ISSN 2560-5232

ENERGY PORTAL MAGAZINE

NR. 9 ■ NOVEMBER 2017

ECOHEALTH

PERTTI IKONEN
Ambassador of Finland

Clean Technology – Finnish Exportation Leverage

THOMAS LUBECK
International Financial Corporation

Tailwinds to the Serbian Financial Market

ALEKSANDAR JOKSIMOVIC
Institute of Marine Biology, Kotor

It is not too late for changes

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Quarterly edition

Address:
103/3 Boulevard Oslobodjenja
11010 Belgrade

e-mail of the editorial board:
info@energetskiportal.rs

Publisher:
CEEFOR Ltd., Belgrade

CIP - Cataloguing in Publication of National Library of Serbia, Belgrade

620.9

Energy portal magazine / Editor-in-chief Nevena Dukic. - [Print ed.]. – 2017, nr. 9 (Nov.)- . - Belgrade: CEEFOR, 2017-

(Kragujevac : Grafostil). - 30 cm

Quarterly edition. – Takes on the numeration of online issue of Energy portal Serbia, where 8 thematic issues were published. – is continuation: Ecomobility. – Second edition on different medium: Energy portal magazine

(Online) = ISSN 2560-5178

ISSN 2560-5232 = Magazin Energetskog portala

(Print ed.)

COBISS.SR-ID 251759884

Dear readers,

We have dedicated the new number of our magazine to an important topic on Eco-Health that is not sufficiently represented in our public, as opposed to global institutions and media, where data and interpretations on the interaction between ecology and general health are almost daily. The decision to deal with the cause-effect relationship between the state of the environment and public health has brought us the challenge to cover the ecosystem in an integrated way, analyzing its individual parts according to the information available in our country.

As the institutions define the concept of EcoHealth and systematic care about it, we presented through a "two-way" interview with representatives of the key institutions of the Republic of Serbia in this area – the Batut Institute and Environmental Protection Agency. We also talked with Pertti Ikonen, the Ambassador of Finland, the world's leading provider of health services and digital health technologies, on how to maintain the balance between ecology and health, without compromising economic growth.

We are witnessing numerous changes in the environment – from air pollution, climate change to drought, floods, and other disasters – but it seems that it has not yet managed to bring us to our senses. However, the interview with Marija Jevtic, Ph.D. from the Faculty of Medicine, Novi Sad, as well as the data provided by our interlocutors from NGOs HEAL and Fractal, could help us understand the consequences of climate change on our health so that we become more aware and responsible to the environment and to our own health. In this issue, you can also read about all the consequences of global warming on agriculture in Serbia in an interview with Ana Vukovic, Ph.D., a meteorologist at the Faculty of Agriculture in Belgrade. Also, we have presented the range of one of the most successful domestic environmental campaigns – "Don't litter! No excuses!" – which SBB Foundation has been leading since 2015.

Although our country has no sea, we were also thinking of preserving the sea – and why it is important even for residents of countries that do not have coasts told us Aleksandar Joksimovic, Ph.D. from Kotor Institute of Marine Biology. There are also texts on renewable energy sources since an energy shift is necessary to contribute to reducing the emissions of substances harmful to health and the environment. We tried to present successful domestic companies, among which Propulzija, which grew from a family manufacture to a reputable European company. We believe that this topic of EcoHealth will be very interesting and that you will, as much as we did when we created this issue, find out a lot of information on ecology and public health.

Nevena Djukic

Nevena Djukic
Editor in Chief

IN THIS ISSUE

WE ARE ALL RESPONSIBLE FOR ECOHEALTH

Although EcoHealth is significant for all living beings on the planet, the general public is not yet sufficiently familiar with the concept and term of this multidisciplinary field

The multiplication of the number of inhabitants of the Earth over the past hundred years is accompanied with the exponential increase in the influence of a man on the environment. Satisfying everyday human needs requires a huge amount of resources that can not be restored during our lifetime. The effects of these global changes are multiple – temperatures are rising, oceans become more acidic, natural cycles of nitrogen and phosphorus have been substantially altered, almost a third of tropical forests and fifth of coral reefs have been lost, and numerous animal and plant species gradually disappear.

Human impact on the planet is so powerful that we speak more and more often about the new geological epoch – the Anthropocene. But, when impacting on the environment and changing its characteristics, changes are taking place in the opposite direction, as well – the state of the environment has a major impact on the quality of life and the health of the human population. Although the largest number of definitions describing the casual and consequential mechanisms is not entirely homogenous in our language, today we most often call the described multidisciplinary field EcoHealth.

In order to better understand the environmental impacts on health, it is necessary to move the focus, that is most often on individual behaviour, to social environment, the way of life and the satisfaction of physiological needs and to the physically created, artificial environment, consisting of housing, offices, schools, farms and factories, road infrastructure, as well as land use and waste management practices. Factors of the environment that contribute to EcoHealth are complex, but with the pollution analysis, we most often continue to deal with it by approaching in a way that is most common in traditional ecology science.

Photographs: Pixabay

AIR POLLUTION

Pollutant substances in the air cause numerous negative effects on plant, animal species, and humans, but also on other environmental factors, such as facades of buildings and cultural monuments, where damage, such as corrosion, is caused due to these effects.

Air pollution can first be observed on plants, because morphological changes of colour, the extinction of certain tissues are rapidly showing, due to plant-cell disorders. The effect of air pollution on the human organism is reflected in the appearance of respiratory diseases (asthma, bronchitis, emphysema, lung cancer) because most of the harmful substances are inhaled.

According to estimates of the World Health Organization, in Serbia due to the influence of air pollution leads to the earlier death of about 5,400 people. Over the past decade, research on the effect of nitrous oxides, sulphur dioxide and ozone on health was carried out in our country, and in 11 industrial cities, particle pollution analysis (PM_{10}) was also carried out, as one of the biggest health threats.

Research has shown that the problem is also an insufficient number of automatic measuring stations of air quality, as well as inadequate use of existing stations.

WATER POLLUTION

A human being, like all other living beings, is supplied with water from the environment, and in the quality of that water, the state of our watercourses and the water supply system is reflected. In drinking water, including bottled, we can expect certain admixtures of harmful substances, which are monitored in accordance with the regulations adopted from the EU Water Framework Directive. If watercourses are loaded with faeces, pathogenic cells and bacteria, viruses and other parasites, they present an epidemiological threat as they cause numerous infections of the skin and digestive tract. In a diverse composition of natural waters, there are also some radioactive minerals, such as radon, which accumulates in underground wells, and pose a threat to the DNA structure of the human body. After continuous exposure to low doses of arsenic, often present in groundwater, headaches and neurological disorders, liver dysfunction, respiratory and reproductive systems may occur. The presence of lead is occasionally a problem in settlements with decrepit water pipes, made precisely from this element.

A large environmental burden is also the untreated wastewater from settlements and industries, which are discharged into rivers since less than 10 percent of wastewater in Serbia is purified. Also, there is a significant deviation in the quality of water supply for urban and rural areas.

WASTE

According to estimates, between 6 and 9 percent of municipal solid waste is recycled, and the composition of the waste deposited in landfills is diversified, which additionally increases its impacts on health and the environment.

Waste of organic origin makes the substances prone to decomposition and decay – which generates waste gases (hydrogen sulphide, methane, and mercaptans), recognizable by their characteristic scents spreading from bins and containers. In this fraction of waste can be found causes of tuberculosis, hepatitis, typhus, paratyphoid and dysentery, staphylococci, streptococci and many other germs, as well as bacteria that persist in garbage for a long time, because they are favourable to the poor base environment created by mixing with ash from the fireplace.

Inorganic components of municipal as well as industrial waste can contain various toxic substances (heavy metals, pesticides, phenols, dioxins, etc.), which easily reach the soil and wastercourses.

In populated areas without an adequately established waste management system, intestinal infections, infectious diseases, and parasites are more frequent. Garbage is the ideal environment for the reproduction of insects and rodents, carriers and agents of animal diseases, which are used in human nutrition.

Although medical waste accounts for about 20 percent of the total generated waste, due to the cause of infectious diseases and toxic substances it can contain, as well as resistant microorganisms, the importance of proper waste treatment is rapidly increasing. This waste can cause poisoning and lead to a series of injuries in people who come into contact with it in any way.

SOIL POLLUTION

The soil, as the basis of agricultural production, and thus the survival of the human race represents a significant natural asset that is being restored very slowly.

The main damage to the soil is caused by pollution of soil and air, erosion, salinization, excessive urbanization, and floods. Pollution can results in its degradation, destruction or temporary or complete deactivation of the soil from the function. Desertification is a burning problem caused by the rise in temperature, caused by climate change.

The illicit practice of disposing of waste to wild landfills leads to soil contamination. During the precipitation, pollutants, pesticides, and other widely used chemicals are washed away up to the first layer of groundwater, which are often sources of water suuply, which can result in epidemics of diseases caused by the use of contaminated drinking water. The introduction of a systemic change in the soil management is of great importance for Serbia, due to the great potentials for the development of agricultural production.

RADIOACTIVITY

Since the Republic of Serbia does not have any nuclear power plant, radioactivity is somewhat less considered as a factor of environmental pollution. But nuclear waste can transmit radioactivity up to 250 years after disposal, and taking into account that there is not one designated landfill in Serbia, it is assumed that certain quantities of radioactive waste are inadequately disposed of. Radioactivity as a result of NATO bombing is a topic of numerous research in our country. In the wider public, the relationship between radioactivity and cancer is of great interest, because our country is at insane second place in Europe in the number of malignant diseases.

NOISE

Although this pollutant is often neglected, the impact of noise in urban areas is increasing. Its most common contaminants are traffic and industry, and it affects psychophysical health by causing nervousness, fatigue, insomnia and hearing impairment. Throughout Europe, prohibition of the broadcasting of loud music in the bars is being introduced, as well as sound isolation along the roads passing through settlements, and this practice is slowly being established in our country.

The occurrence of a type of pollution entails the disturbance of the natural balance in other parts of the ecosystem, affecting all human beings, since pollution does not know national and regional borders, nor racial, gender, and class differences. Despite the availability of a large amount of data and information, we are often not sufficiently aware of the exposure to environmental hazards, or we are unable to measure the concentration of pollutants in real time, nor to evaluate their final health affects. However, if EcoHealth is viewed as the overall result of evolution, the relationship of previous generations to the environment, current population health is also subject to change. It is necessary to work on the development of people's awareness that any positive change in our daily activities contributes to the improvement of the situation and that after decades of permanent irresponsible behaviour towards nature and environment in which we live, we need time for the efforts invested to become visible.

In order to combat environmental impact, urban communities should be equipped with the necessary financial, scientific and technical means for anticipating, preventing and mitigating environmental impacts on human health. Creating conditions that favour EcoHealth is multisectoral responsibility. The community, as a primary public health actor, should take the lead in establishing partnerships between institutions such as the Public Health Institute and Environmental Protection Agency, the civil sector, and be the leading promoter of EcoHealth among the population, as it is a key criterion of sustainable development.

Prepared by: Marija Nesovic

Pertti Ikonen
Ambassador of Finland in Serbia

Clean Technology Is an Exportation Leverage of the Greenest Country in the World

Having been investing in the health sector and environmental protection for decades, Finland is now highly ranked among the world's leading countries with the most advanced standards of environmental protection and health technology. In a conversation with Pertti Ikonen, Finnish ambassador in Serbia, we found out what measures the Finns have applied to develop "ecological health" which involves a multidisciplinary approach in order to preserve the balance between ecology and human health and encompass many areas including recycling and energy efficiency.

EP Is an effective Finnish environmental policy the result of the implementation of the strict EU legislation or there are some particularities in applying those standards in your country?

Pertti Ikonen Finland has indeed been doing well in international environmental rankings. Just to name one example, by the environmental performance index (EPI) 2016, Finland is the greenest country in the world. Even though we Finns are well-known for our compliance with rules and regulations, including EU legislation, environmental protection is something that is also close to our heart. Our Nordic environment is particularly vulnerable, especially in the northernmost part of the country, Lapland, where nature can be slow to recover from any damage. It is more difficult and costly to repair any damage done to our nature than to prevent it in the first place, so therefore, we need an appropriate legislative framework to protect the sensitive environment we live in.

EP Was it necessary to run intensive campaigns on the importance of preserving the environment as a way to keep and boost the health of the nation back at the time when Finland was about to join the EU in early 90's?

Pertti Ikonen Environmental protection in Finland has a longer history than our EU integration. Its roots are in the international nature conservation movement in the 1960's that started as a reaction to worsening water and air pollution. The Ministry of Environment, with departments focused on specific aspects of conservation and nature policy, was created in 1983, twelve years before Finland joined the EU. Also, our country is limited in terms of natural resources, which has created a conservation-focused mindset and the ability to do more with less. For example, used paper has been collected in Finland for almost a century and today, the recycling rate is 93 percent, while in many countries this is still something new.

EP Your country provides many good examples of how to protect the natural environment. What is the key approach to keeping ecological balance and ecological health, without compromising economic growth?

Photograph: Private archive

Pertti Ikonen Sustainability and economic growth go very well hand in hand and in today's world, they should be seen inseparable. According to a recent study, Finns believe that in the future, domestic companies will be most successful in environmentally sustainable technologies, health technology, and the forest industry. Already today, the clean tech industry is one of the cornerstones of our economy. Finnish companies are global leaders in energy efficiency, clean industrial processes, and bioenergy.

In the extreme conditions of our country, innovative thinking has always played an important role. In the Global Clean tech Innovation Index 2017, Finland ranked second in clean tech. One example of our clean tech innovations is wood-based biofuel produced from forest industry residues. To name another example, 38% of the Finnish energy is produced from renewable sources and the national target for renewables is 50% by 2030. This ambitious goal provides many business opportunities for companies specializing in renewable energy production and distribution as well as products and services.

EP How has your country achieved harmony between preserving nature and retaining land for many human needs?

Pertti Ikonen I will focus here on the forest sector which is one of the mainstays of the Finnish economy. Today, the forest industry accounts for over 20 per cent of Finland's export revenue and it is a major employer, especially in regional areas. This is understandable as Finland is Europe's most forested country, with more than 70 per cent of the land covered with forests. As a result of sustainable forestry, Finland's forest resources are increasing as the natural growth of forests more than compensates for the amounts of timber logged. In addition, 3.0 million hectares of forest, 13 per cent of the total forest area, are protected or under restricted use.

EP Finland's health sector has grown at a faster pace than many other sectors in recent years. What has given the major push ahead in this sector?

Photographs: http://imagebank.visitfinland.com

Photograph: http://imagebank.visitfinland.com

Pertti Ikonen Research and development (R&D) play a crucial role here and it is something that we take very seriously in Finland, not only in the health sector but across the board. The importance of R&D is also reflected in the amount and diversity of funding which comes both from the private sector and the government. In 2014, 3.17 per cent of Finland's GDP was used for R&D expenditure, which amounted to the highest R&D intensity of all 28 EU member states, followed closely by other Nordics Sweden and Denmark.

In the health care sector, this research-driven environment has earned Finland an impressive reputation for its numerous world-renowned scientists and groundbreaking treatments to various diseases. Finland has become one of the leading health care providers in the world in terms of diagnostics, treatment, and aftercare. Currently, the healthcare sector also attracts a significant amount of international investments, especially from global pharma and health tech companies, venture capitalists and private equity funds.

EP The Finnish Diplomatic Mission in Serbia has been organizing the local Slush competition since 2015, providing local start-ups with an opportunity to present projects in the field of sustainable development. What kind of help can a local start-up company with innovative ideas expect?

Pertti Ikonen Finland supports innovations and the start-up ecosystem in Serbia. That is why for the third year in a row, the Embassy of Finland, in cooperation with the Serbian Innovation Fund, has organized the local Slush competition for startups. Each of the three shortlisted companies from this year's competition offers solutions that support the Sustainable Development Goals, adopted by the United Nations in 2016. For the first time this year, all three companies that have entered a major competition participated in the Global Impact Accelerator and the Slush Conference in Helsinki in late November and early December. The Accelerator program provides a chance for the local startup company to improve its skills and business model and prepare the company to pitch its idea at the Slush conference, which is the biggest tech conference in Northern Europe. It is expected that this year it will gather more than 17,000 experts in the field of innovation, startups, and technology.

The conference offers a great opportunity for Serbian companies to connect with the global start-up ecosystem, investors, and potential partners. This was also recognized by the Serbian companies that attended the Slush Conference this year and in this way make the most of this unique opportunity. The Embassy would like to see more involvement of the relevant Serbian institutions in this sector. So far, good cooperation was established with the Innovation Fund and the Ministry for Innovation and Technological Development. Last year, Serbian experts had an opportunity to get to know the best practices from relevant Finnish institutions within their TAIEX study visit to Finland. This year, the Ministry for Innovation and Technological Development is considering participation at the Slush conference and meeting with relevant counterparts from Finland. All preconditions for creating an efficient innovation ecosystem in Serbia are in place and Finland will be there to help in this process.

EP In addition to what we have mentioned, what other activities the Embassy undertakes in promoting regional cooperation and development projects for climate preservation?

Pertti Ikonen In 2017, Finland is celebrating 100 years of independence and the Embassy is organizing numerous events to mark this special year in Serbia, Montenegro, and Macedonia. It is important to mention that we are supported by 18 partner companies in organizing different

projects and events throughout the year. One of my favorite projects is planting trees in different cities around Serbia. We are looking forward to continuing with this project next year and to implement it in Montenegro and Macedonia, as well.

Finnish companies are a great example of responsible, environmentally friendly and sustainable businesses with highly developed social corporate responsibility. In September, we organized a seminar on "Sustainable and Innovative Businesses" that also included a social corporate responsibility component. The aim of the seminar was to show in which way Finnish companies and their distributors are implementing these values in their daily activities and to share the best practices with Serbian stakeholders, companies, and institutions.

Interview by: Tamara Zjacic

Photographs: (above) courtesy of Pertti Ikonen; (right) http://imagebank.visitfinland.com

DIGITAL HEALTH TECHNOLOGY, THE BIGGEST FINNISH EXPORTATION ADVANTAGE

When it comes to health technology, Finland ranks among the three strongest health technology economies in the world. Digital health technology is one of the most promising fields in our country and on this sector, our expertise stems from Nokia's years on top of the global mobile business. Even though our country may be best-known for mobile phones and games such as Angry Birds, digital health is actually our largest high-tech export. Our health tech solutions, ranging from x-ray and imaging equipment to wearable technology and implants, are not only developed but largely also manufactured in Finland. For decades, Finland has been one of the few countries that export significantly more health technology than they import. For example, the Finnish company, Planmeca Oy, that also has a presence in the Balkans, is the largest privately held company in the field of dental equipment. Their product range covers digital dental units, 2D and 3D imaging devices, and comprehensive CAD/CAM and software solutions.

Since Ambassador Ikonen is a keen sportsman, he is used to wearing Finnish health technology wherever he goes. „On my wrist, I always wear a SUUNTO watch that tells me my pulse. The Finnish company Polar created this portable hearth monitoring technology already in the 1970's. With these products, I cannot get lost in the wilderness as they also include GPS positioning."

ABB Automated Fast Charging System for Electric City Buses

With increasing air pollution levels and stronger public commitment to clean transportation, electric city buses offer an ideal opportunity to improve life in cities, while also reducing operational costs. ABB's automated fast charging system solves the key problems for large-scale adoption of zero-emission electric buses: long charging times and short driving range belong to the past.

ABB automated fast charging system which allows electric city buses to drive 24/7, thus enabling true zero-emission public transport in cities.

With its automated rooftop connection and a typical charge time of 4–6 minutes, the system can easily be integrated in existing bus lines by installing chargers at endpoints, terminals or intermediate stops. The modular design provides a power of 150 kW, 300 kW or 450 kW in just a few minutes, giving the city bus enough energy to continuously cross the defined route during the day.

Practical solution is based on international standards

ABB's automatic charging system is based on IEC 61851-23, the international standard for fast charging electric vehicles. This means that it is designed in accordance with electrical engineering regulations and ensures adequate safety systems at the site, and the systems architecture and working principle are supported by the wider automotive community. The robust automated connection is based on a pantograph: a proven system used commonly on trains, trams and, metros, but mounted in inverted position on a stylish infrastructure pole. When a bus arrives at the charging stop, wireless communication will be established between bus and charger and the pantograph will come down automatically. After all safety checks are performed the system will provide the bus with a powerful fast recharge.

Simple cost effective interface works with any electric bus

ABB's automated solution can be used with any electric bus provided it has the correct rooftop interface. The inverted pantograph connection makes it possible to use a low-cost and low weight interface on the roof of the bus, consisting of 4 simple contact bars with a weight of around 10 kg. This allows manufacturers of electric buses to reduce the weight of their vehicle, improve the energy efficiency and design a lower cost electric bus. The attractiveness of ABB's charging solution is confirmed by manufacturers of electric buses. In July 2014 ABB announced that it signed

Photographs: ABB

a global cooperation with Volvo bus to jointly market fast chargers and buses.

Connectivity and remote management

High uptime and fast service response are key for charging electric buses at high-frequency bus lines. The automated fast charger will be offered together with ABB's proven suite of connectivity features including remote diagnostics, remote management, and over-the-air software upgradeability. With over 3000 web-connected DC fast chargers installed globally, ABB has proven that its suite of connectivity features enable industry-leading uptimes, and fast service response, anywhere in the world.

ABB will supply 101 electric buses in Belgium using an "OppCharge" protocol

ABB has received an order for 12 more charging systems from Volvo Buses, which will together constitute the largest single fleet of electric buses and charging systems in Europe. The project includes the installation of a total of 15 ABB chargers by 2018 in the city of Charleroi in Belgium, for charging 101 Volvo electric-hybrid buses in the Valona public transport system within the TEC Group. It is a turnkey contract and includes complete equipment: chargers, transformer stations, electrical installations, other equipment, assembly works, and the service contract.

In January, ABB promoted the first two "OppCharge" chargers for 7 electric-hybrid buses in the zero-emission zone in the city of Namir. The chargers will charge vehicles with a power of 150 kW in 3-6 minutes at the terminals.

ABB enables networking, remote monitoring, software upgrades, diagnostics, and management, which directly enables fast service and system reliability. With more than 5,000 installed chargers worldwide connected via the Internet, ABB solutions provide the shortest response and reaction time.

