the Faculty of Technical Sciences in 2012 and completed his master studies in 2016 with the theme "Contemporary interpretation of the traditional Vojvodina house from baled straw".

Together with professor Slobodan Krnjetin he wrote a book "Straw-bale construction", which will be used as a textbook at three departments of the Faculty of Technical Sciences: Department of Architecture and Urbanism, Department of Civil Engineering and Geodesy and Department of Environmental Protection. Goran is a member of the Association of Novi Sad Architects.

measure of intensified precaution and additional binding of binders to straw buildings, Milenkovic recommended the installation of thickly knitted, thin meshes in plaster on all the joints of the foundation and the wall, as well as on the upper joints of the wall and the roof structure.

The skeleton of the straw panels is placed on the prepared base – the foundation steps and the foundation slab. Straw represents filling in wooden frames, which are at the same time, constructive elements. There is a possibility that they will be covered with dry coatings such as OSB plates, and as far as the exterior is concerned, the occupants can choose between the ventilating and classical demit facades. Connections to the utility and other infrastructure are built into straw walls, well insulated and closed. Therefore, the home of straw with its appearance and expediency does not even stand out from the classically built house. Besides, Goran noted that the process of legalization differs only in that the straw is entirely new to us in construction so that the building can be built exclusively in the case when the construction is of solid material, and the bale is used as a filler. The procedure for obtaining a usage permit must include the report on energy efficiency and fire protection.

Is there interest for straw bale houses in our country?

Very few people in Serbia have ventured into such a construction feat. The number of owners of straw homes is single-digit, and every new building in the media is sent out as a sensation. Milenkovic thinks that the reason should be sought in the fact that the citizens are not informed enough and the lack of any regulations, although he is optimistic about the future of such construction: "In our country, the information about the positive values of straw in construction is growing over time. Judging by similar processes in developed countries of Europe in the past, there will be an increase in the number of straw bale facilities."

The sufficient incentive for the construction of baled straw to increase in our area is the fact that houses of straw panels spend less than 15 kWh/m² for heating per year. For comparison, the annual consumption of heat in an insulated building with 10 cm of stone wool or styropor is 80 to 100 kWh/m². Most of the existing old buildings in Serbia have no thermal insulation and consumption exceeds 200 kWh/m².

We learned from Goran that there is ESBA - European Straw Building Association, based in Brussels. Its members are organizations from Slovakia, Austria, Belarus, Portugal, Estonia, Germany, Hungary, Poland, Italy, Spain, France, Italy, the Netherlands, Great Britain, Switzerland, Lithuania, Belgium, Denmark, Greece and Romania.

"Straw bale construction is an adequate means for reducing carbon dioxide emissions and increasing energy efficiency," emphasized Goran Milenkovic, adding that everything that involves the use of natural materials for construction, energy efficiency and the use of renewable energy sources for the functioning of the facilities helps our environment. "The basic principle of sustainable construction is the use of local materials of plant, animal or mineral origin, with as little processing in industrial processes, or the use of recycled materials, as well as with less energy spent on transport."

Prepared by: Jelena Kozbasic

Photograph: Courtesy of Goran Milenkovic

HOW TO MANAGE AIR QUALITY DATA

As part of the "FOI-4-ALL" competition, conducted by the Bureau for Social Research in cooperation with the Partners for Democratic Change Serbia, and Law Scanner, the Fractal organization has got down to a research task on how much the monitoring of air quality at the local level is current, receptible, and available to the public. The project is funded by the Delegation of European Union to the Republic of Serbia.

The Fractal organization was founded in 2001 in Belgrade with a mission to promote communication, trust, and cooperation between people from different backgrounds. Guided by the same idea, representatives of Fractal and their associates also carry out the action entitled "For better air quality through transparent and responsible data management".

Members of Fractal and associated organizations wanted to determine the extent to which omissions arise in the implementation of the Law on Air Protection and the Law on Environmental Protection through the receipt, and insight of contracts, reports, and all other available documents of the Institute of Public Health and other relevant institutions responsible for measuring.

According to the annual report of the Environmental Protection Agency, the cities with the worst air quality in our country are Uzice, Valjevo, Subotica, Sremska Mitrovica, and Kragujevac. The troublesome fact is that Kosjeric and Smederevo are excluded from the report because of an insufficient number of measurements and data volumes.

All of these cities are based on heavy and light industry. These productions plants produce not only products for the market, but also a large quantity of pollutants harmful to human health and natural environment. For this reason, it is essential that the residents of these cities have easily accessible, current, and understandable information about the state of their environment.

Local self-governments in Serbia are obliged to publish, on their official websites, the data they receive from local air monitoring networks and to make them visible and understandable. The research efforts of the Fractal Team gave insight into whether the situation "on the ground" corresponds to a legally prescribed reporting model.

A report by the World Health Organization states that about seven million people die annually due to exposure to fine particles in polluted air that penetrate deep into the lungs and cardiovascular system, causing stroke, heart disease, lung cancer, chronic obstructive pulmonary disease and respiratory infections.

