



# ENERGY PORTAL MAGAZINE

NR. 13 ■ 2018.

## NIKOLAUS LUTTEROTTI

Ambassador of Austria

We Set the Stage for Environmental Education in Kindergarten

## PAVLE RADULOVIC

Minister of Sustainable Development and Tourism of Montenegro

Chapter 27 Has Been Opened

## NEBOJSA ZELENOVIC

Mayor of Sabac

Efficient Local Administration and Foreign Direct Investment



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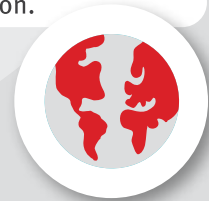
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Dear readers,

Things are clear. If we continue with frantic exploitation and burning dirty energy sources, we will bring the survival of our planet and our descendants into question. Therefore, we decided to dedicate this issue of our Magazine to clean energy that should be our primary source of energy. Sustainable development is significant to the Austrian government, and their Ambassador to Serbia Nikolas Lutterotti said that their government is taking a number of measures to protect the environment and climate, and he also referred to the country's investments in environmental protection. "With financial support, which is now about 108 million euros, we were able to encourage investment in the protection of the environment in the amount of 645 million euros and to provide significant incentives to the economy and employment. At the same time, the entire economy, as well as individual businesses, are getting new opportunities for development", says Ambassador Lutterotti.

Montenegro has recently opened Chapter 27, which is a crowning achievement of their work in the field of environmental protection, so we talked with Pavle Radulovic, the Montenegrin Minister of Sustainable Development and Tourism, about their further plans for improving the environmental health. The sustainable practices that Montenegro plans to introduce in 2020 include a solar catamaran that will transport passengers on the route Herceg Novi – Tivat.

Mirko Popovic from the non-governmental sector gave us an awakening review of our current situation regarding renewable energy sources and pointed out that the percentage of energy utilisation from renewable sources should not be increased due to the Energy Community, but because of us and our health.

The Financial Times ranked Sabac on the list of ten European microgrids for 2018 and 2019, according to the strategy for foreign direct investment, so that is why we chose the mayor of Sabac, Mr Nebojsa Zelenovic to be our interlocutor in this issue.

The successful examples of the Solar Valley in Novi Sad and Krizevacki suncani krovovi showed us how the sun could unite communities. You can also read about them, and we are sure that in other texts you will find some new and exciting information about the world around us!

*Nevena Djukić*

Nevena Djukić  
Editor in Chief



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Ambassador of Austria

The Most Important Factors are Education and Awareness Raising

At the moment, Austria is one of the world's best destinations for sustainable tourism, and this has been confirmed by the World Economic Forum in the Travel & Tourism Competitiveness Report. The ambassador of Austria explained to us that the government of this country invests great efforts in many areas of its environmental policy which include climate protection, public transport, alternative energy sources, and waste management.



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Industry Segment Manager at ABB, Serbia

Writing the Digital Future

The company ABB highlights two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. We asked Milan Jevremovic about the degree of realisation of set goals as well as about network expansion of ABB chargers for electric vehicles, solar systems, and solutions for better energy efficiency.

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**50 MIRKO POPOVIC**  
**Independent Environmental Consultant**  
**Bigger Progress Is Not Achieved with Small Individual Contributions**  
 Let's leave those talks about turning off our computers and mobile chargers when we are not using them out. A long time ago, David MacKay sent a clear message: "If each one of us does a little, we will achieve a little." Therefore, it is important to inform the citizens about effective measures for improving energy efficiency and efficient use of fuels, especially biomass, in households. If a wood stove is a measure of development, then we chose not to develop.

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**The First Non-invasive Prenatal Test with the Highest Level of Genetic Information**  
 Numerous variants of non-invasive prenatal tests provide only partial analysis and only the most common chromosomal disorders. "No test has the completeness and precision as a MaterniTGenome that has been clinically validated in America with 100 per cent. All other analyses fail in reaching the level of karyotype", explained Ivana, a biochemist and geneticist.

Photographs: (Mirko Popovic) photo courtesy of Mirko Popovic; (Ivana Cvetkovic) photo courtesy of Ivana Cvetkovic

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# Shift Towards Clean Energy in Southeastern Europe: Challenges and Opportunities