ABB automated fast charging system which allows electric city buses to drive 24/7, thus enabling true zero-emission public transport in cities

The quiet and clean Volvo 7900 Electric Hybrid buses are designed for zero-emission areas and silent or safety zones and can run about seven kilometres in quiet, emission-free operation. The batteries are recharged in 3-6 minutes at the route's end stations. Energy consumption is 60% lower than a corresponding diesel bus. Volvo electric-hybrid buses are in operation in Gothenburg, Stockholm, Hamburg, Luxemburg, and Namir. ■

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Ivan Smiljkovic
Member of the Executive Board
at ProCredit Bank

A Bank with a Clear Development Orientation always Stands with Business People

The professional Jury of Novi Sad fair declared this year ProCredit Bank as the best bank in agribusiness, which is a confirmation of a long-standing commitment of this financial institution to support domestic agricultural producers who persistently and patiently develop their business. With Ivan Smiljković, a member of the Executive Board at ProCredit Bank, we discussed a trend of growing interest in credit lines among Serbian farmers and owners of small and medium-sized enterprises from numerous industrial sectors, as well as the interest of companies that produce or import equipment, seeds, intermediate goods and commercial vehicles in partner relationship with the bank in order to improve domestic economic development.

EP The data from your portfolio indicate that you have provided the largest financial support to farmers in the domestic banking market so far. How did you develop this business sector?

Ivan Smiljkovic We have been actively supporting Serbian farmers for seventeen years, but this is not our only focus. Serbian agriculture is seen as an integral branch of the entire economy, so our goal is actually to develop small and medium business in Serbia by providing financial support to enterprises. When it comes to agriculture, we always work with our partners and we agree on conditions that can influence the growth of yield and income. We strive to provide facilities for the procurement of various types of equipment: process, production, and processing. Naturally, we help in the purchase of tractors, combines, and attachable machinery. On the basis of long-standing cooperation, suppliers of this equipment expect increased sales and are ready to reduce the price by paying part of the interest for agricultural producers. This is the biggest side benefit of our joint cooperation for both the end-user and the supplier. The number of our partners has expanded, but the world's leading manufacturers of equipment and materials are in the lead position because they can guarantee quality, lower energy consumption per unit produced, which automatically means that the businessmen can have lower costs and greater competitiveness. Nevertheless, domestic companies which produce a lot of smaller agricultural machinery and reproductive material, as well as domestic seeds, are also involved.We also have construction companies that offer construction of agricultural facilities, such as storage silos.

EP What is your assessment of the future of financing and development of the agricultural sector in our country?

Ivan Smiljkovic In the previous period, we had the opportunity to see that the average agricultural holdings with five to ten hectares of land reached the level of large producers with several hundred hectares, some even more than 1,000 hectares, which made them serious businessmen not only

Photographs and illustration: ProCredit Bank

in our country, but probably also in the region. The development of agriculture in Serbia takes place quite quickly, and we are quite different from other countries. Our participation in this advancement is great, but the entrepreneurial spirit of the farmers, as well as their desire to invest from a loan or reinvest from gained profit, is significant. Taking this into account, I can freely predict them bright future.

EP Do you expect some other banks to provide more support to agribusiness?

Ivan Smiljkovic Competition in agriculture loans is growing because, in the last year and a half, the number of banks that give loans to farmers has increased. Our advantage lies in the knowledge and expertise we have gained over the past seventeen years, as well as the commitment of management and employees to provide appropriate solutions for financing agriculture. This is not an additional segment of business for us, but it is strategically important, and we are dedicated to its progress through a comprehensive banking offer for small and medium business and agriculture. These two segments, agriculture and the development of small and medium-sized enterprises make up over 90 percent of our total placements and, thanks to that, we today hold a leadership position.

EP Out of a total number of agricultural loans granted, almost every other is approved by your bank. What is the advantage of your offer to farmers?

Ivan Smiljkovic We have business units that are solely dedicated to cooperation with agricultural producers and providing services in issuing agricultural loans. It is important to say that farmers need not only credit but also advice on how to manage finances, where to allocate surplus funds and what measures of credit support they need. It is obvious that we have raised our cooperation with individual producers to a higher and new level. Here is one example of this cooperation. Last year we organized, on the level of the entire ProCredit Group, an important meeting in Thessaloniki, attended by about 850 producers and businessmen from the region, not just farmers. In this forum, our businessmen could exchange experiences with other businesses with small or medium-sized enterprises in one place, as well as to find a new market for their products or to reach the supplier of equipment, seeds, and reproductive material. This is best seen in the long-term and consistent relationship of our bank towards clients.

EP Agricultural loans with state subsidies have been reallocated this year, and ProCredit Bank mediated it be-

"GREEN FUNDING"

ProCredit Bank The commitment to protect the environment in ProCredit Bank is reflected in a concept based on three pillars of activity. "The first is an internal pillar which is dedicated to the continuous reduction of direct impacts that our bank and our business have on the environment. This is about the activities that we are trying to reduce our consumption of energy, water, paper and the like," says Ivan Smiljkovic. The second pillar refers to risk management and the promotion of environmental standards when approving loans to clients. At the very end, the third pillar is green financing, which means that ProCredit Bank actively promotes and supports various types of investments in energy efficient projects, renewable energy sources and environmental protection solutions.

"We are proud of the fact that in September this year the share of green loans exceeded 10 percent and the growth rate is more than 30 percent. This is the biggest growth of one sector. And our plans in this segment are very ambitious. This is one of the pillars we often say that it supports our basic strategy of investing in the development of small and medium-sized enterprises that have a green strategy, "says Ivan Smiljković, adding," We are a development-oriented commercial bank. Nevertheless, while we strive to help develop the domestic economy, we take care of preserving the environment for us and our children as well as for all future generations."

tween its clients and the Ministry of Agriculture in order to improve business in the agro sector with this support.

Ivan Smiljkovic Every year our participation in the Ministry of Agriculture's agriculture loan programs is about 50 percent. We provide funds, while the Ministry subsidizes interest. The procedure for obtaining subsidized loans is not so complicated, and for our farmers, perhaps the most important thing is our timely reaction and individual approach as well as the understanding of business models, which gives them security in obtaining loans. This year, support to the agricultural sector has been improved, so loans were granted to agricultural producers under 40 years old, as well as women in agriculture, and the interest rate was 1%. The speed of processing requests and understanding of needs are the most important factors that enable the producer to obtain this loan. Our role was also to actively inform the competent Ministry on the problems of farmers, and especially this year when droughts were expressed, in order to take these reasons into account when determining terms and deadlines for the loan.

EP What are the basic conditions for crediting agricultural production?

Ivan Smiljkovic First of all, there must be agricultural production, that is, a registered agricultural holding with a certain history of business, certain revenues, and a sustainable business. In order to ensure stability and predictability of development, as a bank, we have been financing our farmers for years to increase their estates. Over the past two years, we have pledged more than EUR 26 million for the purchase of land through long-term loans with a repayment period of over 10 years, which is in line with the time of their return on investment. Specific conditions for the loans depend on the agricultural sector.

Ivan Smiljkovic states that ProCredit Bank promotes investments in renewable energy sources and energy efficiency in order to promote the development of domestic agriculture. "The new technology that domestic businessmen, through our loans, acquire to improve productivity but already imply a high degree of energy efficiency - less energy is consumed, and CO_2 emissions are lower. Two years ago, we organized a seminar in Novi Sad on active investment in biogas plants. A year passed from the initial steps towards the installation of these plants and the implementation of the first one and this time was spent on obtaining permits and starting out of documentation, which required a lot of dedication and effort. Today, the number of farmers interested in investing in renewable energy sources, and above all in biogas, is increasing. One of our projects is also a solar irrigation pump. Our partners and we have made the first such pump, which should primarily help vegetable growers irrigate their plants without the active participation of electricity or oil. We also tried to offer this product to our customers, but the response was not great due to low electricity prices. Nevertheless, I believe that greater interest in this investment will follow in the coming period".

Our attitude is that small and medium enterprises, as well as agriculture, are the pillars of Serbian economy development. Almost 90 percent of our total placements were for small and medium-sized enterprises. We are proud of the fact that today the total placements of small and medium-sized businesses exceed 500 million euros in our bank. I would like to emphasize that this is not only specific to ProCredit Bank in Serbia, but the support to small and medium business is the focus of the whole Procredit Group and that in the past period all banks within the group increase their participation in financing small and medium enterprises.

EP What is the InnovFin Guarantee Scheme with which loans from the European Investment Fund can be obtained?

Ivan Smiljkovic We finance our portfolio partly from the credit lines we receive from international financial institutions, but mostly for the financing of our placements we rely on deposits that we have collected from the population and the economy. In our bank, one of the most attractive savings offers with very good interest rate is current at the moment and it is intended primarily for individuals. This means that all clients who leave a deposit in ProCredit Bank indirectly contribute to the faster development of domestic agriculture and small and medium-sized enterprises. Here, I would like to point out that as a responsible financial institution, we are directing our attention entirely to what contributes to the development of the domestic economy, and it is a guarantee for our depositors that we will use the entrusted funds for the best possible purpose.

On the other hand, the European Investment Fund allocated EUR 160 million through ProCredit to Serbia through the InnovFin program, and at the level of ProCredit Group, 850 million was approved for countries in South East Europe in which ProCredit Group is represented. This is an excellent guarantee scheme that has been prepared within the Horizon 2020 program to improve the competitiveness of the economy in Europe, and by introducing innovations in production, marketing and other areas in the small and medium business sector. Interest rates today are at the lowest historical level in Europe and Serbia, and we do not expect them to change drastically. Therefore, interest is no longer an insurmountable problem in financing. The biggest obstacle to financing encountered by owners of small and medium-sized enterprises is their inability to provide guarantees for long-term loans, despite having good ideas. InnovFin, which guarantees 50 percent of the placements, assists here.

In March 2016, we began to use the funds from this program, and by the end of September 2017, we financed over 62 million euros of investments that brought some kind of innovation to small and medium-sized enterprises. Another program that we also use is the Western Balkans Enterprise Development & Innovation Facility, also intended for small and medium businesses, which provides 70 percent coverage. In March this year we got 25 million euros and by September we used them. Through these two programs, we enabled our businessmen the access to funds of around EUR 90 million for a year and a half, which they used to improve their business processes and, therefore, their competitiveness on the domestic and foreign markets has increased significantly.

EP Some time ago you held a seminar on energy saving through investing in energy efficient solutions in domestic companies. Then you presented the results ProCredit achieved by investing in energy efficiency measures in its branches. What are the results of these investments?

Ivan Smiljkovic ProCredit has been taking care of energy consumption, CO_2 emissions and the use of natural resources as well as recycling for years. We are the only financial institution with ISO standard 14001:2015 that we introduced last year together with all members of ProCredit Group. We focused mostly on building energy efficiency measures, we developed a manual on how to equip our buildings, which includes all the elements - from insulation and heating to the monitoring system. We already have 100 percent of LED lighting in all of our business units. In almost all buildings, we have building management systems (BMS) with remote control, which help reduce energy consumption. I will use one example to see the savings. The heating energy we spent in the period from 2011 to 2016 decreased by 71 percent and the total energy by 38 percent.

We should not forget that we are also the first financial institution and company in Serbia that imported a fleet of electric cars. For the past year and a half, we have been using seven Volkswagen e-ups for our regular activities. Our long-term goal is to increase our fleet not only to electric but also to hybrid cars. So it was natural to invest in electric car chargers. Each of our branches has a built-in charger, and in the head office, we installed the first solar-powered charger this year. The energy mix in our country is primarily based on coal, and since we have decided to use electric cars powered by coal-based electricity, our impact on CO_2 reduction would not be significant if we did not launch solar-charging projects. We are currently considering the possibility of installing a solar power plant on the roof of our building to produce electricity for your own needs. The process of collecting bids is underway and in the first quarter of 2018, we will be dedicated to the realization of this project.

Interview by: Tamara Zjacic

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Key Partners for Improving EcoHealth

The concern about the state of the whole ecosystem, contained in the conceptual goals of EcoHealth, requires interaction between all expert services and institutions of the health system and environmental protection. In order to present that systematic health care is systematic in our country, we talked to representatives of the two most important institutions of the Republic of Serbia that conduct activities in the mentioned area.

Filip Radovic, director of the Serbian Environmental Protection Agency

Primarius Verica Jovanovic, MD MSc, Acting director of the Institute for Public Health of Serbia "Dr Milan Jovanovic Batut"

EP How is EcoHealth institutionally defined and what kind of approach does it imply?

Filip Radovic Coinage EcoHealth primarily signifies the field of research on the impact of changes in the ecosystem on human health. In recent years, this research discipline that examines changes in biological, physical, social and economic environment and connects them with human health, has been transferred from research centres to institutions where it gathers doctors, veterinarians, ecologists, economists, spatial planners and many other experts in the field of social and natural sciences, in order to make certain actions on the basis of the research results so as to prevent and adapt to the resulting changes in the environment, and to eliminate their consequences.

Verica Jovanovic EcoHealth can be defined as a multidisciplinary concept that makes a part of public health, that is, the level of health and well-being, and society, communities, and populations together pursue it. EcoHealth is achieved by the symbiosis of ecosystems and activities that are carried out in order to preserve and improve health globally. Activities from the ecosystem are tools for collecting the necessary data, and the analysis of the data sets out the most important measures for the preservation and promotion of a healthy environment, which is a prerequisite for the health of the population. An interdisciplinary, cross-sectoral approach involves interface of content from one area to another, from the environment to the preservation and improvement of health, in order to fully solve certain problems and challenges we face in everyday life, work and the environment.

EP In which sector is the relationship between the state of the environment and public health reflected best?

Filip Radovic More than five million people worldwide die from diseases caused by impure water in just one year. It is estimated that due to the lack of accessibility to drinking water, poor health and hygiene conditions, about six thousand children in the world lose their lives on daily basis.

Numerous risks to human health threaten from all sectors of living and working environment. Every year, 100 million people suffer from malaria, and about two million people die. This disease is transmitted by mosquitos and high temperatures are suitable for their reproduction. The temperature rise trend is present due to climate change, and responsibility for this is multisectoral.

Verica Jovanovic The consequences for health due to the use of inadequate drinking water are occasionally present in our country. On such rare occasions, institutes play a significant role in prescribing necessary measures for controlled water supply and for curing the resulting problem, in accordance with the legislation of the Republic of Serbia.

However, the role of the Institute is primarily reflected in the supervision of regular controls of the correctness of

Photographs: SEPA/Filip Radovic, Energetski portal/Verica Jovanovic

drinking water and the implementation of measures to improve the quality of water supply.

EP How do you assess the awareness of the population about the importance of preserving public health and the environment in Serbia and globally? Are these topics sufficiently represented in the public?

Filip Radovic Consciousness about the importance of preserving the environment and its improvement is certainly present in a significant part of the community. However, it is questionable whether public information media give primacy to these topics in the reports. In recent months, there has been a noticeable increase in the media coverage of topics in this area, and those who perform this activity are primarily representatives of state bodies and local self-government.

Verica Jovanovic Instead of assessing the general public's awareness of the importance of preserving health, and understanding the impact of the environment on health, I would emphasise the importance of cooperation with the media. Partnership relations with institutes and competent ministries allow even more media space for this important topic.

From the standpoint of each community, environmental protection and conservation is a priority of society's overall importance. A healthy environment is a basis for the development and preservation of human existence and an important factor for the quality of life of the population. Therefore, the public health institutions are especially concerned with environmental impacts, which can lead to unfavourable results for citizens' health and they continuously carry out various promotional activities, lectures, discussions, and publications in order to exchange information and improve citizens' awareness of the importance of preserving the health of the environment. The mission of the Institute of Public Health of Serbia is dedicated to promotion and preservation of the overall health of the population, which at the same time includes the promotion of EcoHealth.

The Health Promotion Centre of Batut, among other target groups, including school children, has been conducting numerous promotional campaigns in this area to improve the awareness of the entire population about EcoHealth. The Centre for Hygiene and Human Ecology defines the key topics and areas in which promotional activities are required.

EP What specific knowledge and infrastructure are needed to institutionalize EcoHealth?

Filip Radovic Essential activities that EcoHealth strives to provide are innovative and practical solutions to reduce the negative impact of changes that occur in the ecosystem on health. In this sense, the support of the scientific and educational community is necessary, primarily through the training of highly educated staff.

Verica Jovanovic Professional services and institutions from the systems of health and environmental protection

More than five million people worldwide die from diseases caused by impure water in just one year. It is estimated that due to **the lack of accessibility to drinking water**, poor health and hygiene conditions, **about six thousand children in the world lose their lives on daily basis**

Photograph: Pixabay

should prepare with joint forces short-term operational plans, the application of which would lead to the improvement of education, information and changing attitudes and behaviours of all of us in order to preserve and protect the environment.

Technological innovations in monitoring, improving existing knowledge, training experts in the country and abroad and building the necessary infrastructure that contributes to the reduction of pollution are key steps for the improvement of EcoHealth. The task of the entire society is to continuously monitor the parameters of pollution of air, water, soil and the effects of other environmental factors that affect health, while ministries, institutes, and institutions for public health, local self-governments, and other institutions provide their logistics and implementation.

EP What is the mutual cooperation of the institutions that you represent like?

Filip Radovic Environmental Protection Agency works closely with the Batut Institute. The set of environmental indicators that are included in the National List of Indicators for Environmental reporting include the quality of drinking water. The Batut Institute, on the basis of data on monitoring the quality of drinking water from the public water supply, submits to Environmental Protection Agency a report that joins other indicators in the annual report on the state of the environment and is then submitted to the Government of the Republic of Serbia.

In drafting the assessment of "Lack of drinking water", Environmental Protection Agency was the coordinator of the subgroup of the same name as the part of National hazard assessment, such as earthquakes, floods, fires, technical and technological hazards, pandemics, epidemics and the like. A representative of "Batut" participated in the work of the subgroup "Lack of drinking water".

Verica Jovanovic Cooperation between two areas of health and the environment is undoubtedly one of the key endeavours for the global improvement of health – both of the environment and the population.

The Institute of Public Health of Serbia and Environmental Protection Agency signed a contract on business-technical cooperation in order to improve the mentioned cooperation. The ongoing continuous cooperation is reflected in the exchange of data from the environment, which are important for health, as well as the parameters related to the treatment of hazardous waste streams, water

OPEN DATA

The website of Environmental Protection Agency contains an overview of past and current activities, reports, expert work and presentation of research results and projects in which the employees participated. Their facebook page is especially visited.

Seven state authorities of the Republic of Serbia, including Environmental Protection Agency, opened their data. Data on all environmental media on the portal data.sepa.gov.rs are available in the form that is easy to download and change format according to individual needs, as well as cross-linking with other data sets.

In the health care system, the tasks of monitoring the risk factors that affect the health of the population, as well as the movement of diseases and mortality from various diseases, are performed by institutes and public health institutes on the territory of individual districts, and for the entire territory of the Republic of Serbia, the Institute of Public Health of Serbia batut.org.rs.

The areas of public health of the population are most directly related to EcoHealth, and the Centre for Hygiene and Human ecology from the Institute "Dr. Milan Jovanovic Batut" primarily deals with them.

Activities are mostly programmed and represent the regular work of the Institute in the field of environmental analysis and monitoring. Project activities within the framework of risk assessment and hazard to health in emergency situations, as well as measuring of the impact of pollution on the health of the population, are also ongoing, with a view to polluting the air, water, and land in certain territories of the Republic.

The urge to modernize the approach to environmental monitoring, which involves the availability of data from different media, is increasingly present in the world. This should be borne in mind, but modern information systems and software are necessary. It is essential to make experts' interpretations accessible in a timely manner, through brief reports, in order to prevent the risk of wrong and incomplete interpretations.

The best practice is to download "open data" models from developed countries of the European Union and the world.

http://www.batut.org.rs/download/publikacije/IstrazivanjeZdravljaStanovnistvaRS2013.pdf
http://data.sepa.gov.rs
http://www.batut.org.rs

supply, wastewater, etc. In the future, taking into consideration the need to harmonize environmental regulations and practices in relation to the opening of Chapter 27, and in the process of joining the European Union, we plan to intensify this cooperation.

EP What kind of cooperation does your institution have with other institutions from the above-mentioned field?

Filip Radovic In the field of monitoring surface water quality, Environmental Protection Agency, since it is accredited only for physical, chemical and biological parameters, sends water to microbiological analysis to district institutions and public health institutes. Water samples are also submitted to accredited laboratories in this area, for radiological examination.

Verica Jovanovic In addition to the aforementioned institutions, the Institute for Occupational Health and Radiological Protection and the Agency for Protection of Ionizing Radiation and Nuclear Safety are also partner institutions responsible for monitoring environmental processes.

"Batut" cooperates primarily with the network of institutes and public health institutes, which monitor the state of health and the state of the environment on the territory of districts.

The cooperation of "Batut" with institutions that are not in the network of health institutions for the assessment of the environmental impact on health is of great importance, because it defines the needs for priority measures to be undertaken in the community, which leads to the preservation and improvement of water supply, managing different waste streams, assessing the state of air and similar phenomena that affect the health status of the population. Environmental Protection Agency is undoubtedly the key institution of the system.

EP What is the current situation in Serbia in the area of public health and the environment?

Filip Radovic In order to present the situation in the most accurate way, I will outline the conclusions from the recently published Environmental Quality Report for Serbia for 2016, prepared by Environmental Protection Agency. The largest quantities of oxides in sulphur, nitrogen oxides and powdered materials in the ambient air come from thermal power plants, production, and processing of metals, food and mineral industries.

During 2016, the air was clean or slightly polluted, except in the area of the cities of Kragujevac, Valjevo, Subotica and Sremska Mitrovica, where it was periodically overpolluted. According to the composite indicator "Serbian water quality index", the quality of the Danube basin in the period from 2006 to 2015 is improving, while on the Morava and Sava River Basin there are no significant changes in the quality of surface water quality.

In 2016, another 310 ha of the territory of the Republic of Serbia was protected. About 7.3 million tons of waste have been produced, of which 7.23 million tons have the character of non-hazardous, while about 74 thousand tons are in hazardous waste. The largest waste producers are thermal power plants.

18 companies joined the Cleaner Production program in 2016, so at the end of 2016, we had 95 companies operating in accordance with this program.

Verica Jovanovic The situation in the field of public health is not easy to present. A large amount of data is being collected on the state of the environment, including those that address the risks to human health, but they can rarely lead to a proven link with health. On the other hand, in public health systems, the parameters of the health condition are measured, but they are more difficult to be connected with the environmental conditions.

Data describing the state of public health are collected as routine statistical indicators of illness and death from the most common and other diseases, according to the international classification of the disease.

Non-communicable diseases (cardiovascular diseases, malignant tumors, diabetes, obstructive pulmonary disease, injuries, etc.) have been dominating in our national pathology for decades. The leading causes of death in Serbia are almost identical to those in developed parts of the world.

In Serbia, about 100,000 people lose their lives each year from all causes of death. Almost every other citizen of Serbia dies of heart and blood vessel diseases, one-fifth of malignant tumors, and one-tenth of the consequences of injuries, diabetes, and obstructive pulmonary disease. In addition to routine statistical indicators of health, as a supplementary, and at the same time of great importance for the complete assessment of the state of public health, research on the health of the population is used. According to the data of the national population health survey, in 2013, on the basis of the measured body weight index, 40.4% of the measured population was normal weight, while more than half (56.3%) was overweight.