Nine out of ten people worldwide breathe excessively polluted air. Citizens of Uzice, Valjevo, Subotica, Mitrovica, Kragujevac, Kosjeric, and Smederevo do not belong to that small group of lucky people who have the luxury to live

Photograph: Pixabay

their life to the fullest. Therefore, they should have easier access to the results of air quality monitoring in their municipalities, as well as health recommendations on how to protect themselves when air pollution is extremely high.

Is it how it works in practice?

Finding air quality data on the websites of the cities of Valjevo, Kragujevac, Subotica, Sremska Mitrovica, Smederevo, Uzice, and Kosjeric and their local Institutes of Public Health is a real research undertaking for an average citizen, who needs apart from the Internet, nerves of steel. It is precisely the lack of transparency on the website of the city of Valjevo that has forced us to contact the competent authorities to check that we did not overlook some segment of their site. However, the answer is missing - unless we count "Thanks, the City of Valjevo" as a clear enough direction. We have come to the requested data, but not with this gratitude.

On the official website, the most current information available is the Annual Report on air quality control in Valjevo and the monitoring of the impact of polluted air on human health in 2018 and the Report on air quality for December 2018. Citizens of Valjevo can access these data within the subsection Environmental Protection in the Documents section. However, the average citizen will not be very much aware of the fact that the mean annual concentration of soot in the territory of the city of Valjevo was 14 milligrams per cubic meter - unless he knows how much the legally prescribed upper limit is. Apart from this, although the authority of the Institute of Public Health of this municipality states that they are responsible for chemical air testing, we were not able to come up with the result of this study on the site of the Institute we were not able to come up with the result of this study.

When it comes to the site of the city of Kragujevac, a link to the Institute of Public Health is available on it, but information on air quality is not. Even on the Institute's website, the most we could find is a general text on air pollution, with measuring points and parameters for air pollution in Kragujevac.

On the site of the city of Subotica you can find annual reports and a map with stations for measuring air quality. But if you are extremely dedicated to "searching" for air quality data, you will also find a link that will take you to the Environmental Protection Agency website where you can see the state of the air in real time. On the map of the Environmental Protection Agency, the presented information is very clear since each level of air quality has its proper colour in the legend: excellent – green, good – blue, acceptable – yellow, polluted – red, and very polluted – purple. The only thing that could confuse is the fact that

the red colour is not the one that marks the highest alarm level. Within the Public Health Institute Subotica, there is a Department for Environmental Protection with several laboratories, one of which is a Laboratory for Physical and Chemical Investigations of Air pollution, but apart from the description of its activities on the website of the Institute, we were not able to find the results of its work.

Citizens can find the Annual report on the state of air during the last year, and the last available monthly report is December 2018 on the official website of Sremska Mitrovica. As we have already mentioned, this kind of reporting about air quality is not only time consuming to the inhabitants, but potentially not easy to understand. The site of the Institute of Public Health of this municipality, in the section for air, offers the services of analyzing the air.

Smederevo residents can view monthly reports on air quality from January to November 2018. In the absence of a municipal Institute of Public Health, these pieces of information were provided by the Institute of Public Health Pancevo.

Uzice and the Institute of Public Health Uzice make the best example in the field of air quality monitoring. The link from the municipal website leads to the Institute, which provides insight into the state of air pollution in such a way that it is understandable to an ordinary person. Measuring points are located in Uzice and Sevojno. Apart from the measured values and the air quality index and its explanation, the citizens of Uzice can monitor the state of air through descriptive categories, such as good and moderately good, which are presented in the table with adequate colours. The review also contains recommendations for citizens in situations where air pollution levels are exceeded, as well as the history of pollution and more detailed information.

At the official presentation of the Municipality of Kosjeric, we were unable to find information about the air. Kosjeric does not have the Institute of Public Health.

As a key problem of the websites of these cities and institutes, we saw their disorganization and maladjustment to modern trends with a lot of information that are displayed without a logical sequence. In this multitude of data on sites, it is challenging for users to find any information they need, including those related to air.

Even the official website of Uzice with an excellent display of information on the state of air which we have highlighted as a positive example has certain shortcomings in the aesthetic sense.

Given the fact that the residents of these communities face the problem of severe air pollution, city authorities should improve the availability of this information to their citizens, but also modernize the websites comprehensively. Reports are often outdated, but also unclear to ordinary citizens.

It turns out that the obligation to inform citizens about air quality is like a dead letter. The search for data in this area on the official internet presentations of the mentioned cities looks like roaming around in the labyrinth. Therefore, it is necessary to work on improving transparent and responsible citizen reporting on the state of the environment and the more efficient implementation of the Aarhus Convention in Serbia.

This text was prepared by Fractal team within the project entitled "For better air quality through transparent and responsible data management". The project is implemented as a part of the "FOI-4-ALL" competition in cooperation with Partners for Democratic Change in Serbia, Law Scanner, and the Bureau for Social Research, and is funded by the Delegation of the European Union to the Republic of Serbia.

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