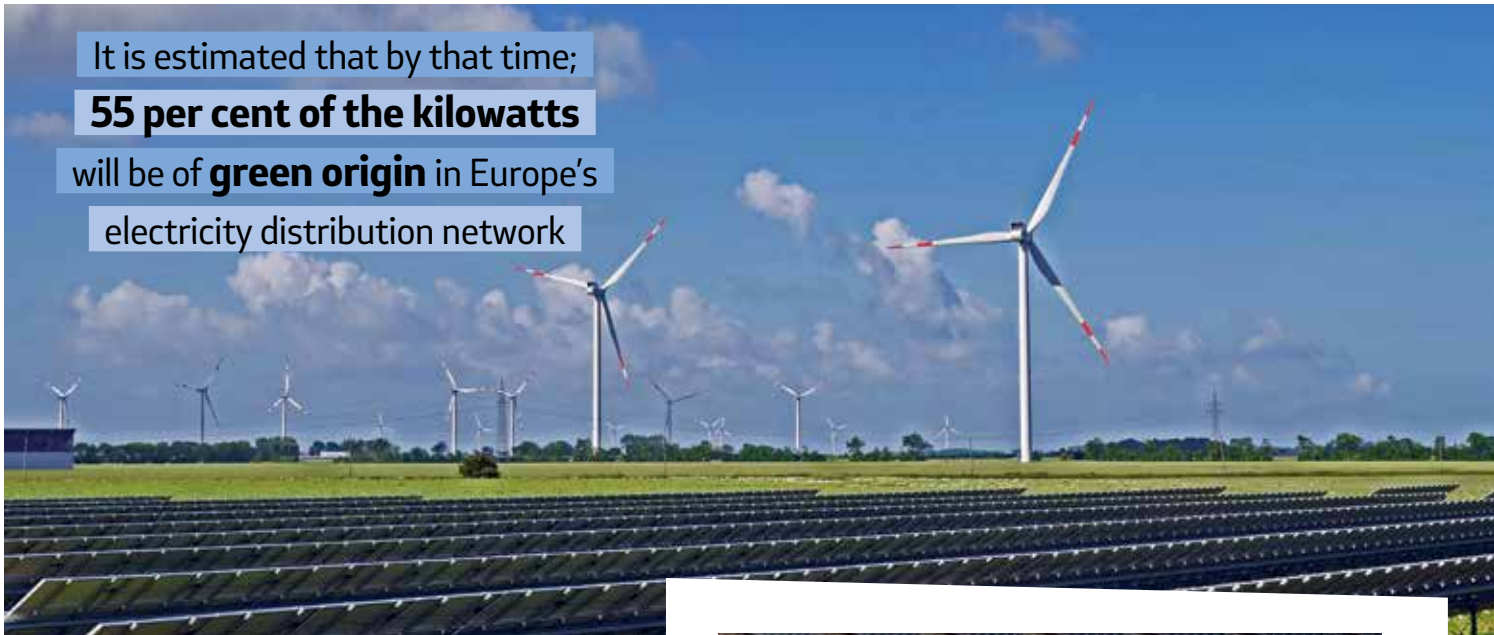
Various means such as petroleum products, biomass, sun, wind, water, nuclear fission, lead us to the production of electricity as the ultimate goal. Each of the methods of obtaining energy has its advantages and disadvantages from the perspective of operating costs, environmental impact, opportunities for continuous energy supply, safety, durability, and price. Numerous studies have shown that coal is the most dangerous for our atmosphere, followed closely by other fossil fuels - oil and natural gas.

If we continue the relentless exploitation and burning dirty energy, we will bring into question the survival of our planet and descendants. Alternatives to fossil fuels exist and are increasingly competitive in the global energy market. Does Southeast Europe keep up with the world in this field?

The German research institute Agora Energiewende gave an overview of the status of renewable energy sources (RES) in this region.

The European Union strives to achieve a reduction of greenhouse gas emissions by 45 per cent compared to 1990 levels by 2030. It is estimated that by that time, 55 per cent of the kilowatts will be of green origin in Europe's electric-

It is estimated that by that time;  
**55 per cent of the kilowatts**  
 will be of **green origin** in Europe's  
 electricity distribution network



ity distribution network, where sun and wind will have a particular contribution to the low-carbon future. South-east Europe, however, has no precise plans for the gradual elimination of coal from its energy mix, and it does not look up to its neighbours from the west of the Old Continent in this field. Moreover, the countries from this region, and especially in the Western Balkans, are looking for investors for new thermal coal and lignite power plants.

For the successful implementation of decarbonisation in the energy sector, which implies the reduction of CO<sub>2</sub> emissions from combustion of fossil fuels, it is necessary to invest in photovoltaic cells and wind turbines continu-

**If we continue the relentless exploitation and burning dirty energy, we will bring into question the survival of our planet and descendants**

ously, but also in the development of renewable energy as well as in energy efficiency in general. Equally important prerequisites are the integrated electricity market, the regulation of the secure supply system, the closure of coal power plants and the elimination of risks.

In order to gain the confidence of investors and encourage them to direct their money into clean energy resources, stable and reliable political frameworks in the energy sector are necessary. In the current market conditions, green investments in Southeast Europe are twice as expensive than the same in Germany or France, so these countries should work to remove obstacles that generate higher project costs.

An essential role in the “greening” of energy also plays the cooperation that goes beyond national borders.