EP Your recommendation to our readers for a healthy life?

Filip Radovic One of the biggest problems of modern society is the lack of physical activity. To be responsible for the environment, we must first be responsible for ourselves. It is necessary to begin today to make at least a few steps more than the previous day and drink a glass of water more than usual. One study has shown that weight loss of just 10 percent helps reduce blood pressure and prolongs life.

Verica Jovanovic Every day we should we do one healthy thing for our way of life and work, our closest, our working and living environment. By preserving the environment with common forces, we will extend our lives and the lives of generations that inherit us. Regardless of the great challenges brought about by technological and socio-economic development, we should devote 30 minutes a day to simple and often forgotten practices and healthy choices: walking, physical activity and preserving your living environment. The network of the institutes and the public health institutes in Serbia is your support and partner in the health mission.

In the promotion of public health, primarily the institutions of the environment and health system participate, but we also participate as individuals, regardless of the profession, the work we do, the place of life or the lifespan. Individual and synergistic contributions are indispensable.

Prepared by: Marija Nesovic

SCHNEIDER ELECTRIC ECOSTRUXURE PLATFORM

The speed of adaptation to new technologies and their application in business processes gives companies a competitive edge and innovation that is today the key to business success. It is clear that the motifs of digitizing the systems and processes of a company can be significantly different, and for this reason, Schneider Electric, the world leader in energy management and automation, has presented a comprehensive solution that simultaneously provides complete information security and complete analytics and reporting at all levels.

It is an **IoT-based EcoStruxure platform that serves as the basis for managing, guiding, automating and optimizing the system either locally or in the cloud**.

The EcoStruxure platform combines three main segments:

1. **Related products (equipment)** – through connection and IoT/Ilot it is possible to collect a lot of data («big data») from the production processes themselves;
2. **Top control and management** – process management and energy consumption;
3. **Analytics** – through fixed, mobile and cloud solutions.

EcoStruxure provides a comprehensive approach to solving competitiveness issues and increasing quality, both in production and in infrastructure, as well as in commercial and service activities such as hotel business or office buildings management. This approach in Schneider Electric has been developed through six technological units for four segments of the market: building, data centres, industry and infrastructure.

Energy consumption is on the rise, and forecasts say it will double in the next 40 years. There are three major challenges that we already face. The first is urbanization, because by the year 2050, additional 2.5 billion people will be living in cities, which will be a burden for infrastructure and public services.

The second is digitalization, given that by 2020, new 50 billion devices will be connected, and the third is industrialization, as predictions say that by 2050 consumption of CO_2 emissions will be doubled. One of Schneider Electric's

Schneider Electric's vision of the IoT concept is **based on the smallest possible CO_2 emission** for property and business management, in safe, secure and efficient operation, as well as on optimum and long-lasting operation of the device, and **automation in buildings and industry can lead to savings** from as much as 63 percent.

Photos: Schneider Electric

global research shows that as much as 40 percent of world energy is spent in buildings, while as much as 75 percent of building costs go to maintenance and operating costs. At the same time, as much as 30 percent of the energy spent in buildings is wasted due to the inefficient use of the building management system. Part of the cause of this energy dissipation lies in the fact that only a fifth of these managers uses the available capacities of the building management system. Also, a global survey conducted by Schneider Electric has shown that such inefficient use of energy can be overcome by the use of smart technologies and IoT, resulting in significant savings through automation. IoT technology can help countries and their economies respond to the greatest challenges facing our planet, including global warming, water scarcity, and pollution. Schneider Electric's vision of the IoT concept is based on the smallest possible CO_2 emission for property and business management, in safe, secure and efficient operation, as well as on optimum and long-lasting operation of the device, and automation in buildings and industry can lead to savings from as much as 63 percent.

The world's most sustainable office building, the Deloitte Building in Amsterdam – The Edge, uses solutions of Schneider Electric. The building has solar panels, most consumers are connected via IoT, to several sensors and a platform for data analysis. Thanks to EcoStruxure platform, the building produces 102% of its own energy requirements, that is, it covers its own consumption and generates another two percent of the surplus energy that goes into the distribution system. The excellent reference to Schneider Electric's innovations is the headquarters of the company in Paris, Le Hive Building, which is also the first building in the world that has the ISO 50001 certificate for managing energy efficiency. Certification ISO 50001 has been achieved thanks to internally developed energy efficient solutions – such as renewable energy sources, lighting, energy monitoring and control, safe distribution of power and advanced security. The result of the applied solutions is to reduce energy consumption by up to 75 percent.

The Amount of Particle Pollution from Air which We Are Exposed to

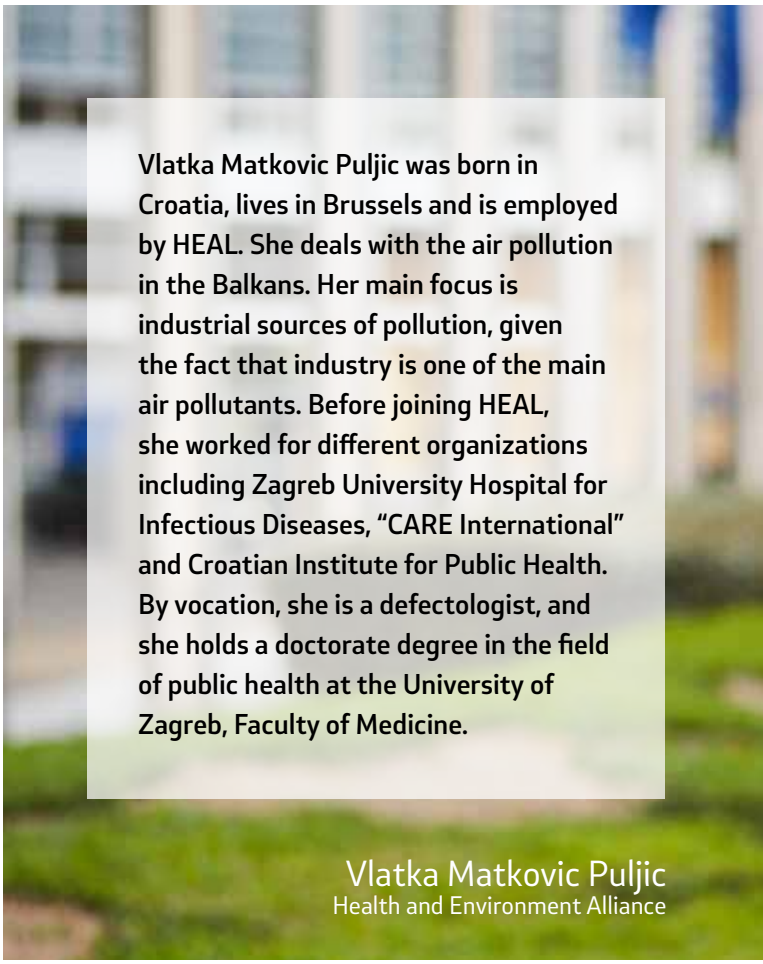
Photo: HEAL

The numerous consequences of air pollution, including the contribution to mortality of one million people per year worldwide, are becoming a hot topic in Serbia. Exposure to air pollution is associated with a huge number of acute and chronic diseases, from irritations through respiratory illnesses to cardiovascular diseases, and contemporary science has made a connection between the air pollution and diabetes. The effects of air pollution on health are well documented, though mixtures of pollutants in the air may be complex.

Air pollution is a mixture of liquid and solid phases; a mixture of gaseous, volatile, semi-volatile substances and their ratio is quite variable. The main pollutants are suspended particles such as ozone, nitrogen dioxide, sulphur dioxide, methane, mercury and soot obtained by combustion of hydrocarbon gases. There are numerous research about the impact of these pollutants on our health.

In an interview with Vlatka Matkovic Puljic from the non-governmental organization Health and Environment Alliance we found out in what way the air quality monitoring should be performed, whether the pollution measurements are properly carried out and to what extent are HEAL's measurements different from the measurements of public institutions.

The air pollution is a global problem which you can see and feel in Belgrade, too. The data of the World Health Organisation according to which more than 7,000 people



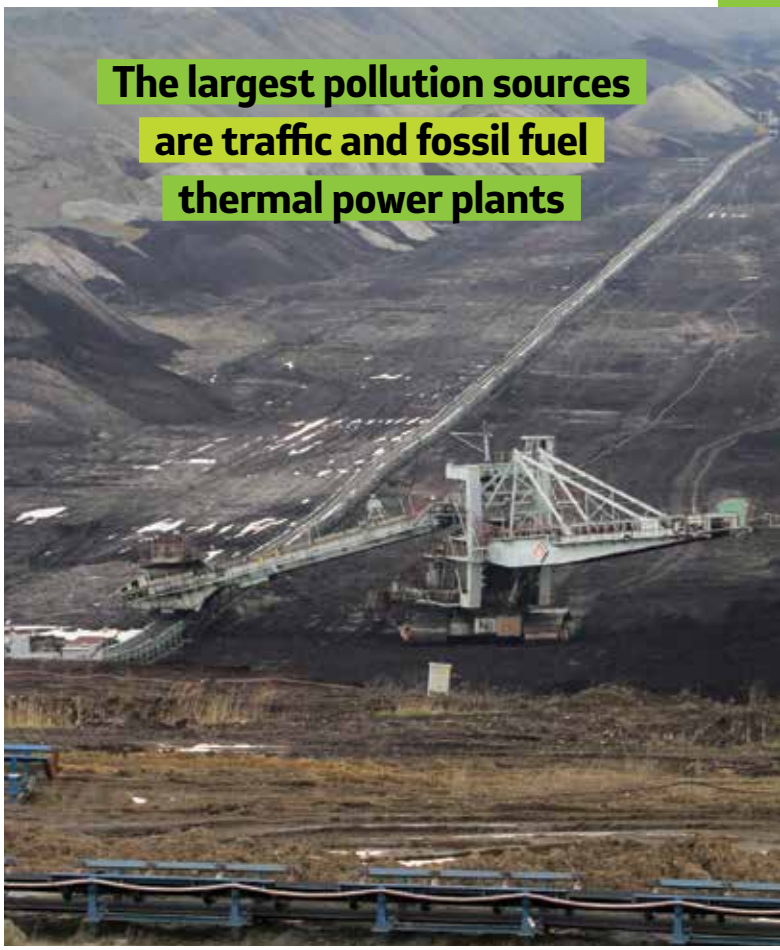
Vlatka Matkovic Puljic was born in Croatia, lives in Brussels and is employed by HEAL. She deals with the air pollution in the Balkans. Her main focus is industrial sources of pollution, given the fact that industry is one of the main air pollutants. Before joining HEAL, she worked for different organizations including Zagreb University Hospital for Infectious Diseases, "CARE International" and Croatian Institute for Public Health. By vocation, she is a defectologist, and she holds a doctorate degree in the field of public health at the University of Zagreb, Faculty of Medicine.

Vlatka Matkovic Puljic
Health and Environment Alliance

die due to air pollution exposure, can serve as evidence. These data put Serbia on the second place in Europe according to the number of premature deaths due to air pollution. In Serbia, there are more than 3,300 cases of premature deaths annually due to only one pollutant – thermal power plant on coal. At a global level, 6.5 to 7 million people die due to air pollution. If this number of deaths were to be transferred into money, we would come to the information that the consequences of air pollution from thermal power plants cost the country between one and four billion euros annually.

"Most people who live in urban areas, live in the polluted environment. The largest sources of pollution are traffic, thermal power plants on coal, house heating on coal, and wood. The total of 50 percent of particle pollution in Serbia come from coal-fired power plants, then from house furnaces, and in the third place are some other sources of pollution", says Vlatka Matkovic Puljic.

Air quality in Serbia represents a huge problem. Measurements show that citizens across the country inhale the air that is considered harmful to health. For example, the concentrations of $PM_{2.5}$ and PM_{10} are significantly higher than the limit values which the European Union and World Health Organisation have set. In the report on air quality from 2013, it is stated that the annual limit value of PM_{10} particles, which is 40 μg/m^3, was exceeded during the



Photos: (right) http://seechangenetwork.org/wp-content/uploads/2016/06/South-East-Europe_The-EU-Road-or-the-Road-to-Nowhere_An-energy-roadmap-for-2050-A-guide-to-the-future.pdf • (bottom) private archive • (middle right) HEAL

course of the year in most locations. During 2013 the quality of air in wider urban areas of Belgrade, Bor, Užice, and Smederevo was rated as III category, which means it was over-polluted. According to the data, 73% of the population in urban and urban-industrial areas were potentially exposed to concentrations of pollutants that are above the reference level in the same year.

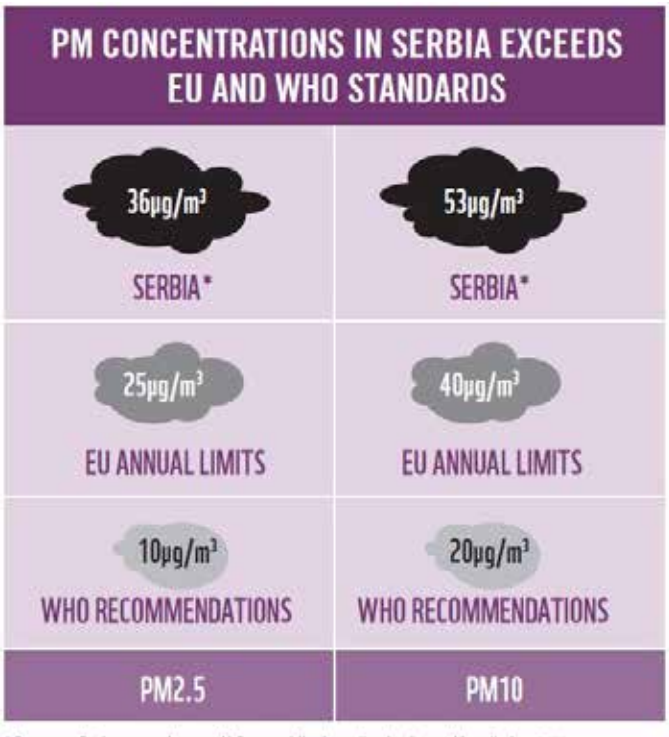
In urban areas, in addition to pollution from thermal power plants that pollute the entire country, other pollutants are also present. In Belgrade, that is traffic, and the other problem is thermal power plants that are located near Belgrade and they emit large quantities of different pollutants such as nitrogen oxides, sulphur dioxide, and other particle pollution.

HEAL carried out an action for measuring personal

exposure to polluted air with the help of small mobile devices "AirBeam" which was proved to be accurate according to the analyses conducted in the USA. There was an open invitation for candidates who wanted to carry these measuring devices and the action was launched in Belgrade and Novi Sad. The idea was that volunteers measure their daily exposure to air pollution, from their exposure when going to work (on foot, by car or bicycles) to staying indoors or during a city walk, etc. The device "AirBeam" measures the pollution caused by $PM_{2.5}$ particles and it operates on photo laser method which is not that sophisticated as a monitoring station that takes a sample of dust on which basis radioactivity and the origin of pollution can be analysed (whether it comes from a thermal power plants, traffic or some other source).

"Air monitoring in Serbia is done and it is relatively good but the number of measuring stations is not sufficient. There are only few monitoring stations for $PM_{2.5}$ in entire Serbia but only the data from the monitoring station located in New Belgrade are taken for the annual calculation instead of taking the data from all monitoring stations. Through this project, we tried to figure out what is the difference between personal exposure to particle pollution in relation to what the monitoring stations have recorded."

While she was in Belgrade in June this year, Vlatka measured the concentration of particles in the city and the average concentration of PM particles from Voždovac to the city centre was 37 micrograms per cubic meter (µg/m3), and the highest was 57. According to the World Health Organisation if you live in a place in which the concentration of $PM_{2.5}$ particles is 12 µg/m3 it is considered to be healthy, while the concentration of up to 35 µg/m3 is con-



* European Environment Agency. AirBase: public air quality database - Air pollution, 2011.

Health and Environment Alliance (HEAL) has urged Serbian authorities to make efforts to purify the air in our country within the Campaign "Unmask my City" which was conducted in Belgrade to mark the World Day against Asthma in 2017. The campaign was supported by the Serbian Ministry of Health and the experts from the Medical School in Novi Sad who conduct a pilot study on the exposure to suspended $PM_{2.5}$ particles. "Unmask my City" is a global initiative of health workers, led by HEAL, for the improvement of air quality and the reduction of greenhouse gases emissions. Activists of initiatives have invited the city authorities all around the world to adhere to the WHO's air quality guidelines and to adopt the appropriate policy and program. The global campaign "Unmask my City" was also launched in Warsaw, Adana, Istanbul, Iskenderun, London, Salt Lake City, Chennai, Ahmedabad and Sao Paolo.

Photograph: Pixabay

sidered to be unhealthy for sensitive groups such as kids, elderly, pregnant women and people with sensitive respiratory system. When the limit of 55 µg/m3 is exceeded, the environment is considered to be extremely unhealthy and the risk exposure is high. At the same time when Vlatka was measuring air pollution for $PM_{2.5}$ particles, two monitoring stations recorded the data for $PM_{2.5}$ – and they were 11 µg/m3 and 14 µg/m3. The first monitoring station is located in the wider city centre and the latter in New Belgrade. Also, the volunteers who carried these devices with them found out that the highest pollution of these particles was in cafés in which smoking is allowed – the concentration of $PM_{2.5}$ particles was 180–190 µg/m3**.

"With this project, we wanted primarily to involve citizens in the active measuring of air quality and monitoring of their personal exposure to air pollution in everyday life, and thus to raise the awareness of what (un)healthy air is," Vlatka explained to us.

Prepared by: Nevena Djukic

* All the data are taken from the official report on Air Pollution and Health in Serbia prepared by NGO HEAL(Health and Environment Alliance).

Citizens Have the Right to Know what kind of Air they Breathe

Everyone should be aware of the fact that air pollution is one of the most important problems at the moment in environmental protection in Serbia. If you asked any man in the street if it was important to him what kind of air he breathes and how it affects his health, as well as the health of his children, common sense would surely make him give a positive answer

Lidija Kesar, NGO Fractal

However, the continuous and concrete interest of the citizens in this problem is missing out. It is sporadic and mostly occurs in ecological accidents or, due to living in the vicinity of large and apparent pollutants that devastate the environment even on daily basis.

The passivity of citizens towards the burning problem is not accidental. The awareness is limited, and the responsibility for this primarily belongs to the state. Lidija Kesar from NGO Fractal explained why citizens seem uninterested in what kind of air they breathe:

"It should be pointed out that in general education, little attention is paid to the state of the environment and the effects of this state on public health. Therefore, citizens can not be expected to be ready to monitor the available air pollution information without difficulty. Even in an attempt to get information on their own, most citizens do not know where to find information of importance. If they find them, they are forced to interpret the tables and charts themselves, to investigate the effects of exceeding the permissible amounts of hazardous substances on health. The

Photos: (top) Pixabay, (left) Energetski portal

AIR QUALITY MONITORING

Within the Serbian National Air Monitoring network (SEPA) there are 45 automatic measuring stations (from SEPA network). Only 35 stations for monitoring air quality out of this number of stations have the technical ability to track PM_{10} particles.

Since 2016, in the SEPA network, $PM_{2.5}$ particles are monitored at 3 measuring stations for automatic air monitoring (two in Belgrade and one in Novi Sad). The lack of system support in maintaining and servicing equipment that works continuously (without pause) from 2010 to 2015 led to a situation where there was not quantity and quality of valid data needed to assess air quality in three broader urban areas*. From our interlocutor Lidija, we learned the encouraging data, confirmed by the Air Quality Monitoring Department of Serbian Environmental Protection Agency that the line for system reparation was allocated in the state budget at the beginning of the year, and that since April 2017, they have actively been working on necessary maintenance and renewal of the network, and that by the end of 2017, about 60 percent of all network problems will be solved.

* This detail was published in the official annual SEPA report on air quality in the Republic of Serbia in 2015.

The biggest challenges in implementing regulations at the level of air quality monitoring and informing the public:

- Unsatisfactory quality and validity of data coming from the state network of automatic air quality monitoring
- No increase in the number of locations for sampling and measuring heavy metals and polycyclic aromatic hydrocarbons throughout the country
- A small number of stations perform measurements of air pollution at intersections in urban areas, despite the constant increase in the number of vehicles
- The problem of data relevance coming from local networks of measuring stations where the measurements are carried out by accredited manual methods has not been solved
- Public information about the state of air has not yet been improved. This includes publishing monthly reports on measurement results from local monitoring network on official sites of cities and municipalities.

Photo: Pixabay

data thus rendered become useless and demotivate people to deal with them."

At the same time, there is insufficient information about the quality of air that should be publicly available. Through the system of state automatic monitoring, a small number stations are monitored, not in the entire territory of Serbia, and Lidija Kesar says that the quality of air, that is air pollution, represents an ecological factor, on one hand, and a health factor, on the other.

"These are two ends of the same problem. Air pollution is largely interpreted from the perspective of quality and environmental protection. Today it is increasingly moving into the domain of public health impacts since the deterioration in air quality has the most direct impact on people and causes respiratory, cardiovascular and malignant diseases. If this issue was treated as a health threat at the state level, but also in the media, more and more people would be interested and able to monitor the state of air quality in their own environment."

The media, both local and national, should maintain permanent interest in this problem and try to inform citizens daily about the state of air quality as well as to suggest to citizens certain behaviour in case of high concentrations and exceedances. This will also encourage the development of civic environmental awareness and health concerns, which may also contribute to changing personal attitudes and habits.

Prepared by: Nevena Djukic

Photo: Pixabay

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Fast charging technology to support all current and next generation vehicles.

ABB Terra fast charging stations for electric vehicles can charge a vehicle in 15-120 minutes, depends on the battery. All ABB chargers come with Internet based Connected services to allow customers to easily connect their chargers to different software systems like back-offices, payment platforms or smart grid energy systems. The Terra 53 is ideal for use at highway rest stops, petrol stations, car dealerships and busy urban areas. **abb.rs**

TAILWINDS TO THE FINANCIAL MARKET

International Finance Corporation – IFC, one of the five members of the World Bank Group, is the world's largest institution that encourages economic development by investing in the private sector in emerging markets. Serbia became a shareholder and a member of IFC in 2001 by purchasing a small package of shares, which was followed by an official invitation from our government to the IFC to come to Serbia and take part in the creation of an investment market as well as in connecting private companies with potential investors. IFC's activities in our country have been managed for the past three years by Thomas Lubeck, who has recently been appointed Regional Manager for Southeast and Central Europe.

Having in mind that development of any market segment does not happen on its own, this financial institution has been supporting businesses through investment and advisory services for years in order to develop the domestic financial market and to encourage other investors to take a part in the existing or future projects. Over the last 16 years, IFC has invested more than 2 billion dollars in a vast number of different projects in Serbia, and the first investment in infrastructure is a project for which IFC allocated the funds in the amount of 19.1 million euros to the Belgian company Elicio for the construction of the Alibunar wind farm. Following this project, IFC also supported the construction of the Čibuk 1 wind farm. The IFC and the European Bank for Reconstruction and Development approved 215 million euros loan to the company "The Balkan Wind farm" for building a wind farm, which will be the largest in the Balkans. Thomas Lubeck believes that these projects herald a change and we can now expect other in-

BRIEFLY ABOUT THE IFC

- **Founded in 1956 in Washington to promote economic development through investments in the private sector**
- **It's one of the five organizations that make up the World Bank Group**
- **175 countries are members of the IFC**
- **The major shareholders are USA, Japan, Germany, France and Great Britain**
- **Other countries have a share of 54.2 percent**
- **Invests solely in private business through loans or in the form of equity interest**
- **Does not invest with government guarantees, but can offer advisory services**
- **One of the IFC's key roles in emerging markets is to bring private sector and investors together**
- **More information can be found at www.ifc.org**

Front photo: IFC; other photos: Elicio

THE CONSTRUCTION PROGRESS: MALIBUNAR FINISHED, ALIBUNAR UNDER WAY

Elicio company finished in October the construction of Malibunar wind farm, with the total capacity of 8 MW, which will supply 7,200 households with electricity. In this area of South Banat, which is very suitable for wind energy exploitation, since it belongs to the region with strong Košava wind, this company started in June the construction of another and larger wind farm Alibunar, that will have 21 turbines providing five times bigger capacity. The investment value is 80 million euros, and besides the IFC, the investors are UniCredit Bank, Dutch Development Bank, and GGF and the Elicio company.

vestors to significantly devote their resources to projects in our country.

"We can finally see our efforts being paid off, as the construction of these two wind farms stands for the first sizeable private foreign investment in renewable energy sources in Serbia."

These two projects have manifold significance for our country – the renewable energy supply will be increased, the emission of harmful gases will be reduced and both energy mix and energy supply of households and businesses in Vojvodina will be improved. Having in mind that Serbia is one of the biggest greenhouse gases producers in Europe,

based on the fact that 70% of our electricity is generated from coal-fired power plants, it's essential we should use the great potential of renewable energy sources on hand.

These projects have brought in the added value such as the key support to the commercial banks, as investors, to help them finance and invest in renewable energy sources. Thomas points up that the IFC is making great effort to mobilize domestic banks so that they take part in such projects alongside the IFC. "By doing this we are creating the market, we are motivating the banks to invest paying attention at the same time that they should be protected. In fact, working on these projects we have mobilized other entities to also invest their funds. "

ČIBUK 1 - THE LARGEST WIND FARM IN THE BALKANS

Čibuk 1 wind farm, with the capacity of 158 MW, 300 million euros worth, will occupy a total area of 37 square kilometers. The wind farm is part of "The Balkan Wind farm" project that is implemented through a 60:40 partnership between Abu Dhabi Future Company Masdar, United Arab Emirates and Cibuk Wind Holding, branch of the American company Continental Wind Partners. The 107.7 million euros financial package provided by the IFC consists of a direct top-up loan of 52.7 million euros, a loan of 36.7 million euros granted by IFC through its Co-financing Program portfolio and Syndicated B Loan of 18.3 million euros. At the same time, the EBRD has provided 17.7 million euros through syndicated loans of type A and B. The project will include 57 wind turbines obtained from General Electric company and it is expected to improve power supply for approximately 113,000 households and businesses. It is expected that the construction of Čibuk 1 wind farm will be finished at the beginning of 2019. The project will also help reduce carbon dioxide emissions by 370,000 tons per year. The project should create as many as 400 new jobs during its construction, as well as to improve local infrastructure with 50 km of new roads. The project will also help Serbia fulfill its obligations under the Energy Community Treaty establishing that in 2020, 27 percent of energy consumption comes from renewable sources.

In addition to the direct investments, this financial corporation was involved as an advisor to the City of Belgrade on a major project for getting energy from waste which was brought to an end after two years of negotiations and cooperation with the City's authorities. "State and local governments hire us to help them properly structure concessions or public-private partnerships, we do tenders and make sure the governments get absolutely the best deal for market. If you take into account the fact that we work primarily with the private sector, who can better know how private companies think and work. That being the core of our business, we can offer best advise on how to get the private sector in, so that they invest in matter of public importance, always bearing in mind the well-defined interest of state or local government. Here we've got a team experienced in working with investment banks precisely on investment advisory projects. To this end, Belgrade will be able to use up to 60-70 percent of waste for heat and electricity production. All this waste is now still dumped at the Vinča landfill without any sorting. There are many benefits from this project – besides energy production, the lifespan of the landfill will be prolonged, and certain environmental problems caused by ongoing method of waste disposal to the landfill will be solved", explains Thomas Lubeck adding that this is the first IFC's advisory service project related to the establishment of a private-public partnership in Serbia in the field of energy production that will surely pave the way to new partnerships that require long-term investment in other sectors in our country.

Many countries are facing one of the crucial developmental challenges such is urban infrastructure, bearing in mind that urban globalization trend will continue in the next twenty or thirty years and that people will keep on leaving rural areas in search for better life in cities. Having implemented individual projects in various cities in order to set up sustainable infrastructure, the IFC launched a more comprehensive initiative called Smart Cities. Thomas Lubeck explains that they have aimed for a holistic approach in designing this city development strategy, taking into consideration how cities will look like in the upcoming decades and what their population will be. "Here we have a strategy that should include numerous improvement measures, which also involves the implementation of energy efficiency in buildings, and we have chosen several cities to work with. Along with Istanbul, Izmir, and Lima, Belgrade is also among the future Smart cities, and with these advisory projects on investment possibilities for energy production from waste, or for water supply and energy efficiency in public buildings, we have taken the first steps that should help your capital city to address emerging developmental challenges." While financing and construction projects are still far from being carried out, a review is being done in partnership with the European Union about where investment might get the most efficiency.

Interview by: Tamara Zjacic

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SLV

SERBIA HAS CAPACITY FOR MANAGING NEW INVESTMENTS IN ECOLOGY

Swedish government agency for international development and cooperation - SIDA was founded with the mission to help reducing poverty in the world and to distribute humanitarian aid to people in the conflict zones worldwide. SIDA has been working in our country for more than two decades offering help on many levels and supporting reforms in a number of areas which Serbia has to take in order to become a member of the European Union.

This includes the environmental sector in which as well we are facing numerous challenges and essential problems. Having identified this area as one of the most important when it comes to its impact on national health, throughout last year SIDA donated 605,000 dollars for general environmental protection projects as well as 271,000 dollars for projects aimed to improve water and sanitation systems, while the greatest financial support (7.2 million dollars) was granted to the sectors of governance, democracy, human rights, and gender equality.

Swedish development cooperation is aiming for a holistic approach on Environment and Gender, says Robert Nygard, the First Secretary Programme Officer in Development Cooperation Section of the Swedish Embassy.

"These are two areas where Sweden has pushed for mainstreaming, thus these perspectives should be an integrated part of all sectors. For instance, there should be analyses of the Environmental Impact and Socio-Economic consequences of all the project dealing with development in general, that is industrial or urban development, agriculture production, and water management, etc."

Given the mainstreaming philosophy, there are projects supported by Sweden which are classified as having some influence in the environment sector, though it is not the main objective. For instance, Sweden supports CSO (like REC) and Standing Conference of Towns and Municipalities (SCTM) which receives funding, although environmental support is not the main objective but rather governance and democracy. Out of the total annual budget, which currently is 11 M Euro, 51% of the budget and 34% of the number of projects (contribution) were classified as having Environment as its main objective in 2017. Currently, there are 6 environmental projects and they are all being carried out with the Ministry of Environmental Protection (MoE), and according to Robert Nygard, commonly they are implemented during a four year period.

"We believe that the Swedish Environment Protection Agency (SEPA) (€0.5 million per year) was giving constructive support to the Serbian government negotiations for the

Photograph: imagebank.sweden.se

opening of Chapter 27 of the EU acquis. SEPA was among other means of support, able to provide an adviser (former Minister of Environment in Lithuania) who led similar negotiations in his country. Much of the work boils down to assessing realistic transition periods during which Serbia could meet the targets specified in the various Directives. In case targets are not been met in time, Serbia could face large fines or miss opportunities to attract major investment, which has been the case for some of the recent EU members."

The Swedish Chemical Inspectorate (SCI) has assisted its Serbian peer to upgrade the Serbian chemical register management both with hardware and software and training for several years with €0.2 million per year. Sweden is also supporting the Integrated Pollution Prevention Center (IPPC) located at the University of Belgrade Faculty of Metallurgy, for two years now, to assist industrial agriculture farms to obtain IPPC (Industrial Emission) permits. It is estimated to amount to about €0.5 million per year. The main goal of the project "IPPC Farms" was to assist competent authorities in Serbia and operators in the process of adopting a sustainable approach for implementation of IPPC/IE Directives in facilities for intensive rearing of poultry and pigs. The project involved more than 50 farms and covered the entire process, starting from drafting the

SOME OF THE RESULTS FROM SWEDISH SUPPORT HAVE BEEN:

1. **Waste management options analysis for Kragujevac**
2. **Landfill risk assessment for Kalenic**
3. **Outline for landfill alternatives in Zrenjanin**
4. **Terms of Reference for studies and design of Batajnica (Belgrade) wastewater collection and treatment**
5. **Study of Novi Sad regional waste system**
6. **Feasibility study for Nis wastewater**
7. **Review of tender documentation for the Leskovac sludge line**

In addition, Swedish support has been used to build the waste transfer station in Cacak, bringing into operation the sanitary landfill in Pancevo, stabilization of the regional landfill in Duboko, introduction of household recycling in Arilje, building a recycling yard in Bajina Basta and construction of a wastewater treatment plant in Kruscica (Bela Crkva). In 2016 two consultancy firms contracted were awarded after a tendering procedure which will be assisting the MoE with technical assistance for WWTP and WM for a 4 year period.

Swedish development cooperation is aiming for a holistic approach on Environment and Gender, says Robert Nygard, the First Secretary Programme Officer in Development Cooperation Section of the Swedish Embassy

Photograph: private archive

IPPC application for permit (with the involvement and work with farms), writing the permits (work with competent ministry and municipalities), to the enforcement and monitoring activities related to checks of compliance with permit conditions (work with the republic and local inspectors). "We expect that about 10 farms will have the IPPC permits within a year", says Robert Nygard adding that all Swedish development support is aiming to assist the Serbian EU accession. "Sweden has assisted the Ministry of Environmental Protection with Technical Assistance (TA) to help resolve 15 out of 20 "bottleneck" projects in Waste Water Treatment Plant (WWTP) and Waste Management (WM) sectors that date back to 2012".

Complementarity to EU IPA funding of projects is the main criteria's deciding on Swedish contribution in all sectors, so the EU acquis is the main criteria for the whole Swedish Western Balkan strategy 2014-2020. Another criterion is manifested in Serbian ownership in terms of national contribution in available staff or funds. After receiving a proposal from a Serbian partner which is often the Ministry of Environmental Protection, the Embassy makes an assessment of relevance a scrutiny of the budget often with the external consultant familiar with Swedish development objectives and Serbian conditions and policies to make a more informed decision.

Given the large investment needs in WWTP and WM (Heavy Investment Directives) which will take place over a long period, throughout all Serbian cities and municipalities, there is a need to have a prioritized list of projects a Single Project Pipeline (SPP) to be presented for the EU IPA funding. "My understanding is that it has been difficult for the government to prepare an SPP with well-prepared mature project proposals. In many cases, these projects require designing, building and operating technology that has never before been built in Serbia so some delays might be expected. Having said that, it appears that now is the time for a fully staffed environmental ministry, a clear strategy and strong cooperation and local leadership from the cities and municipalities to move forward", explains Robert stressing that Serbia stated the establishment of source separation, starting with a two-bin system of dry and wet fractions, as the short-term priority whereas the long-term goal is the establishment of a system to achieve the recycling rate of municipal waste of minimum 50% until 2030.

Transitioning to a recycling culture is one of the most important steps to generate projects and investment. Under the Article 53 of the Serbian National Law on Waste Management*, local self-governments are obliged to introduce and implement selection and separate collection of waste for recycling not later than three years from the date of entry into force of the Law (the Law came into force in 2016) and, households and other municipal waste producers are obliged to select municipal waste for recycling.

"It is estimated that there are over 3000 non-sanitary landfills or dumpsites in Serbia which should be closed down, remediated and replaced by some 26 regional sanitary landfills. In Sweden, only 5% percent is not recycled, which is the EU ambition. It is necessary to introduce 'source' or 'household' separation to reduce the operational costs of regional sanitary landfills", says Robert Nygard having in mind that recycling helps minimize the use of landfill space, cuts down the need for mixed waste transport costs, creates new jobs and generates revenue from secondary raw materials.

* Law on Waste Management (the Official Gazette of the Republic of Serbia, No. 36/2009, 88/2010 and 14/2016), Article 53.

But, it must be recognized, that recycling will cost more than just dumping waste in the ground.

Behavioural change is seldom easy and it is challenging to persuade citizens to take on more work voluntarily and separate waste into different material types unless they fully understand and accept the reasons why this will benefit them directly or indirectly.

According to Robert, experience from other countries going through the same experiences has shown that building modern water and wastewater infrastructure requires the largest investment of time, money and effort. So, the EU delegation has assessed, and Sweden concurred, that WWTP and WM are the most urgent areas to address from many perspectives, that is multidimensional poverty perspective.

The biggest problems often appear to appear in the planning process. Establishing a shared understanding of the size of projects, the standards expected in construction and operation, affordability limits and the staffing required to design, build and operate facilities requires time and experience.

"Developing projects for multi-million euro grants requires a Serbian investment in the key project staff in public institutions. Sweden can support Serbia with some specialist expertise but can only, and will only, do so if there are national counterparts ready to operate at this high level", says Robert.

Larger cities, not just the capital, should be leading the way. Unless Serbia resolves the vast majority of waste being generated by the urban centres then changes in the smaller towns or rural areas will not sufficiently improve the quality of the environment of the country. Recent progress has been seen through the actions of the Ministry of Environment, with Swedish support, to bring projects in Belgrade, Novi Sad, Nis, and Kragujevac to the point they can be financed and built.

"The best example of overall progress in the Ministry is that after a 3-year pause in funding for environmental projects, the EU has accepted with EU IPA 2017 that Serbia has the capacity to manage new investments. While this does not mean that all skills and capacity issues are resolved, it is a sign of progress", confirms Robert expressing his hope that the cooperation between Swedish Development Cooperation Agency and Serbian partners will lead to experience from individual projects that then lead to better, more practical national plans that lead to new, bigger investments and tangible changes to environmental quality for everyone living in Serbia.

Prepared by: Tamara Zjacic

Company PROPULZIJA

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For a quarter of a century, as long as this company exists, we have managed to do some incredible things. We turned a small family business that produces accessories made of metal to a big company with more than 120 employees. Our main area of expertise is POS (Point Of Sale), POP (Point Of Promotion) and POSM (Point Of Sale Material) design and development. We started in one industry and soon we spread to 7 more (Tobacco Industry, Pharmaceutical Industry, IT Industry, Automobile Industry, Banking & Insurance Industry, FMCG Industry, Building Industry), and at the same time upgraded the professional level of our team of mechanical and electric engineers, industrial and graphic designers. We also formed R&D team of people with a very particular set of skills.

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3. Engineering Development
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5. Black Metal Processing, Metal Plate Processing, Non-Metal Plates Processing
6. Wood & Plastic Processing
7. Surface Protection Sector
8. Powder Coating & Paint
9. Digital Printing Sector
10. Multimedia & Electronics Sector
11. Branding & Packaging Sector
12. Logistics & Transport Sector
13. Quality control Sector

We have also made progress in the other way, by increasing the number of countries with which we operate. In the beginning, we only did business with two countries, and later that figure rose to more than 17 countries and it continues to grow. Constant progress and expansion of the activities within which we operate led to a very successful cooperation in August 2017. Namely, we implemented a project in cooperation with ProCredit Bank, which is not only important for our company, but for our city and state as well, as it significantly affects the raising of environmental awareness in the community. We have designed, built and installed a unique carport with solar panels and an electric car charger and in that way be became a part of a family of innovative companies that follow the world trends and actively participate in the development of the network of electric chargers in Serbia. This unique project, as the first in a row, thanks to the cooperation with MT-KOMEX.

If you visit the administrative building of ProCredit Bank in the Boulevard of Milutin Milanković, you can see our carport for 2 vehicles with Schneider Electric chargers that enable quick and easy charging. The installed chargers are registered on all European maps of charging stations for electric vehicles. Of course, when you come to visit us in order to see our production capacities and be sure of the possibility of cooperation to mutual satisfaction, at the parking lot in front of our administrative building you will be able to see installed carport with solar panels with the installed capacity of 10 kW and a Schneider Electric charger for your car.

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Photographs: Marko Obradovic Edge

Dragica Pilipovic Chaffey
Jovana Lukic

Campaign "Don't litter! No excuses!" SBB foundation

Since SBB foundation began the cleaning action in Serbia in 2015, small steps of their ecological team have gradually paved the way to a comprehensive and still very important campaign to which public figures, citizens, public companies, environmental organizations, numerous associations and companies joined. Thanks to the great media attention and obvious results, as well as the striking name and the slogan of the campaign "Don't litter! No excuses!", the idea of an individual, personal contribution to environmental protection came to life again. We talked with Dragica Pilipovic Chaffey, the Chairman of the Board of SBB Foundation and Jovana Lukic, the Director of SBB Foundation.

EP You have chosen to send a direct, corrective message to the campaign slogan. Did you have any doubts about how people would react to a clearly articulated command "Don't litter! No excuses!"?

Dragica Pilipovic Chaffey I might have formulated it differently, less directly, because the fact is that the minority litters, not everybody. However, my colleagues felt that it was necessary to send a loud and clear message so that it would reach as many people as possible. Someone will always show resistance to what you do or order, and we cannot influence it. Nevertheless, everyone accepted our message, and many took part in the campaign and gave their support. A loud minority always asks for an excuse not to do anything.

Jovana Lukic After the clean-up campaign in Serbia in 2015, we realized that if we want better results we need to get more support. So the action grew into a campaign, and the name of the campaign was created to make people aware of the message and to adopt the message as much as possible. We have not pointed a finger at you, but we can all find ourselves in it. Both the one who litters and the one who does not litter – the first should stop with inappropriate behavior and the other try to influence people in the surrounding.

EP Previously, we had various short-term cleaning actions that had very limited results. You have been doing this for over two years and it would be good to know what the effect of the campaign is.

Dragica Pilipovic Chaffey It was interesting for us to see what kind of respond a cleaning action will have. You wonder what is the point of the action if your team comes and cleans one surface, for example, one park, and after two weeks you realize that the park is in the same condition as before cleaning. However, since our campaign has lasted for a long time, those small changes that we have made give visible results because we have noticed that there is a change in people's behavior. In addition, within the campaign, we also teach preschoolers to take care of their environment, and children will one day, thanks to the early adopted behavior, positively influence this society. In our

country, there are no shortages in areas where something needs to be improved. You can carry out actions everywhere. It is important that people recognize that what you do is meaningful and then, people are supportive.

Jovana Lukic That is why the campaign has to last for a long time. With continuous activities and with a personal example, we can influence people to change their awareness and behavior. We show positive effects that are caused only by nice behaviour, without any effort and endeavour. Our entire campaign is positive and focused on change for the better.

EP How did you manage to get public utility services to participate in the campaign?

Jovana Lukic We got support at the beginning. Without their support and permission, we would not be able to do this at all. They recognized our campaign as a significant one for the whole society. In Belgrade, they send us lists of dirty places that citizens report, join when they can and participate in annual actions. In smaller towns, it is easier to organize collective cleaning actions, because we conduct weekend actions there. It is not realistic in Belgrade that a public utility company sends us people every day because we clean every working day. There is no need for everyone to be at the same location, everyone has their own agenda. Nevertheless, their everyday contribution is significant, because they take away and dispose of the collected waste in a prescribed place, and this is also a big support for us. We would not be able to do this because we do not have a mechanism or logistics.

EP So, we could say that you have become "secret public utility officers"?

Dragica Pilipovic Chaffey We do not mind to be named like that. For example, I would like to be able to clean off the deserted coast of the Ibar River, but this would mean that we should include a large number of municipalities, and for the time being, we are not able to organize such a comprehensive action. And water is the most important resource, the most useful for the whole society.

EP What was the reaction of citizens, other companies, and public figures?

Jovana Lukic We realize the idea which is important to many. When people recognized themselves in this desire to live in a cleaner environment, it was easy to win them over. We all care when we see that parks, streets, and other areas have been buried with waste, but citizens needed someone to take the initiative in order to join. The desire to live in a beautiful and clean environment always exists, but mostly we do nothing on our own because we realize that it would be just a drop in the sea. Everyone likes to be a part of a wider story, in this case, an initiative with organized teams and the financial support we have launched. There is always a possible remark that after the cleaning, this new condition does not last. However, there are changes in behaviour.

Dragica Pilipovic Chaffey When citizens saw that we were persistent, they stayed with us, from the famous ones who helped us record commercial spots of the action on a voluntary basis, individuals who went out to the field to help us, to local public utility companies. A large number of partners joined us. If we have seriously approached this and are working devotedly all the time, it is natural that the citizens wish to be a part of our action and to change their habits.

THE LEADING TEAM OF SBB FOUNDATION

Dragica Pilipovic Chaffey got acquainted with the field of work of SBB in 2004, when the European bank, where she worked, gave the first loan to this company. SBB, a small company with a great desire to grow in the field of distribution of TV content and the Internet, had the opportunity to realize its plan. Then Dragica became a member of the Board of SBB on behalf of the European Bank. After 40 years of living abroad, working in responsible positions for international financial institutions: the European Bank for Reconstruction and Development (EBRD) and the International Monetary Fund (IMF), Dragica returned to Belgrade, became a member of SBB team in 2008, and from 2009 to 2015 she held the position of SBB's General Manager. Currently, she is a Vice President for corporate affairs of United Group and the Chairman of the Board of SBB Foundation.

Jovana Lukic joined the SBB team in 2011 as a Director of corporate communications of SBB company. She has led numerous projects in the field of communication and corporate social responsibility. Since 2015, she also holds the position of Director of SBB Foundation, as a key person to launch and implement all CSR projects. She takes care of the achievement of the planned goals, as well as of the successful incorporation of all segments of the Foundation's work.

All photographs: SBB

EP What is the change in the behavior of our citizens you are referring to?

Jovana Lukic It happened a few times to us that people report a location that is filled with waste, and when we get there, we see a completely cleaned area. This is a real change because people took the initiative. So, they did not wait for our team, but they, themselves organized the action and arranged the area in their surroundings. It is interesting that last year we had the situation that for a month and a half we were looking for a larger surface that needs to be cleaned. And this is the best and the greatest achievement of this action. And even if it does not have to do anything with our action, if it is not about the direct impact of this campaign, it is certainly good that people themselves take care of their surrounding.

Dragica Pilipovic Chaffey If someone cleans before us, it just means we can go to some other place and clean it. We should be fully aware that this society belongs to us and that it is up to us what kind of society we will live in, starting from the situation in our immediate environment. That's why we do not think about what others are doing, other companies or the state, but we try to contribute to the better state of the environment that belongs to us. We are doing this for our society. We are a part of that society and we have the right and obligation to do something. Some time ago, I was contacted by the Director of the European Bank for Reconstruction and Development in Serbia, Daniel Berg, expressing his desire to contribute to the campaign "Don't litter! No excuses!". People apply themselves to participate in our campaign.

EP What is the next step of SBB Foundation when it comes to the further course of this campaign?

Jovana Lukic So far, we have cleared the garbage in an amount that can cover about 70 football fields. It's a huge amount of waste and it's not just papers. As before, we continue to clean. By the end of the year, we will donate five new playgrounds, so, this year included, 21 playgrounds will be placed with new swings, slides, see-saws, climbing frames and other facilities. Children spend a lot of time in the playgrounds, so this is the right place to teach them how to take care of their environment.

We are currently giving away eco bags in our branch offices because we want to point out to people the problem of overuse of plastics, which is been degraded in nature for hundreds and thousands of years.

EP But that is not all. You have one more project designed for children of pre-school age with the same goal, to educate children in environmental protection.

Jovana Lukic Part of the campaign "Don't litter! No excuses!" for children aged 3 to 7 is the play "Who litters there?" which is created and set up especially for us. We hired a scriptwriter and director Bojan Butkovic and Boško Djordjevic to make an original play and the team that goes to kindergartens consists of two actors, two ballerinas and a choreographer/organizer and so far 4,500 children have seen it across Serbia. We presented the play in a printed book that children receive after the play so that they can show their parents what they learned.

EP A lot of work is ahead of our institutions on the eve of the opening Chapter 27 on the environment as part of joining the EU. And your efforts to raise awareness of the importance of clean environment contribute to the change of our society's relationship to environmental protection.

Dragica Pilipovic Chaffey Of course, it is not just about the waste we see, and to what extent we can influence ourselves as individuals. There is also a problem with an environmentally polluting industry that will also have to take steps to reduce to the extent prescribed by European laws.

Many years ago when I was working for the European Bank, a project was financed in the Gulf of Split in the area of wastewater management, where it was almost unthinkable to bathe in the sea due to the high level of pollution. The project has been successfully implemented, wastewater has since been processed at a place far from the bay and such purified water is disharged far into the open sea. After the completion of the project, the mayor of Split was swimming in the port of Split in a truly crystal clear sea. We will also have similar projects. The only thing is that it is expensive and a long-lasting process, but extremely important.

EP We should not miss the opportunity to mention another SBB Foundation campaign entitled "Live Your Idea".

Jovana Lukic We defined the program so that anyone can apply with a good idea that contributes to a positive change in the society or the development of SBB services. It is important that they have a good idea, that they can implement, and we financially help them with implementation. It is interesting that a large number of teachers applied for this competition and the largest number of winners is among them. So, we have a teacher from Kragujevac who has already been giving IT classes for children twice a week free of charge and now he needs additional support. Then, there is "Robolab" from Zrenjanin, where gathered teachers teach children about robotics, and one teacher from Novi Pazar created a cultural-artistic society for high school students of all nationalities with the desire to reconcile differences between them. These are just some of the examples of accepted projects.

Dragica Pilipovic Chaffey Not all our actions are bombastic. Actually, the campaign "Don't litter! No excuses!" is more evident, but we also have other projects and activities. We spend even more money on very discrete things. Now we have 65 families with more than 240 children that we help within the project "The Core". The number of families in "The Core" is growing, and this is a long-term support we have committed ourselves to. We provide support until the children, in the families covered by the program, have turned 19 years or have completed the college. And it is quite clear that it is not easy to manage everything when the revenues are small and irregular.

Jovana Lukic It was important for us to focus because we had ad hoc actions earlier. By establishing SBB Foundation, we gave direction to socially responsible business. The goal of each of our campaign or action is a functional society. Thus, the "Core", that is, the help of families fits into our mission, as well as all our other activities - "Don't litter! No excuses!" or "Live your idea." We are working for the betterment of what has the potential for change.

Interview by: Tamara Zjacic

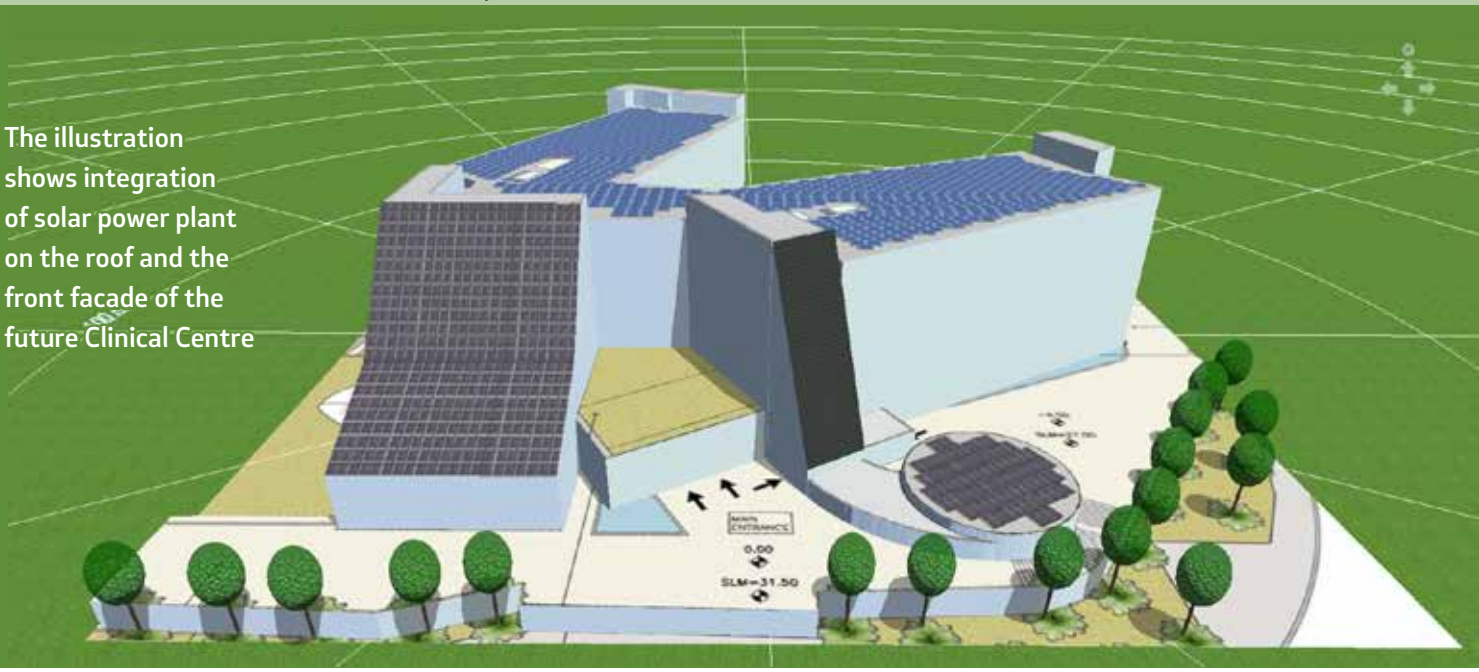
HOW IS ONE CLEANING ACTION ORGANIZED

Actions are conducted in cities where SBB has its own branch offices because besides cleaners, employees also form an ecological team. It is cleaned from spring to winter, as long as weather conditions allow it. This year the teams worked well even at 40 degrees. Weekend actions are conducted inland, and the capital is cleaned every working day. In Belgrade, the locations are selected based on the report of the cleaner coordinator that goes around Belgrade and records the locations, and when the city sends information about the dirty surface, the ecological team goes to that location. Cleaning actions are carried out together with the city of Belgrade and "Beokom" from the very beginning. Public Utility Company "Zelenilo-Beograd" helps them clean up larger areas with plenty of vegetation, sour trees, bulky or dangerous waste because without them they would not be able to do such an action.

"When we announce a clean-up action in a city, we invite people to join us, we paste posters in the area that we clean, inform self-government and, in agreement with city services, choose the location, because they know best where to clean," said Jovana Lukic. She adds that they do not know how many citizens will join the announced campaign: "3 to 200 citizens can come. We never know that, but we are in the field anyway." This year SBB Foundation sends a new message "All together" to encourage more people to join them because cleanliness and health are the interest of all citizens.

Construction of Small Solar Power Plants on Roofs of Public and Commercial Buildings

Contribution to reduction of greenhouse gas emissions is also possible from the health sector



The illustration shows integration of solar power plant on the roof and the front facade of the future Clinical Centre

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In addition to several decades of experience in the field of mechanical engineering and welding, «MT-Komex», a company based in Belgrade, in the past seven years, has enriched its construction activity with the area of renewable energy sources. Following the world trends, the staff of «MT-Komex» has passed through a series of tranings and specialization for performing assembly, construction and installation works. In the past period, the company «MT-Komex» has participated in numerous projects for the construction of small hydropower plants, gas, and solar power plants.

PROJECT EXAMPLE

SOLAR POWER PLANT ON THE ROOF OF THE CLINICAL CENTRE

Location Mediterranean country, with an average radiation energy value of about 1,500 kWh/m² annually.

Installed capacity of the power plant 300 kWp

Annual production 450,000 kWh

Emission reduction od 448,000 kg CO_2 annually through energy savings

Illustrations: MT-Komex

The engineers and contractors of «MT-Komex» – specialized in the construction of solar power plants, have been trained and certified to install photovoltaic panels with associated equipment, as well as voltage inverters.

So far «MT-Komex» has been a contractor for 8 small solar power plants with a total installed capacity of 2.4 MW.

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Marija Jevtic
The Faculty of Medicine in Novi Sad

We Have Upset the Planet – Now It Retalitates against Us

Photograph: private archive

On the occasion of the World Environment Day, we had the opportunity to listen to the lecture by professor Marija Jevtic, Ph.D. on air, climate, energy and their importance for health. Marija Jevtic is a hygiene specialist, a subspecialist of communal hygiene with the pathology of the settlement and a full-time professor at the Faculty of Medicine at the University of Novi Sad.

EP Since you are a hygiene specialist, that is, an expert in the field of public health, can you tell us when and how did you become interested in this area?

Marija Jevtic Our specialization has a beautiful name - hygiene, by the goddess of health and is defined as a science of health. Hygiene studies environmental factors and their impact on health, striving to favour those who contribute to the health and reduce the effects of those who harm it to the minimum. All medical sciences are interdisciplinary and multidisciplinary today, but the way hygiene interacts with other professions is nevertheless specific.

Medical students see their future most often in clinical medicine, which is fully expected and justified, but one part of the medical profession is dedicated primarily to health, not an illness, and that is the part that makes preventive medicine and to the larger extent – the field of public health. The moment I met hygiene, and this was during my last year of faculty, that area became my orientation.

Health is common weal which implies that **health care belongs to everyone** – the whole community

EP How can we realize the connection between ecology and public health from the point of view of your profession? How do changes in the environment affect people's health?

Marija Jevtic Ecology is represented in hygiene significantly within the medical or health ecology, which studies the interrelations of individuals and population with the environment. During work, with all due respect for other professions, we study the behavior of environmental factors, we investigate the presence of various harmfulness and we try to assess their risk for health. A person is viewed as an individual or as a population in relation to the environment. This - in a way, selfish, anthropocentric view, adapting the environment to oneself and, consequently, influencing the environment that changes in the long-term, losing its original qualities - as a consequence, today there are significant changes in the environment. It could be said that we have greatly disturbed the planet, and it retaliates against us with symptoms of air pollution, climate change, droughts, floods, weather and similar phenomena. These are very important challenges for public health.

When talking about health, it is necessary to emphasize that absolute health does not exist. On the other hand, public health is defined as the science and practice of protection in improving health in the local community through preventive medicine, health education, control of infectious diseases, sanitary monitoring and monitoring of ecological hazards. Public health is, therefore, the science and art of improving health, preventing disease and prolonging life through organized community efforts.

The fact that health is a commonweal implies that health care belongs to everyone – to the whole community. Public health promotion can not be achieved without preserving and cultivating the environment, with the participation of all stakeholders, therefore the link between ecology and public health is very significant.

EP How do you comment on the current state of the environment in our surrounding and beyond?

Marija Jevtic The analysis of the state of the environment depends to a considerable extent on the method of data collection, which varies from a country to a country. Developed countries devote a lot of attention to the environment, not only in terms of monitoring the situation but also with the attitude towards the environment. The World Health Organization has developed a system for monitoring environmental and health indicators (ENHIS), and there are efforts to develop it within the national public health system.

The complexity of approach to preservation and improvement of the environment is reflected in the fact that this chapter is the most demanding and most expensive in the EU accession negotiations process. Nevertheless, the main motive for the tendency towards system regulation in this area should not be a negotiated procedure, but preserving and improving the health of the population.

According to the data of the World Health Organization, seven million deaths annually at a global level, are attributed to air pollution, so it is not appropriate just to comment on the situation, but to launch actions and to stop negative trends through personal and corporate responsibility. This applies to both our and global environment. Changes are much faster and worse than we anticipated.

I think it is very important to emphasize that besides monitoring and research, very important thing is to have rules and to respect them, as the way of life and behaviour.

EP How would you describe environmental changes in the light of public health?

Marija Jevtic The twentieth century will remain in history as a century of prosperity, progress, technological and

Photographs: Pixabay

infrastructural development, new achievements, modern technologies and communications, the invention of drugs for many diseases. The picture of the state of health is significantly changed, and mass non-communicable diseases have a higher percentage of mortality than infectious ones. In developed countries, life expectancy is significantly longer. Nevertheless, we will remember this period for conflicts, wars, forced migrations, traumas, present and growing inequality and poverty. These are the challenges that we should be aware of and with which 21st century began.

A man always strives to live in the community, believing that the community will enable him a better and more contented life, secure infrastructure as well as the necessary energy. This primary aspiration has led to the fact that the dominant share of people in urban areas still lives mostly in basically inadequate, unhygienic conditions in an infrastructure that is insufficiently or completely unregulated. Even in fully-regulated and advanced environments, the exposure to negative environmental factors is intensifying (water pollution, air pollution, waste, noise, natural disasters), so that we have recently been faced with their ever-increasing impact, and in this regard, the state of mental health of the population.

EP What are the possibilities to answer these numerous challenges?

Marija Jevtic In order to look at health factors in urban areas, the term urban health emerged, which grew into a special discipline. In addition, the 17 Sustainable Development Goals (formulated by United Nations as a determinant of future social and economic development in accordance with the principles of sustainability) provide a framework for the necessary action and direct national levels to specify activities and their combining, as the challenges are not present everywhere in the same way.

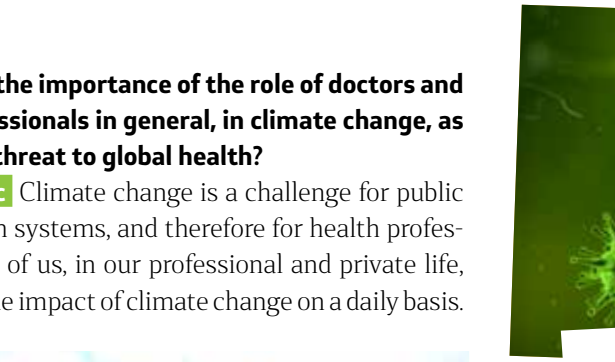
For example, we are not exposed to the problems of demographic growth in the number of inhabitants, but we are disposed to the decline in birthrates and aging of the population. It follows that priorities at the national level should be set taking into account this fact, and accordingly formulate strategic sustainability frameworks.

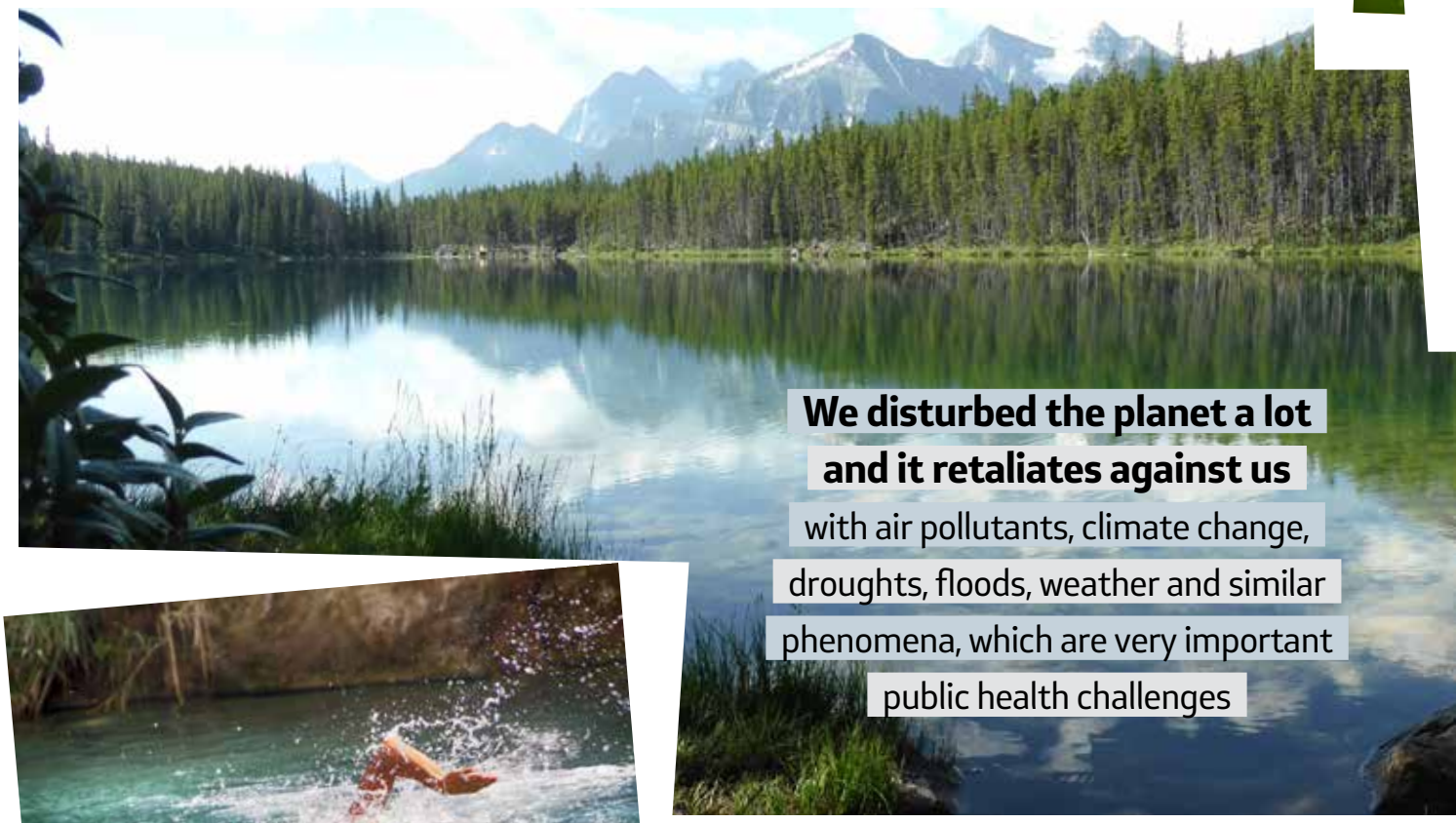
It is precisely the skill in choosing priorities, consistency in times of frequent changes, and persistence in activities part of a public health prescription, the result of which is seen after a lot of patience and many years. In order to succeed, we need not only awareness and knowledge, but also the capacity to change and readiness to give up, for the sake of sustainability in the future that will not be ours. Therefore, the process of education is very important, the readiness for rapid changes in education in the preparation of future experts, health professionals and others.

EP What is the importance of the role of doctors and health professionals in general, in climate change, as the biggest threat to global health?

Marija Jevtic Climate change is a challenge for public health, health systems, and therefore for health professionals. Each of us, in our professional and private life, recognizes the impact of climate change on a daily basis.

Photograph: Pixabay





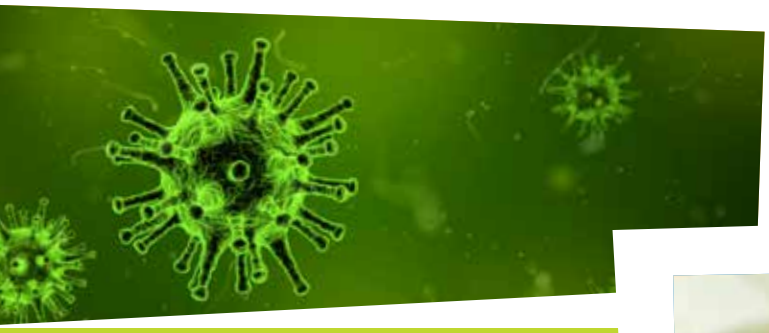
We disturbed the planet a lot and it retaliates against us with air pollutants, climate change, droughts, floods, weather and similar phenomena, which are very important public health challenges

The possibilities for the operation of health professionals are reflected in the strengthening of their own capacities in human resources and their planning; participation in local and national public health policies and environmental protection; co-operation with urban planners in order to provide various benefits by taking the lead role in reducing harmful emissions in hospitals and clinics using appropriate technologies.

EP You mentioned the term urban health, can you identify some of the important priorities for the functioning of the urban environment?

Marija Jevtic Urban environment, as a newly built environment, has its characteristics, and infrastructure is an important factor for the urban environment to function as an organism.

I would mention that energy is a magical word that is often mentioned in health care. I will make a digression and mention that the surplus of energy (by food intake) that we have at the individual level leads to obesity as one of the most significant challenges in many countries.



"As soon as he understood his power, a man began to act towards nature as a random and intolerable rogue in the orderly order of artificial things, in the world of his own products, which would otherwise be perfect without nature."

Borislav Pekic, 1999

On the other hand, energy is indispensable for the functioning of the institutions, the quality of life and everyday life, and although it is not the primary concern of the health sector, it is essential. The quality of life of individuals and the population depends on the way of using energy resources, and the consequences of incorrect choices for energy security are visible in the health sector. The price of energy is not just the one we are currently paying for, it costs energy for today, but also the short-term and long-term health consequences.

The role of health professionals is not only focused on the treatment of consequences, but also on indicating decision makers to take into account the health impact when deciding on energy issues. From the perspective of health, it is important to develop an environment that allows the development and use of renewable energy sources, with the right energy sources and increasing energy efficiency. Also, health systems are significant energy consumers and participate in a large amount of energy consumption in large part, and therefore have the opportunity to contribute to mitigating climate change by their actions.

For example, the knowledge and skills of a top surgeon (or another specialist in the clinical medicine branch) can only be shown if the infrastructure conditions are met, to perform the appropriate intervention (necessary energy, water supply, etc.). It is, therefore, necessary for health professionals themselves to be aware of and to actively contribute to the decision-making process on energy strategies using the principle of health in all policies.

EP Who would you identify as a partner in environmental conservation and promotion activities and contributions to public health?

Marija Jevtic The interested public (civil society) is entitled to the availability of environmental data. The non-governmental sector is an important partner in providing support to the health sector in its efforts to improve public health activities in the field of monitoring, research, and assessment of health impacts. Some organizations, such as the RES Foundation, the Belgrade Open School and the international organization HEAL, provide strong support to the health sector and play an important role in highlighting the relationship between ecology and public health, as well as the joint activities in the energy transition that is ahead of us and which should be in the function of long-term preservation of the health of the population.

Continuous activities in avoiding harmful factors in our environment and cultivating positive factors give us the ability to preserve and improve human health. These activities imply continuous persistence in respecting public health priorities so that in the near future we can make decisions for the benefit of our descendants, whose quality of life and health depends on the state of the environment that we hand down.

Interview by: Marija Nesovic

AIR POLLUTION HARM TO UNBORN BABIES MAY BE GLOBAL HEALTH CATASTROPHE

Air pollution significantly increases the risk of low birth weight in babies, leading to lifelong damage to health, according to a large new study.

The research was conducted in London, UK, but its implications for many millions of women in cities around the world with far worse air pollution are "something approaching a public health catastrophe", the doctors involved said.

Globally, two billion children – 90% of all children – are exposed to air pollution above World Health Organization guidelines. A Unicef study also published on Wednesday found that 17 million babies suffer air six times more toxic than the guidelines.

The study analysed all live births in Greater London over four years – over 540,000 in total – and determined the link between the air pollution experienced by the mother and low birth weight, defined as less than 2.5kg (5.5lbs). The scientists found a 15% increase in risk of low birth weight for every additional 5 micrograms per cubic metre (µg/m3) of fine particle pollution.

The average exposure of pregnant women in London to fine particle pollution is 15µg/m3, well below UK legal limits but 5µg/m3 higher than the WHO guideline. Cutting pollution to that guideline would prevent 300-350 babies a year being born with low weight, the researchers estimated.

The new research shows the impact of air pollution on babies in London is significant, but affects a relatively small number – only about 2.5% of all full-term babies are born with low weight. However, many cities around the world – such as Delhi in India – suffer far higher levels of toxic air, raising concerns of huge impacts on unborn babies. Outdoor air pollution is already causing millions of early deaths every year among adults and children.

Unicef executive director Anthony Lake said: "Not only do pollutants harm babies' developing lungs – they can permanently damage their developing brains – and, thus, their futures. No society can afford to ignore air pollution."

Source: Guardian

NEW ZEALAND CONSIDERS CREATING CLIMATE CHANGE REFUGEE VISAS

New Zealand could become the world's first country to essentially recognize climate change as an official reason to seek asylum or residence elsewhere, a government minister indicated in an interview Tuesday. If implemented, up to 100 individuals per year could be admitted to the island nation on a newly created visa category, according to an initial campaign promise the proposal which is now being considered is based on.

This may appear relatively insignificant, given that the United Nations High Commissioner for Refugees predicts 50 to 200 million people to be forced out of their homes because of climate change by 2050. Yet the announcement has still stunned environmental activists who have long demanded such resettlement programs but have been blocked by governments and courts — including New Zealand's Supreme Court.

Although New Zealand's approach does not bind other host countries, the experiment could be used as a role model, both in national courts and in the public debate. If implemented, the New Zealand proposal would likely be used by activists in European nations such as Sweden or Germany to pressure their own governments into creating similar schemes.

Adapted by: Marija Nesovic

Photo illustrations: Pixabay

ELECTRIC CARS ALREADY CHEAPER TO OWN AND RUN THAN PETROL OR DIESEL – STUDY

Electric cars are already cheaper to own and run than petrol or diesel cars in the UK, US and Japan, new research shows.

The lower cost is a key factor driving the rapid rise in electric car sales now underway, say the researchers. At the moment the cost is partly because of government support, but electric cars are expected to become the cheapest option without subsidies in a few years.

Photo-illustration: Pixabay

The researchers analysed the total cost of ownership of cars over four years, including the purchase price and depreciation, fuel, insurance, taxation and maintenance. They were surprised to find that pure electric cars came out cheapest in all the markets they examined: UK, Japan, Texas and California.

Pure electric cars have much lower fuel costs – electricity is cheaper than petrol or diesel – and maintenance costs, as the engines are simpler and help brake the car, saving on brake pads. In the UK, the annual cost was about 10% lower than for petrol or diesel cars in 2015, the latest year analysed.

Pure electric cars receive a sales subsidy of about £5,000 in the UK and Japan and £6,500 in the US. It was estimated that an electric car such as the Nissan Leaf would become as cheap to own and run as a petrol car without subsidy by 2025.

The push to roll out electric cars, which produce less climate-warming carbon emissions, has been supercharged by concerns over air pollution, particularly from diesel cars. In the UK, where toxic air is at illegal levels in most urban areas, sales of diesel vehicles have plummeted by 30% in the last year while sales of electric cars have soared by 37%.

Air pollution concerns are especially acute in China, which is now the biggest market for electric cars and growing rapidly, mainly driven by domestic manufacturers including BYD, Geely and Beijing Auto.

Source: Guardian

BIOACID MORE ACIDIC OCEANS WILL AFFECT ALL SEA LIFE

Since 2009, scientists working under the BIOACID programme have studied how marine creatures are affected by acidification during different life stages; how these reactions reverberate through the marine food web; and whether the challenges can be mitigated by evolutionary adaptation.

Some research was done in the lab but other studies were conducted in the North Sea, the Baltic, the Arctic, and Papua New Guinea.

A synthesis of more than 350 publications on the effects of ocean acidification – which will be given to climate delegates at next month's summit – reveals that almost half of the marine animal species tested reacted negatively to already moderate increases in seawater CO_2 concentrations.

Early life stages were affected in Atlantic cod, blue mussels, starfish, sea urchins and sea butterflies.

But an experiment with barnacles showed they were not sensitive to acidification. And some plants - like algae which use carbon for photosynthesis – may even benefit.

Adapted by: Marija Nesovic

SCIENTISTS DISCOVER PLANTS RESPOND TO ANESTHETICS – WHICH COULD END ANIMAL TESTING

Scientists have found an unexpected new source for lithium, a key component in battery-powered electric cars and other renewable energy technologies: supervolcanoes.

Most of the world's lithium comes from Chile and Australia, and expanding access to the mineral is crucial for meeting demand for new green technologies to reduce carbon emissions, Stanford University scientists said on Wednesday, reports Thomson Reuters Foundation.

"The demand for lithium has outpaced the scientific understanding of the resource, so it's essential for the fundamental science behind these resources to catch up," Stanford University researcher Thomas Benson, the study's lead author, said in a statement. "Now we have a way to easily find more of these lithium deposits."

The discovery comes as more companies, including large carmakers whose products cause significant carbon emissions, work to develop climate-friendly technologies. Electric cars, which use lithium ion batteries, are gaining traction as an emission-free alternative to conventional cars.

"We're going to have to use electric vehicles and large storage batteries to decrease our carbon footprint," Gail Mahood, a professor of geological sciences at Stanford University and the study's co-author, said.

Supervolcanoes are much larger than ordinary volcanoes and erupt at least 1,000 cubic kilometers of material in one eruption. Scientists studied the contents of craters left by supervolcanoes in Oregon, Nevada and other parts of the United States, which erupted millions of years ago.

They sliced through tiny bits of volcanic magma, which were trapped in crystals in the craters, and analyzed them to find the valuable silvery-white metal. Sweden-based Volvo pledged last month that all new cars it launches after 2019 will be electric vehicles or hybrids.

Other automobile firms are also planning to increase production of electric vehicles, which will boost the demand for lithium, considered a strategic resources by some governments.

Source: Futurism

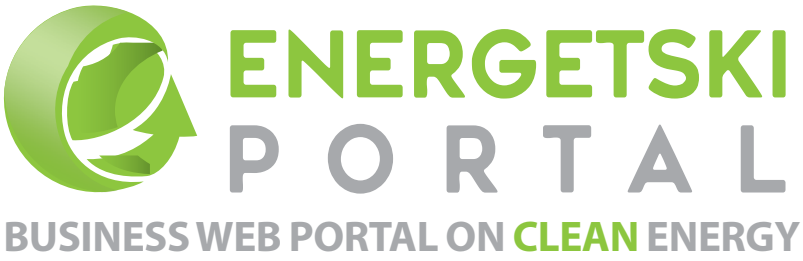
WORLD'S FIRST 'NEGATIVE EMISSIONS' POWER PLANT OPENS IN ICELAND

In October, the nation flipped the switch on the world's first power plant that eliminates more CO2 than it produces. The pilot program, which is operated by Climeworks, can remove an estimated 50 metric tons of CO_2 from the air each year. The gases aren't just contained; rather, they are turned into limestone where they will remain for at least one million years.

The process works by capturing the CO_2 from ambient air using Climeworks' patented filter. The geothermal power plant then heats up the filter using low-grade heat; this extracts pure carbon dioxide. The gases are then bound to water and sent 700 meters deep into the ground. When CO_2 reacts with basaltic bedrock, it forms a permanent solid mineral. Quartz reports that by burying the harmful greenhouse gases in rock, the odorless gas is prevented from being released for at least one million years. The process isn't exactly cheap, for instance. Climeworks estimates that it costs $600 to extract just one ton of CO_2 from the air.

By the end of 2017, the full capacity of the plant is expected to be 900 tonnes per year – but that's only the equivalent of the annual emissions of 45 American people. Nonetheless, the company remains hopeful that this is the beginning. By 2025, the company seeks to cut costs to $100 a tonne and capture 1 percent of man-made carbon emissions each year. There are no details on how this will be accomplished, but with investors such as Bill Gates and the European Space Agency throwing money into research for "direct air capture," it could be accomplished.

Source: Inhabitat


ENERGETSKI
PORTAL
BUSINESS WEB PORTAL ON CLEAN ENERGY

Ph.D. Aleksandar Joksimovic
Institute of Marine Biology, Kotor, Montenegro

The Adriatic is Our Heritage – We Must Preserve It!

With four national parks, and a multitude of forest systems, more than 50 protected plant and animal species, although small in size, Montenegro has three different natural environments at a distance of only 100 kilometers: the coast, karstland, and the region of high mountains.

In 1988, the Montenegrin parliament declared Montenegro as an ecological state, confirmed by the international community in 1992 at the United Nations Conference on Environment and Development in Brazil.

Taking into account the impacts of the proximity of the sea to the entire ecosystem as well as human health, we bring you a story about the Kotor Institute of Marine Biology, the only scientific research institution in Montenegro that deals with the biology of the Adriatic Sea.

For 56 years, employees and associates at the Institute of Marine Biology in Kotor study biodiversity of the southern Adriatic in order to preserve it – protect it from the impact of climate change, extinction and migration of marine organisms, and pollution caused by man's activities. In the capacity of the organizational unit of the University of Montenegro, within the Institute today there are Laboratory for benthos and marine protection, Laboratory for ichthyology and coastal fishery, Laboratory for marine chemistry and oceanography, Laboratory for plankton and seawater quality and Laboratory for development research and mariculture. The Instutute publishes a scientific magazine "Studia Marina". By providing recommendations for responsible use of marine resources, the Institute cooperates daily with almost all institutions in Montenegro.

Our interlocutor is Ph.D. Aleksandar Joksimovic, the Head of the Laboratory for ichthyology and coastal fishery in this Institute. Mr. Joksimovic received a doctorate at the Faculty of Biology of the University of Belgrade. His doctoral dissertation was about "Fishery Biology and population dynamics of some economically important fish species of the Montenegrin coast", and he is also the main negotiator of Montenegro for the opening of negotiation Chapter 13 (Fisheries) of the EU as well as the scientifically responsible person on behalf of Montenegro at the General Fisheries Commission for the Mediterranean.

– More than 20 national, bilateral and international scientific and research projects are currently being implemented at the Institute, and at the same time, thanks to the strong will of the employees, numerous student visits, such as the traditional May spring school, are conducted for biology students from all the countries of the region and beyond. We, at the Institute, carry out numerous educational campaigns because we want to transfer the results and methods of our research to interested, young people – said Ph.D. Joksimovic.

National projects, conducted for the needs of the Ministry of Science and the Ministry of Agriculture and Rural

Photographs: private archive

Development, are primarily dedicated to sustainable development of marine fisheries but also to mariculture because natural resources are rather prevalent and burdened with the outflows of polluting substances into the environment. Although the Montenegrin fleet is small, a large number of fishing vessels of other Adriatic countries are extremely active in the Adriatic Sea, resulting in a noticeable downward trend in marine resources.

– In cooperation with partner institutions, the Institute also implements IPA projects from the Pre-accession Assistance allocated funds of the European Union, such as the recently completed NetCet project, dedicated to the research and study of whales, turtles and other marine mammals. The DeFish Gear project is also worth mentioning, focusing on the analysis of marine waste, primarily particles and filaments of plastic, which are potential foods of marine organisms, and can be found in their organs, as well as on the surface and the bottom of the sea – Ph.D. Joksimovic told us.

The Institute also has an accredited laboratory for monitoring the sanitary quality of seawater. For many years, the quality of water on public beaches has been checked for the needs of the Public Enterprise for coastal zone management.

In the previous years, the South Adriatic developed a model for the protection against oil pollution and its derivatives, which in case of accidental situations could be spilled from ships, and surveys have been carried out on potential dangers of ballast water spillage (water that the vessels are sucking for their stability) in the coastal area, under IPA projects "HAZADR" and "BALMAS".

Food coming from the sea is significantly present on the tables of inhabitants of the coast, but also of the inhabitants of the entire region. With the support of the Albert II Foundation from Monaco, the Institute has been implementing a project for exploring the Pen Shell (Pinna Nobilis), a very important species that was once dominant in the Bay of Kotor but has become compromised over the past decades. The emphasis is placed on the revitalization of this species and its artificial reproduction in order to eventually be returned to the natural habitat.

Four years ago, the Ministry of Science launched a competition for the establishment of the first Center of Excellence in Montenegro, which was announced as partners by the Faculty of Electrical Engineering and Biotechnology of the University of Montenegro, the Institute of Public Health and the Institute of Marine Biology, and after a long evaluation process they were given the chance to, form BiO-ICT, the first Center of Excellence in the field of biotechnology and bioinformatics, through the HERIC project funded by the World Bank.

Within the BiO-ICT Center, and in cooperation with the Center for Ecological Security of the Russian Academy of Sciences and Arts from St. Petersburg, the status of shellfish used in human nutrition is monitored. The system measures the cardiac activity of the shellfish through the sensors on the shells, and cardiac rhythm of the shellfish is obtained by means of optical cables and transmitters on the monitors. The essence of this measurement is that in this way you get an overview of the situation in real time, that is you learn how shellfish react to changes in the marine environment which is otherwise very dynamic. If the

heart rate deviates from normal, this indicates that the changes have occurred, and at that point, the team goes to the field to sample water and determine what is the cause of the changes, through chemical and microbiological analyzes. The system was set up in an experimental farm in front of the Institute and in the private farm "COGI mar" and according to Mr. Joksimovic, so far eco-toxicological analysis of heavy metals in tissues of shellfish, sediment, and water have always been within normal limits, so we can freely conclude that food caught in the bay has no negative impact on human health.

The Bio-ICT Centre of Excellence has enabled the Institute to cooperate with various businessmen dealing with the cultivation of fish and shellfish. Ph.D. Joksimovic singled out BokaGard, a business unit of Skoljka Boke, which today follows all trends in science and the result of this successful cooperation is a certificate of quality that enables the export of products outside Montenegro. In the mentioned farm, mussels, and oysters are produced, and the quality of the sea water, in which they are grown, is estimated based on microbiological parameters.

The Institute is engaged by the Ministry of Agriculture and Rural Development for the development of mariculture and monitoring of the quality of seawater in farms. Parameters are measured every 15 days and based on them, a database is created, available to breeders. In addition to monitoring, it is the Institute's obligation, if an irregularity is detected – that the parameters are beyond the limit

values, to alert breeders and recommend for the farm to be temporarily closed in order to investigate the causes of the deviation.

So far it has not happened that some of the breeding farms are closed, because there is no longer an active industry, and besides, there is a phenomenon of self-purification in the waters of the Bay of Kotor, as many rivers with a large flow of fresh water flow into the sea. All sampled waters are mainly the first category, which is confirmed by the analysis of water on the beaches, that are performed during the summer season for the Public Enterprise for coastal zone.

This summer, within the framework of the project implemented by the Bio-ICT Centre for Excellence, in partnership with the Public Enterprise for coastal zone management, and the company "APLITUDO" from Podgorica, smart buoys were installed, on several locations in the open sea and one in the Bay of Kotor, which are powered by solar energy and are used to measure the salinity, temperature and pH of the water. The measured data are sent to the base of the site using GPRS. As this is a pilot project, we are working on a model for the data to be available for interested individuals and companies, through registration and subscription, and in the future, this concept could become an open data form, with the extension of the monitored parameters.

Since its inception, the Institute of Marine Biology has been successfully cooperating with Belgrade Institute for Biological Research "Sinisa Stankovic", through activities related to bioindicators of the environment. Ichthyologists use different tools and methods to sample living organisms – fish, crayfish, and shellfish, and their habitat, and biologists from the Institute "Sinisa Stankovic", do over two hundred analysis on the tissues of these organisms (muscles, liver, gills).

– Through this form of cooperation, we have the results of how the organisms respond and what happens in their tissues in relation to the pollution that can come from the outer

environment into the seawater and thus to the food chains of different species. When I moved to Kotor twenty years ago, there were noticeable problems with the wastewater from the sewage systems that were manifested as the turbidity of the surface layer, the disorder of clarity, the change of colour into yellow and red, as well as the smells that spread during the summer months. In the last decade, the problems have been solved thanks to the system for collecting and purifying wastewater from Boka which is located in Traste. Technical water is discharged at 3,650 meters from the coast, at a depth of 56 meters. The discharge was designed in the seventies, because there are extremely strong currents in that place, and the water discharged there has little effect on the Adriatic ecosystem – explains Joksimovic.

In the summer months, Budva has overcrowded capacities, and it happens that due to the heavy load there is sometimes a pipe break, which causes a decrease in water quality due to the increased number of coliform bacteria. By alerting the competent institutions, these accident situations are solved in the shortest possible time, and the quality of the water is brought about to its original state. According to Ph.D. Joksimovic, earlier there were infections such as abdominal pain and skin changes among bathers that have come into contact with the water of poorer quality. These are mostly symptoms that are cured quickly. In the long run, the system is viable and in function.

The Institute, with its numerous associates, carries out actions to raise awareness of the importance of preserving the sea and coastal area. There is also cooperation with several non-governmental organizations that are making great efforts to change the irresponsible behaviour of individuals with actions for cleaning the coastal area.

– We want to teach children that the sea is our heritage, that they should take care of it and respect it so that it is clean because we inherited it clean from our ancestors. Nobody who comes here will neither pollute it nor clean it. As a human species, we must be aware that we are only a part of nature, not its masters. Therefore, we must not behave that way, because nature is a great living organism that requires attention. We are witnessing the changes that are taking place due to our activities, but they are not limited to the sea. We are aware that summers became hot and winters extremely cold in the areas where they were not like that earlier, while the frequency of hurricanes and typhoons increased. Nature's clock is ticking the eleventh hour, therefore it is necessary to do everything we can to change the consciousness of people around us, otherwise, the bough we are sitting will be cut off. I believe it is not too late for changes – concluded Ph.D. Joksimovic.

Prepared by: Marija Nesovic

BIOMASS – Energy all around Us

Maja Matejic, Portfolio Manager for Energy, United Nations Development Programme (UNDP) in Serbia

In 2015 the Ministerial Council of the Energy Community of South East Europe reached an agreement on the implementation of the EU Directive on the promotion of renewable energy sources by which the signatory countries of the Energy Community Treaty commit to the determined energy quotas produced from these sources in the total gross final energy consumption in 2020.

The targeted share of renewable energy in the total gross final energy consumption in Serbia for 2020 is 27 percent.

The potential of renewable energy sources in Serbia amounts to 4.3 Mtoe equivalents of oil annually. The largest share of 61% has biomass and its total energy potential is available throughout the country. The energy potential of unused biomass in Serbia is equal to 55% of the total electricity produced or 78% of the total annual natural gas import or 51% of the annual oil import.

The use of biomass is technically feasible and economically cost-effective solution for a big part of Serbia's needs for renewable energy, stresses Maja Matejic, Portfolio Manager for Energy United Nations Development Programme (UNDP) in Serbia. She believes that investments in biomass power plants can have a significant financial effect and thus provide additional incentives for economic development and job creation, especially when considering that biomass is used mainly locally, or near the place of origin.

Photographs: UNDP

The Office of United Nations Development Programme (UNDP) in Serbia, in partnership with the Ministry of Mining and Energy of the Republic of Serbia, is implementing a five-year project "Reducing Barriers to Accelerate the Development of Biomass Markets in Serbia". The aim of this project is to ensure that biomass from attractive potential becomes a widely used source of renewable energy. The Project was launched in 2014 and is financed by the Global Environment Facility (GEF) and the UNDP funds, with a budget of $ 3.2 million. The total value of the project will reach $ 30 million. Co-funding was provided by the institutions of the Republic of Serbia as well as the other partners participating in the project.

The project supports key stakeholders in creating a dynamic and viable biomass market in Serbia through the improvement of the institutional and regulatory framework and then carries out capacity building measures for all actors to identify, prepare, finance, construct and manage bank-based projects for the use of biomass for energy production. It also develops instruments to ensure the security of supply continuity of biomass energy production plants and reduce the business risk of biomass production and sales, such as long-term biomass supply contracts and detailed technical specifications of biomass products. The project also implements investment support mechanisms, such as grants to selected investors in CHP plants,

The energy potential of unused biomass in Serbia is equal to **55% of total electricity produced** or **78% of total annual natural gas import** or **51% of annual oil import**

and provides support in the technical preparation of similar projects through the preparation of feasibility studies and technical documentation. Among other things, a number of training for municipalities, investors, and banks are being implemented, as well as strengthening institutional capacities at the national and local levels.

Within the Ministry of Mining and Energy, a cross-sectoral Biomass Support Unit (BSU) has been established, in cooperation with other partners, which is working to eliminate the existing obstacles to the development of the biomass market.

On the supply side, these barriers include insufficiently efficient collection and distribution of available biomass, logistical problems, underdeveloped mechanisms for long-term and safe supply, while on the other side, factors that make it difficult to initiate investments are high initial costs and high perception of risk of investments in biomass for loans, explains Matejic.

She reminds us that in November 2015, the Biomass Support Unit (BSU) in cooperation with UNDP successfully implemented Public Call for the Award of Grants for Construction of Biomass/Biogas Combined Heat and Power Generation Plants.

Six projects for the construction of CHP plants for biogas with the total installed capacity of 6.35 MW and total investment value of 22.6 million dollars were chosen. The grant is projected to make up to 15 percent of the investment value, or a maximum of $275,000, and the investment value of each project exceeds $1.2 million. These projects enable the increase of the total installed capacity of the biogas/biomass CHP plants in Serbia by 130 percent.

The built biomass CHP plants, which will continue to operate after the completion of the project, as well as the establishment of mechanisms for legal and institutional support, have the aim to raise the level of confidence of investors and financial institutions in the financial viability of such projects, which will encourage new, similar investments, concludes Matejic.

One of the components of the project is the development of e-commerce platform for biomass trading in

cooperation with the Chamber of Commerce and Industry of Serbia. With the expert assistance of UNDP, the Chamber of Commerce and Industry of Serbia has established the information portal "Green Energy" (www.zelenaenergija.pks.rs). This portal contains news on renewable energy sources and energy efficiency, laws, and by-laws, regulations and standards, competencies of institutions, projects and financing sources, scientific papers, market participants database, ads, and other information important for business in Serbia in this sector.

The Chamber of Commerce and Industry of Serbia is still developing this portal and in the next phase, electronic commerce is planned for various types of biomass in Serbia when the legal regulations for e-commerce enter into force. Vera Raznatovic, Independent Advisor in the Association of Energy at the Chamber of Commerce and Industry of Serbia, expects the portal to contribute to the

LONG-TERM BIOMASS SUPPLY IS IMPORTANT

It is important for the investors in this area to provide biomass supply for many years. This is also one of the conditions that banks require to finance such projects. In order to reduce barriers to the accelerated development of the biomass market, the project has developed five models of contracts for long-term biomass supply from forestry and agriculture. Detailed technical specifications of biomass which is the subject of this trade, have been developed for this purpose. Also, the models of contracts are in line with the bank requirements for ensuring compliance, which should contribute to reducing the high-risk perception of biomass projects.

construction of capacities in the field of renewable energy sources and energy efficiency, to improve competition and connect the participants in the biomass market: investors, designers, contractors, equipment distributors, banks, government and civil sector.

– The portal should provide future domestic and foreign investors with information, instructions and support, as well as under what conditions to develop, finance, build and manage successful and profitable projects in the field of renewable energy sources and energy efficiency. Special attention is paid to the development of software that enabled the first online trade in Serbia in various types of biomass. The segment of the portal for biomass trading is very important for the development of the biomass market that practically does not exist in our country or is taking place mostly in the gray zone – concludes Vera Raznatovic.

Prepared by: Srdjan Boskovic

Company CEEFOR Ltd.

Improvement of Energy Efficiency by Construction of Cogeneration and Gas Power Plants

▲ An example of a realized project
–The exterior of a cogeneration plant

The Centre for Energy Efficiency and Sustainable Development (CEEFOR Ltd.) is a team of 20 experts with extensive work experience in the field of renewable energy and energy efficiency. The team consists of mechanical engineers, electrical engineers, construction engineers, technologists, architects, traffic engineers, fire protection engineers, economists and financial experts, philologists, and interpreters. CEEFOR Ltd. has so far implemented numerous projects in the field of renewable energy sources.

Company CEEFOR Ltd. designs and obtains all opinions, conditions,and permits for the needs of the construction of cogeneration power plants and power plants with gas engines.

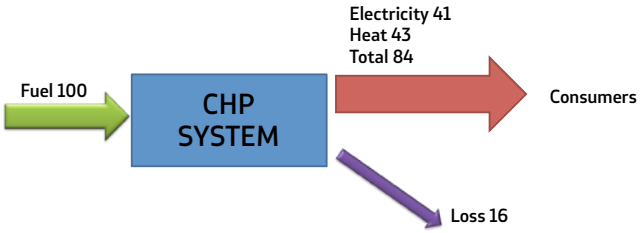
- By the end of 2017, six cogeneration and gas power plants with a total installed capacity of 8 MW have been successfully built and put into operation.
- So far, technical audit and supervision of the construction of four biogas plants with a total power of 2.4 MW have been successfully carried out.

◂ ▲ An example of a realized project –Interior appearance: gas engine

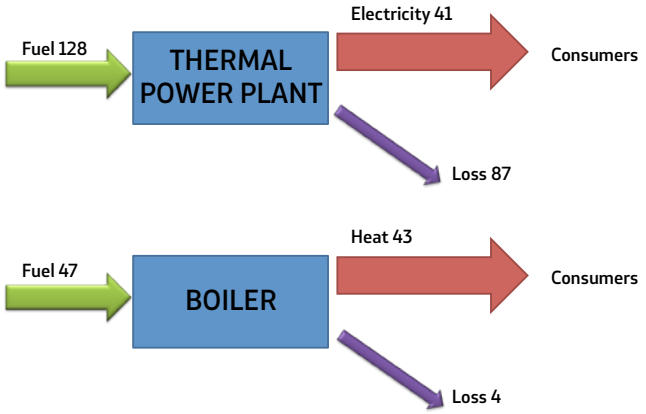
The concept of a cogeneration plant (CHP) involves combined production of electricity and heat using a single fuel (land, waste and landfill gas, as well as biogas). Gas power plants produce only electricity.

The following diagrams show the comparison of a cogeneration plant with conventional energy supply

Scheme 1: Energy supply from CHP plants



Scheme 2: Energy supply from conventional thermal power plants and boilers for heating



According to the schematic diagram, by comparing the equally obtained amount of electricity of 41 units and heat of 43 units, more than 70 percent more fuel inputs are needed when using conventional energy supply systems than a cogeneration plant.

Advantages:

- Improving energy efficiency
- Possibility to generate revenue by selling electricity distribution system at prices defined by the privileged producer (feed-in tariff)
- Possibility of utilizing heat for the needs of heating residential and office space, industrial and agricultural facilities and various technological processes.

Photographs and illustration: CEEFOR

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HEALTHY ENERGY IS CREATED IN "BASTALISTE"

KATARINA MILENKOVIC

Katarina Milenkovic–President of citizen's society "Ama Centre" and the coordinator of "Bastaliste"

Katarina Milenkovic graduated communication from a Faculty of Political Sciences, the University of Belgrade. She was engaged in journalism and public relations, after which she founded the association "Ama – Centre for the Care of People and Nature".

Katarina grew up in Pirot and during the childhood, she had no contact with the village and agriculture. She gained a basic knowledge of agriculture owing to the Internet and volunteering on organic farms around the world. During 2013, she established "Bastaliste", a collective organic garden just 10 km from the center of the capital.

We learned techniques for organic vegetables growing from our own mistakes. We communicated with people from Slanci and watched what they were doing. In every generation of gardeners, we had a few of them, remembering how their grandparents were growing vegetables. For the last two years, we have had a professional association for organic agriculture in "Bastaliste", who comes once a month, diagnoses our parcels and advises us what to improve. People from Slanci recognize "Bastaliste": I hear positive comments very often when going by public transport. They see us simply as "those who do not spray anything!". That means a lot to me, because of people from Slanci supply Belgrade with food," said Katarina, adding that she is not actually a food producer, but perhaps even the worst gardener in "Bastaliste" since her plot has the most weeds.

– I would like to point out that I quit "safe work" because I wanted to do what I deeply believe in. When you work for someone else, you usually only participate in other people's visions. Although it's nice to work in a community, if you

All photographs: AMA Centar except Katarina Milenkovic (left) – private archive

have your own vision, it's better to look for your own place. When I founded "Ama Centre" four years ago, I started a struggle to achieve my own vision, that is, everyone should have access to food, not just any kind of food, but to food good for their body and whose production has no harmful effect on the environment – Katarina tells us the story of the "Ama Centre".

"Ama Centre" shares numerous information and educational materials on sustainable agriculture on its website.

As one of its goals, Katarina states the concept of One municipality – one "Bastaliste". In a desire to bring us closer to this vision, Katarina explains that garden communities as a form of urban agriculture represent more than the place where food is produced. In addition to the obvious benefits – a nicely arranged space where the position of the population is being improved by food production, the message of sustainable development is transferred in practice. The garden also represents a green oasis that affects the microclimate of its environment and lowers the air temperature in the environment for several degrees.

Citizen's Association "Ama Centre" works in the areas of sustainable development, environmental protection, organic production and permaculture, rural development, communities, youth, women's and minority rights and the media. Projects of "Ama Centre" are WWOOF Serbia, Bastaliste, Bastaonica, and Women for Sustainable and Solidarity Agriculture.

WWOOF Serbia presents the education program through volunteering on organic farms throughout Serbia. Ama Center is a member of the Global Federation of WWOOF Organizations (FoWO).

"Bastaliste" was created while I lived in Slanci. In front of the house, there was a flat plot, which we rearranged and invited people to join us in the formation of the first garden community. In the debut season, we had 5 members. The following season, with the help of the President of the Local Community of the village of Slanci, we got a new plot, where "Bastaliste" has been for the fourth year now. And this was the "textbook example " of abandoned land – uninhabited for 30 years, with lots of garbage, shrubs, and thorns – explained Katarina.

After three months of intensive work, members of "Garden" have brought the abandoned plot to a fruition. Today, this parcel has 22 subplots of 40 square meters that are handed over to the members of "Bastaliste" for the production of vegetables for their own needs. Gardeners share equipment, a drip irrigation system, and a pavilion that will host a number of workshops next year.

The time required to maintain the plot depends on the season. Spring is the most demanding time of year because at that time land is prepared and then sowing is performed. During the season it is necessary to pull weeds, to water the crops and to pick fruits. For a plot of 40 square meters, it is necessary to spend several hours two to three times a week.

– When you watch the plant grow and you know what you eat, it changes your view of the world, but also the mental and emotional state. Working with land and people fundamentally changes you. When you live and work in a garden community, you are drawn together. If my parcel was covered with weeds, it would affect the others. There are no concrete walls that would prevent the spread of weeds. Therefore, we must support each other so that our organic garden can survive. And that's what makes us a garden community. So, apart from dealing with food production, we also present a social experiment that explores how much we are willing to give ourselves for others, how much we hurt and/or appreciate each other. Personally, I really enjoy it because the community is getting stronger every day – explained Katarina.

After "Bastaliste", a garden community was founded in Sabac. Since the founders are acquaintances of the members of "Bastaliste", the formation of another garden community in our country, was supported with the knowledge

and experience of our debutants. There were initiatives for founding "Bastaliste" in other local governments, but so far no one has come into operation, so the citizens of Kragujevac, Novi Sad, Nis and Obrenovac will wait for some time for their own production of organic vegetables.

The garden community, according to Katarina's words, can be viewed as both open and closed system. Everything that is brought in it – remains there. There is no waste management system in Slanci, so the obligation to carry garbage to containers reminds people of any intention to produce garbage at all. On the other hand, "Bastaliste" realizes interaction with the environment. By composting the leaves and sorting recyclable rubbish, members of this community give an example of the environment.

– So far in "Bastaliste" we have composted and used natural spraying macerates. In the future, we will deal with "green" energy because we do not have a connection to the grid. The rainwater collection system would also be useful for irrigation. If someone wants to give such kind of contribution, the invitation to become our member is on – said Katarina.

The only formal condition for accessing this garden community is to give up on the use of artificial fertilizers and chemical preparations. At the end of each year, Ama Center invites new members, which is posted on their website, Facebook page, and mailing list. Interested candidates fill out an online questionnaire, on the basis of which the admissions committee gets an impression of who are the potential members, what values they live and what they believe in. A narrow circle of selected candidates is called on the day of open doors, where they are practically introduced to "Bastaliste" and we go through another round of interviews. The admission committee is made up of members from at least two previous seasons.

– There were some interesting experiences during the reception, from e-mail permutations and invitations of candidates that we did not like, to the disappointment and aggression of rejected candidates. Nevertheless, since the introduction of this system three years ago, our community is rapidly strengthening", Katarina said proudly.

Ama Center cooperates with other civil society organizations, and Katarina is a frequent guest at various events. The concept of urban garden communities implies that they are located on publicly owned land, but the cooperation with the City of Belgrade has not yet happened.

– City authorities have been briefed on our project since foundation. We negotiated with representatives of several municipalities and secretariats of the City of Belgrade, asking to give us the parcel for use. According to their reactions, the only problem is the lack of enforcement procedures, since the comments on the very idea are very positive. Still, I think that where there is a will – there is a way. We are at our

Garden communities as a form of urban agriculture **represent more than just a place where food is produced**

disposal to transfer experiences from abroad since we know a lot on this subject – explains Katarina.

Environmental protection involves a large number of measures and activities, and the food takes a small part of it. However, food is close enough to man to understand its environmental impact. In Serbia, with the exception of associations dealing with organic agriculture, there are rare ones that, like "Ama Centre", have an integral approach that studies the position of food in the ecosystem.

– Of course, it will never be possible to produce all the food in urban areas, but if we do everything we can, we will save our planet – the only one we have. The civil sector is the one that initiates changes. State apparatus is by nature large, bulky and inert. In order for a change to happen, the first impulse is needed, which must come from citizens, because we care most about the quality of our lives. Our duty and obligation is to introduce novelties and fight for education. Being successful at that, depends on many factors, not only on us, especially in Serbia – such as it is, which of course does not mean that we should give up," she explained.

At a recently organized conference of the United Nations Food and Agriculture Organization of the United Nations (FAO) in Belarus, Katarina was the only representative of the civil sector in Serbia. During the event, FAO's new goals were presented, and Katarina hopes that Ama Center's activities will contribute to the realization of these goals in Serbia.

On the World Food Day on October 16, in the Cultural Center "Grad", for the second time this year "Delicatessen Monday" was held, during which food was prepared by members of "Bastaliste". Prepared foods were harvested on their plots, with the purchase of only necessary supplements. They named dishes "Potage of the magic pumpkin and Jesenjska proja", "Sataras a la Garden", "Just a cake with lavender", "Bundevara cake" and "Exotic banana bred" because the gardeners wanted to draw public's attention to the use of locally grown food which almost has no environmental footprint, but also to promote urban and organic agriculture, as well as the concept of garden communities.

– I am very proud of the members who have initiated and organized these events. They did it great – Katarina is pleased.

Katarina Milenkovic recently was one of the speakers at the TEDx conference in Mokrin. The concept of these conferences is the transmission of messages that encourage the community to be socially responsible.

– To survive, only air and food are needed. Access to air is not limited so far (we will not speak about the quality this time), but the food that needs to be brought into the body at least three times a day – it ever is. In the world, a large number of people are starving or eating foods of inadequate nutritional value. Agriculture is one of the largest polluters of the environment. Every day, when we go to the grocery store or to the market, while cooking and eating, we must be aware that the food we eat leaves a trace on our environment. When a person realizes himself and begins to live by contributing his activities to making this world a better place, he opens the door for small revolutions. Look around – how you live, with whom you live and socialize, what you eat, where you are buying, what you are talking about, where your thoughts go. All this affects the world as it is. Energy and mental personal hygiene are enough to change things for the better. All these "small" revolutions together make up the "big" one that we all are waiting for. There is no "big" revolution, without change within a man.

"Bastaliste" achieves interaction with the environment: by composting leaves and sorting recyclable rubbish, members of this community give an example for the environment

In short, my motto is: MY PERSONAL CHANGES ALL (THE WORLD) – concluded Katarina with a succinct message she hopes to reach as many people as possible.

Prepared by: Marija Nesovic

Vojin Djordjevic

Preciousness of Unprocessed Water

When VODAVODA first appeared on our market in 2004, in just three months, it won millions of consumers and a third of the domestic market of bottled water. The water factory stopped operation in the meantime, VODAVODA disappeared from the shelves and the rest of us were deprived of one of the best quality water coming from the natural and healthy environment in Banja Vrujci. For three years now, this brand has been available again for sale and it gradually occupies a place that it used to have on the domestic and foreign markets. With Vojin Djordjevic, we discussed the importance of natural mineral water, which without any artificial filtration and processing is only bottled in the new plant with a striking name "The House of Water".

EP Are you satisfied with the comeback of VODAVODA to the domestic market?

Vojin Djordjevic We are extremely pleased that the results of the achieved sales show a very good trend, although the figures are still not on the profit side. We invested much more than we earned, but I am sure that, due to the special quality of VODAVODA and the beneficial effect on the health of all who drink it, all investments will be returned in the future. We are satisfied that an increasing number of consumers find out about the existence of unspoiled nature and water source owned by Banja Vrujci. It is not necessary to travel to this water spring in order to enjoy this water. Packed in a bottle of VODAVODA, it is available to us at almost all the retail outlets in our country. We are on a good path that has become our obligation and we must not stop.

EP The promotion of VODAVODA brand is based on water properties from a depth of 605 meters and the absence of its processing. Do you consider the information that water is not being processed but bottled directly, as an important one for the consumers?

Vojin Djordjevic This information is important for every consumer of bottled water. Such unprocessed water is very rare in Serbia and in the world. When something is created, as we create the world brand VODAVODA, it is necessary to

think not only of ourselves but of factors in the process of creation: people, nature, quality, future. Only such a brand is true, durable and, above all, good. We have done everything that VODAVODA is natural: that it comes directly from nature to the consumer and that nature is left untouched. That is the essence. You know, the first contact with water from Banja Vrujci with the outside world is the moment when the consumer opens the bottle of VODAVODA.

EP What does your team do so that the consumer learns about the quality of VODAVODA?

Vojin Djordjevic The business strategy of VODAVODA brand is based on well-founded principles that are a sound basis for a quality upgrade. This also applies to the area of water quality that we offer to consumers. The quality of water is not proved by aggressive marketing or large-scale sales, but by science-based certificates, issued by accredited top experts who, on the basis of the detailed analysis, confirm quality. Our team, according to the brand strategy, sent VODAVODA for an analysis to top-level and relevant scientific institutions in our country and in the world, and then, with justified facts, addressed consumers. First of all, we emphasize that VODAVODA is the holder of the world's most prestigious certificate – NSF. It guarantees to the consumer safety, consistency in the same mineral composition always and superior quality achieved by the highest global standards in the bottling process. This year we have completed another long-term research in our scientific research institution with the highest credibility. As we expected, the results obtained, are exceptional and will soon be officially announced. In science, there are clear parameters for assessing water quality, and there is no mistake.

EP Can you explain to us what you wanted to say or highlight when you named the plant "The House of Water "?

Vojin Djordjevic We do not have a water processing factory that processes water, like other brands. We do not use chemicals for water treatment, and we do not have harmful substances that pollute nature, and we recycle the packaging. We do our best for VODAVODA to be the brand with so-called "zero waste". This is the latest concept of sustainability of a healthy environment, which is no longer enough to create unwanted waste, and then neutralize it, but you must follow the course of nature that prevents the development of any unhealthy substance.

That's why we have been thinking about what to name the production itself for a long time. The usual name for our industry is "factory", but it was not appropriate for us, because it means machines that change water by using chemicals, and we do not do it. We were not happy with the "bottling plant" designation. It was not until the solemn opening when the priest said: "Today we are happy because we are in this house of water ...", we realized that he said the essence. It is a home that symbolizes everything we want to say to the world - to preserve, nourish, give away and always give birth to water over and over again.

EP Is it easy to preserve this balance between the man and nature?

Vojin Djordjevic Possibilty to master the technology of water bottling with the highest quality process, brings me

Photographs: VodaVoda

SOCIALLY RESPONSIBLE BUSINESS AND SUSTAINABLE DEVELOPMENT

The quality of water is supported by laboratory analysis carried out in international accredited laboratories. Thanks to this, the VODAVODA brand is classified as a significant promoter of environmental protection. The Strategy of Corporate Social Responsibility and Sustainable Development envisages enabling "The House of Water" to use clean energy. Accordingly, a solar power plant will be installed to obtain heat and electricity. This will completely round up the environmental sustainability of VODAVODA.

joy, but also the responsibility. The obligation in "The House of Water" is to use technology in a way that is even more stringent than the one prescribed by law. By using modern methods of preserving nature and the environment, we take care not to jeopardize or disturb its balance.

EP NFS certificate has enabled VODAVODA to be on the world market as well. Was it necessary to introduce certain technological novelties in "The House of Water"?

Vojin Djordjevic No, it was not. NSF certificate just confirmed that we did everything in the right way and that we just have to continue doing so. We know that the water we draw from the spring in Banja Vrujci is perfect, with an ideal mineral composition and naturally well balanced. On domestic, but also on the world market, you have the least water that has not been processed. It is a real treasure.

EP What do you think is crucial for the good placement of such a product on the foreign market?

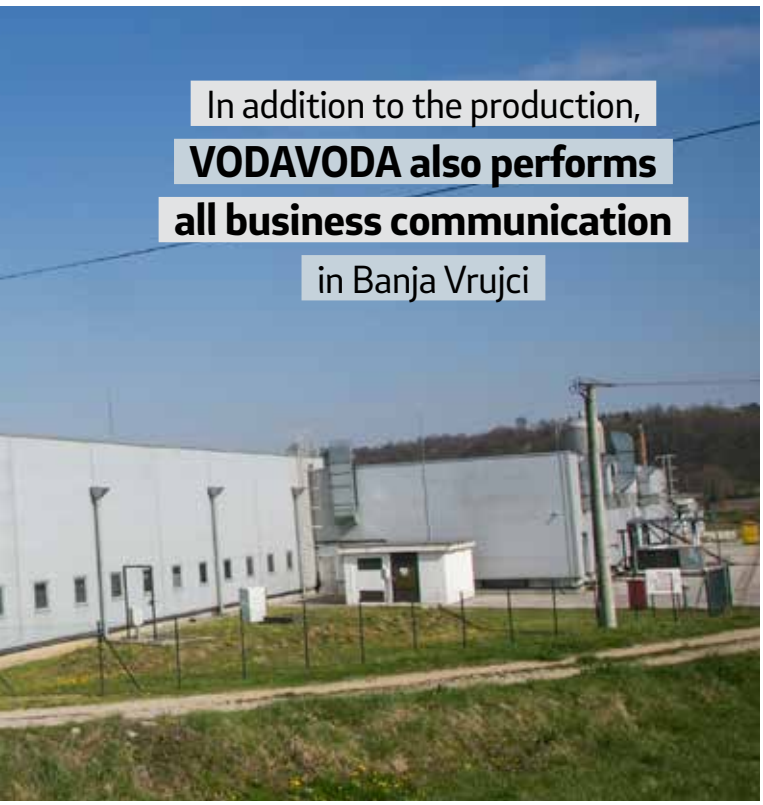
Vojin Djordjevic VODAVODA became a hit on all the markets on which it appeared. In Kuwait, where it appeared this year, it provoked a sensation. There are already indications that this will happen again in other countries in the Persian Gulf. Foreign distributors contact us for bottle design. They unquestionably estimate that their customers will first reach for the unique bottle shape on the shelf in the supermarket. Getting to know the composition and natural properties of water is the next step that leads to a lasting relationship with the consumer. Natural mineral waters, such as VODAVODA, are very rare in the world today.

EP At one time, VODAVODA was better sold on the Taiwan market than the famous Evian water. Do you believe that you will repeat that success?

Vojin Djordjevic The fact that in 2006 we sold more water in Taiwan than world leader is a proof that consumers reward quality. This is one of the events that motivated me, even when it was most difficult, not to sell the brand VODAVODA and not to leave Banja Vrujci. I was also encouraged by the positive reactions of visitors to fairs and information from the market. I do not give up on the idea that VODAVODA remains unprocessed. I believe that natural quality water with exclusive design has no competition. I do not have a dilemma that VODAVODA will surpass that success in Taiwan.

EP You have also taken steps that have a positive impact on the development of Banja Vrujci, and the improvement of the lives of its inhabitants. What's your contribution to the progress in the spa environment?

Vojin Djordjevic We try to contribute to the development of Banja Vrujci, but it is not appropriate if I talk about it. It is better to ask the people of Banja Vrujci about this. Our most important goal is to preserve and protect the nature of this incredible place. By that, I mean the use of renewable energy sources in the whole Banja and then in the region. In addition, we want people of that region to live in prosperity, peace and spiritual joy. I gave the vow to restore the church Protection of the Theotokos, whose ruins we found during the construction of "The House of Water". The locals tell me that today they feel the existence of sin because of the demolition of this church after the Second



World War. I am convinced that the renewal of the church will bring good to everyone.

EP About 80% of bottled water from domestic springs is in the hands of foreign companies. In addition to your "The House of Water", there are only "Heba" in Bujanovac and "Milan Toplica" in Prokuplje, with a few smaller producers in domestic ownership. Do you think we are managing water resources intelligently?

Vojin Djordjevic Serbia is rich in water resources and has the potential to prudently manage this wealth itself, despite the fact that world trends in water are dictated by multinational companies that own two large sources in our country. For the production and distribution of bottled water, huge investments are needed, the ones that multinational companies have. It is very difficult for the domestic manufacturer to compete with such a strong competition. Empowering domestic production and the availability of bottled water could create a natural balance. Domestic bottled water would outdo the quality of the waters of multinational companies and thus conquer the market, while multinational companies would continue to dominate with their advertising. Our example can help potential new water producers. VODAVODA has achieved competitiveness in the market of water quality and packaging design.

EP In this regard, there is more and more talk about the sale of spas in Serbia located at the sources of geothermal and mineral water. How could it affect your local community?

Vojin Djordjevic Spas in Serbia have a long tradition. Their many sources with geothermal and mineral water are known for their healing properties, and the natural environment for centuries have been a subject of admiration. We would all like to have our spas come into the hands of those who will take care of them in a way that their quality deserves so that we are once again proud of the top quality and top service. I believe that the state knows what the interests are and that clear regulation in the process of promoting spa tourism is prescribed.

For me, Banja Vrujci is supreme. Because of its nature and people you just grow fond of the region, it becomes a part of you as if you were born there. We have found a way to contribute to the development of tourism in Banja Vrujci and we want to further improve it as much as possible. VODAVODA performs all of its business communication, not only production, in Vrujci. Guests from abroad, distributors, customers, journalists, all who come to us on business stay in our hotel where we present the beauty of spa tourism. Full of impressions they take to their worlds some of the most beautiful stories about the place where VODAVODA wells up. I would like people from all over the world, not just because of business, but because of the beauty of this region, to come to Banja Vrujci and see where VODAVODA is bottled.

EP The World Economic Forum recently released warning results of water research from the water supply system on five continents indicating the presence of micro-particles in almost all water samples. No one knows how this will affect people's health, but it is obvious that the plastic we throw in watercourses, ends up in water supply systems. In your opinion, how can we influence people's awareness of the importance of preserving watercourses and sources?

Vojin Djordjevic We should all be aware that water remembers everything, every thrown plastic bag, PET packaging, a discharged chemical. Campaigns to raise awareness precisely serve to inform and encourage people how to dispose of waste properly. They remind us to think of ourselves and of others, as well. Controlled use of products that are unhealthy for nature is only the remedy of consequences, but not the cause of the problem. However, the question arises why, at all, are those products that threaten the nature and the man in it produced. Today's world is not able to completely and quickly get rid of the production of products that pollute nature. Still, we can be caring. On a personal level, we can take care not to waste the packaging, and on a professional level, factories should act responsibly with waste materials. Continuous campaigns and the availability of a waste disposal sites we make it easier for the individual to be responsible. The legislation, as well as credit facilities for companies, enable the introduction of a system for waste treatment and recycling of packaging.

We are all participants in this global problem and we are all together responsible for the outcome. Therefore, there is no such thing as one man, one source, one river, one country, but our common land and one nature - our planet Earth.

Interview by: Tamara Zjacic

Ana Vukovic
The University of Belgrade
– Faculty of Agriculture

Subtropical Plants are already Grown in the Plains of Serbia

Photograph: private archive

Global warming has an impact on all components of a climate system, which includes the entire natural environment in which man's activities take place, changing the established quality and safety of life, as well as causing changes in sustainable development. Climate characteristics of a place are no longer considered to be the absolute values. They are in a constant process of change that cannot be stopped in the near future, not even if greenhouse gas emissions were reduced, which requires planning of the trend of changes of established practices and lifestyles. Due to this fact, it is necessary to make an effort in the area of education and raising awareness of the impacts of climate change, adjustment measures and the mitigation of their consequences. It is of special importance to introduce innovations in the materials of the educational institutions, which would have the greatest effect on the making of a nation that is aware of the problem, as well as of the future experts that can continue and improve the initiated process of solving the greatest challenge modern civilisation has ever faced. We discussed this, as well as the interdisciplinary cooperation in research on climate change done at the University of Belgrade, with Ana Vukovic, a Ph.D. meteorologist and lecturer at the University of Belgrade – Faculty of Agriculture.

EP Efficient and modern agriculture requires significant knowledge. Does it imply a multidisciplinary approach and good knowledge of ecological and climatological aspects?

Ana Vukovic In planning, establishing, maintaining and improving the agricultural production, cooperation with pedologists (experts on soil properties), meteorologists, technologists, chemists and many other experts is frequent. Ecological aspects have a key role in sustainable development of agriculture because the greater part of the production depends on the nature of the very environment in which it is placed. Even though the conditions may be artificially controlled to a certain extent, at the last resort, adequate water resources need to be provided.

Climatology is very important for plant production and it dictates the choice of species for a production area. Due to drastic climate changes all around the world, resulting from global warming, along with the change in successfulness of the established practices in agricultural production, great efforts have been made to analyze the intensity of the impact that climate change has on agricultural production in the present and the one that it will have in the future, as well as on the proposing of adaptation measures and their prioritizing in order to effectively implement these measures and to create a sustainable agricultural practice.

EP Agricultural production also requires high energy consumption, thus greatly contributing to the increase of the emission of carbon dioxide, methane, and nitric oxide. Can

sustainable development neutralize this emission through adequate managing of agricultural systems and through regeneration of the neglected and destroyed land?

Ana Vukovic Sustainable agriculture can considerably reduce the current emission of harmful gases, which indeed is one of the main tasks of sustainable development, but it cannot reduce it enough. This indicates a close relationship between different sectors in the implementation of mitigation measures. Speaking of, the main goal of mitigation, i.e. reducing the impacts of climate change, is not to neutralize, but to reduce the gas emission, which, in truth, is possible only if a great effort is made and established practices of different sectors of the economy are reformed. A realistic goal is to slow down the climate changes and stop the further increase of the concentration of harmful gases sometime in the future. Our obligations to the EU imply reducing the emission by 20 percent until 2020, and by 40 percent until 2030 compared to the emission in 1990, with the primary goal being the reduction of global emission by 80 percent until 2050. Agricultural production will surely have a part in it, but probably less than other sectors, due to the complexity of the problem with the reduction of emission from the agricultural sector.

Secondary products in agriculture, such as pruning residues, the husk from grapes and fruits, straw and other, can be used as energents (biomass). By composting, we create organic fertilizer and return organic matter into the ground which contributes to sustaining natural carbon cycle in the climate system.

EP Food and Agriculture Organization of the United Nations estimated that the number of people on the planet will grow up to 9.6 billion by the 2050 and that it needs to be followed by the food production increase up to 60% in comparison to today. Is that volume of production sustainable and manageable?

Ana Vukovic Analysis of the FAO show that the emissions from the agricultural production have grown up to 15% in

Photographs: Pixabay

Due to the increased need for food,
it is necessary to expand agricultural areas

the first decade of this century, mostly in the developing countries, where the agricultural production was increased the most. Estimates show that by 2050 we can expect emissions to be higher up to 30% in comparison to today. These projections point at seriousness of the problem and are warning us how urgent it is to pass adequate reform measures when it comes to agricultural practices. We need to bear in mind that the increase of the world population is not happening linearly but much faster and that after 2050 which is not that far away, the existing problem will overgrow our capacity for stabilization.

EP European Environment Agency (EEA) warned that, with the increase of the temperature and decrease of the summer precipitation, Serbia will face the effects of climate change, and also the higher risk of flooding and forest fires. What efforts do the Government of Serbia and other institutions put into helping farmers adapt to new circumstances?

Ana Vukovic Institutions of Serbian Government recognize mentioned problems, which is very important. We established National Covenant for Climate change, which consists of representatives from universities, ministries, and other relevant institutions where discussions about these problems and how to overcome them take place. There are national reports about climate change and its effects on Serbia, adaptation plans and implementation strategies, and many other official documents that deal with climate change in different sectors.

Ecological aspects are playing **a key role in sustainable agricultural development**

Likewise, Serbia is obligated to EU to decrease its emission of harmful gasses, to increase its use of renewable energy sources and it energetic efficiency, and we are working on it intensively. Republic Hydrometeorological Service of Serbia is monitoring risks of floods and also performs climate monitoring for the whole Southeast Europe.

In order to put into practice the measures of adaptation proposed by the state, that are based on analysis and recommendations of experts, it is necessary that the public and the producers take this problem seriously. The change of practice, in the sector of agriculture, and in the other parts of the economy, poses a complex problem and it needs the involvement of a large number of experts covering different fields of expertise. When a good mechanism of interdisciplinary cooperation is formed, the steps that are taken for defining problems, analysis, prioritization, determining and passing the measurements of adaptation can keep up with the trends of climate change. The establishment of the National Council on Climate Change, the work of the Department for Climate Change of the Ministry of Ecology, and a major project of the Ministry of Education, Science and Technological Development titled "Studying climate change and its influence on the environment: impacts, adaptation, and mitigation" have laid foundations for the creation of such a mechanism.

EP The report "Impact assessment and adaptation measures to altered climatic conditions" warns us that, if no adjustment measures are taken, by 2030 we can expect a decrease in corn production by 58 percent, wheat up to 16 percent, and significantly reduced sugar beet, soybeans, and grapevine. Will it be possible to grow some other species in Serbia?

Ana Vukovic Considering the economic status of our country, it is very important that adaptation measures correspond to the capabilities of the manufacturer. The proposed priorities in agriculture include shifting sowing time and adapting the soil to climatic conditions, optimizing the sowing density and irrigation, optimizing the use of fertilizers, selecting varieties tolerant to altered climatic conditions in order to maintain the quality and quantity of yield, protection against frost, hail, and erosion damage, and likewise, it is important to obey recommendations for crop rotation. Measures of adaptation in agriculture are also related to the adaption of the sectors dealing with water resources and forestry, which is why we come to a conclusion on the necessary cross-sectoral cooperation. Monitoring

Photograph: Pixabay

of the appearance of new diseases and pests due to the changed climatic conditions is also needed.

In our country, the climate in lower regions changes from moderate continental climate to subtropical one, while the current climate characteristics are moving towards higher altitudes and towards the north. By the end of the century, according to the worst-case scenario of the emission of harmful gases, it can be expected with a strong possibility that the climatic characteristics of lowlands will

The greatest danger of soil degradation is in Vojvodina because of a small representation of forest vegetation, and a large representation of arable land

be shifted to a height of about 1,000 m and at a distance of about 1,000 km to the north in areas of low altitudes. Therefore, accordingly the spatial distribution of agricultural production changes. It is already possible to cultivate new species from subtropical areas in the lowlands. This points to the fact that the exchange of expertise in the agricultural sector at the regional level is also welcome.

In addition to these and many other negative impacts of climate change in our country and globally, there are also positive aspects. For example, the dry and warm summer of this year, as in 2012, created favorable conditions for a high-quality yield in viticulture and the production of top quality wines.

EP It is estimated that we lost almost two billion dollars due to drought in 2012, and at the end of that year, there was a problem with aflatoxin, a toxic and cancerogenic matter.

Ana Vukovic The occurrence of increased concentrations of toxic materials in foods of animal origin shows us that livestock production is also not protected from the negative effects of climate change. When water quality decreases, the risk of such cases increases. However, the example that you mentioned has raised awareness both at the national and local level among the producers themselves.

EP In order to meet growing need for food, agricultural production is increasing. At the same time, the land area favorable to agricultural crops is reduced. Does this leave the door open for genetically modified foods?

Ana Vukovic GMO is widely spread and represents good practice in agriculture since it enables the cultivated agricultural crops to retain the quality and quantity of products. The problem may arise due to the accompanying preparations for treating soil and plants during their development, which is why we are actively warned about the necessary optimization of the use of fertilizers and preparations for the protection against diseases and pests. Due to the increased need for food, it is necessary to expand agricultural areas. Certainly, GMO plays an important role, but so does the practice of cultivation, which implies good selection

CONSEQUENCES OF CLIMATE CHANGE IN SERBIA

In addition to increasing temperatures and reducing summer precipitation, there is a redistribution of precipitation during the year. Precipitation maximum occursin the cooler half of the year, and the climatic monthly maximum of precipitation is moved from June to May and it is expected that the trend will continue. Rainfall intensity increases, as well as the number of days without precipitation. The total annual amount of precipitation is on the rise, however, the decrease will occurin the second half of the century. The occurrence of strong precipitation and drought periods will be more frequent, and the dry periods will become longer, followed by high temperatures. Conditions are favorable for developing intense cloud systems, which are accompanied by stormy winds, intense precipitation, and hailstorms. All projections show that the temperature rise trend continues, which will result in a decrease in the duration of the snow cover, cold days and the earlier beginning of the warm period, which suits the earlier beginning of the vegetation.

When the plant first begins vegetative development, in a period of high risk of late spring frost, it is likely that significant damage will occur due to freezing, as was the case with some agricultural crops this year. Also, plants that need moisture at the beginning of the vegetation may enter into a dry season underdeveloped, which already happened at the beginning of June.

The flood risk, especially in torrential watercourses, is increasingly higher due to the increased intensity of precipitation and shifting the maximum to the earlier the dates when the snow melts. The increase in dry periods accompanied by extremely high temperatures increases the risk of fire, which is another major problem in Serbia.

of species and varieties and optimization of other components of the production cycle, adapted to the climate trends and characteristics of the substrate.

Bigger food production is also possible by increasing the yield per unit of production area, which also ensures higher incomes of the producers. A good example of such practice in our country is vegetable production in protected areas.

EP There are already problems with the lack of certain nutrients such as zinc and iron in raw foods. What is the connection between soil degradation and these problems?

Ana Vukovic Soil degradation is a serious problem in agricultural practice because it impoverishes the soil that supplies the plant with the ingredients necessary for its proper development. In Serbia, the greatest risk of soil degradation is represented by intensive precipitation and irregular crop rotation. Ignoring this problem can lead to a significant reduction in production areas with long-term consequences that entail economic instability. Climate change poses additional difficulties in the prevention of degradation of soil which is already exploited by intensive agricultural production.

In many parts of the world, there is also the desertification of agricultural areas that can aslo cause the change of the microclimate with even greater reduction of precipitation and additional depletion of the surface layer by wind erosion. This effect leads to a decrease in air quality and the occurrence of respiratory diseases, as well as to the reduction of people's safety due to extremely high concentrations of particles raised by strong winds.

In Vojvodina, the greatest danger is from soil degradation, because there is a small proportion of forest vegetation, high coverage of arable land, and is soil is of powder or clay texture, which is a consequence of the existence of the former Pannonian Sea. Degradation in other areas is caused by deforestation and erosion, heavy precipitation and torrential floods. A significant anthropogenic factor in soil degradation is also the uncontrolled use of mineral fertilizers without prior soil analysis.

EP Conventional agriculture is the biggest polluter of the environment, drinking water and air, so environmental production is a necessity. Laws in many countries clearly define ecological agriculture, and what is the situation in Serbia?

Ana Vukovic Agriculture in Serbia is in the period of conversion from conventional to ecological, ie. organic production that is supported by legal regulations. The state stimulates the development of organic production by providing subsidies. The organic production group of the Ministry of Agriculture is responsible for the control system in the field of organic production and supervision of the work of the authorized organizations for control, as well as for harmonization with the European Union legislation in this field.

It is important to note that such innovations in agriculture are accompanied by certain adaptation and mitigation measures. In Serbia, the rearing of wine-growing areas, with detailed climatic and pedological analysis of the terrain, is based on which the recommendations for the selection of wine sorting and regulations for the production of wines with geographical origin are given. The project was carried out under the guidance of the Faculty of Agriculture, University of Belgrade, in cooperation with the Faculty of Agriculture, University of Novi Sad, the Ministry of Agriculture, the Fruit Institute in Nis and other experts. The reorganization of fruit-growing production areas has begun in which the climate conditions for the growth of existing ones will be reviewed, as well as the analysis of the climate potential for the rearing of new species/varieties on the territory of Serbia.

Interview by: Marija Nesovic

Photography: Pixabay

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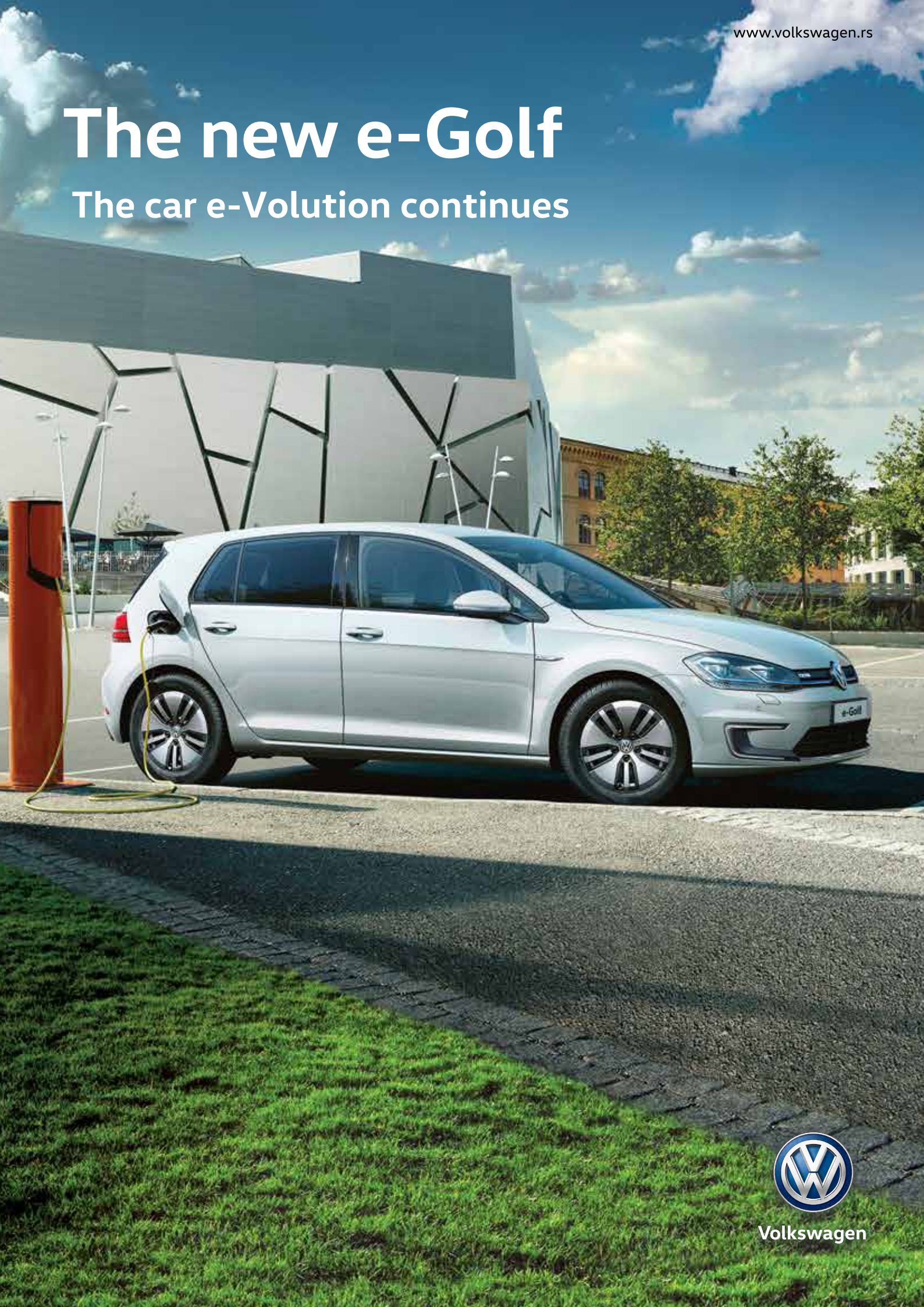

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