Merging of energy systems at the regional level does not require huge financial resources and is an effective way to strengthen the security of the electricity supply chain. The regional market should consequently ensure the “flexibility” and network resistance.

Power plants in Southeast Europe are worn out, and as much as 95 per cent of capacities will require replacement by 2050. It is an opportunity for sustainable energy resources to take the place of thermal power plants in the energy mix. However, according to project plans, which are mainly financed by China, fossil fuels will be replaced - by fossil fuels.

Another challenge for the energy transition in this part of Europe is the energy (in)efficiency of buildings. Residential and public buildings consume more than 40 per cent of electricity, which means that there is a vast potential for improvement.

Transition to RES creates a less centralised energy system. Administrative apparatus should encourage consumers to produce clean energy for their consumption.

The final step of a successful energy transition is a comprehensive plan that refers to energy security, competitiveness, and mitigation of global warming.

Whether sun's rays will illuminate more solar panels or coal mines in Southeast Europe in 2050, is currently unknown. However, it is clear which option is better for human health and the environment.

Prepared by: Jelena Kozbasic



Nikolaus Lutterotti, Ambassador of Austria

## Austria – One of the Best Destinations for Eco-Tourism in the World

**T**he sustainable development is a goal which the Austrian government aims for, and there are certain areas where that goal has been almost completely achieved. Austria holds a PEFC certificate for sustainable forestry for over 90% of their forest, so when we talked to the ambassador of Austria to Serbia Nikolaus Lutterotti we wanted to know more about the progress in other sectors as well as about the fields of responsibility of the Ministry of Sustainability.





**EP** According to EPI ranking for this year, Austria made a step forward in the last two years having reached the eighth place. What actions have been taken to achieve this?

**Nikolaus Lutterotti** The Environmental Performance Index EPI is a very complex assessment of environmental trends and progress. Twenty-four performance indicators across ten issue categories are used for the ranking of the countries. Therefore, we are happy to see that the continuous improvement in environmental protection in Austria is internationally recognised. On the other hand, we need to remain realistic, because we know that it is difficult to make such international comparisons.

Austria took great efforts in many areas of its environmental policy: climate protection, waste prevention and waste management, wastewater treatment, public transport, alternative energies, Eco-taxes and energy efficiency.

Surely **Vienna** is an excellent place to live, but it is only fair to say that life in other cities such as **Graz, Salzburg** or **Innsbruck** is equally comfortable, maybe even more

We increased the amount of Eco-taxes from 7,087 million € in 2005 to 9,052 million € in 2016 (which includes energy taxes, transport taxes, environmental pollutions taxes, resource taxes). Resource efficiency in Austria has increased by more than 30% since 2000. Absolute resource consumption decreased in the period 2000 – 2015, in particular since 2006, by a total of 6.1 %.

Where we still have problems to solve is traffic and mainly the transit traffic. Austria is in the centre of Europe, and so transit routes go through our country.

**EP** The survey conducted by Mercer, an international consulting firm, has shown that there's no place in the world where life is as good as it is in Vienna. Are the other cities in Austria following Vienna's example?

**Nikolaus Lutterotti** The Mercer's Quality of Living City ranking is based on indicators such as the economic, natural, political, social, socio-cultural environment, medical and health considerations, public services and transport, housing, consumer goods, schools & education and recreation.

You must take into account that the study concentrates on opinions of expats. From a total of 231 large cities, Vienna is the only Austrian city which is being analysed in the Mercer Quality of Living ranking.



10



**For biogas plants** of the more efficient second generation **11.7 million €** per year have been made available for five years, with contracts being limited to a duration of three years

Photographs: Pixabay



## THE INITIATIVE "KLIMAAKTIV"

By introducing Mission 2030 (#mission2030), the Climate and Energy Strategy run by the Federal Ministry for Sustainability and Tourism in sectors of the renewable energy, energy saving and building & renovation and mobility, Austria has adopted a course towards a clean, sustainable and safe future in the fields of energy and mobility. The ambassador Lutterotti believes that with this strategy they have demonstrated how to protect our climate in the best possible way and ensure climate-friendly energy supply and mobility.

"It is our great responsibility to further develop our country with a view to sustainability and in the interests of the generations to come. In this context, clean mobility is a key area for #mission2030. For its successful implementation, it takes innovative ideas and implementation projects as well as partnerships on a broad scale. With the klimaaktiv mobil programme, the Ministry of Sustainability and Tourism sets a clear signal in launching the implementation of

#mission2030 and supports specific projects for clean mobility – ranging from electromobility and alternative vehicles to promoting cycling and intelligent mobility management. More than 11,600 klimaaktiv mobil projects provide impressive evidence that there is a high degree of readiness across Austria to become involved in clean mobility. With financial support in the amount of some EUR 108 million thus far, we have been able to trigger environmental investments of approximately EUR 645 million and provide important stimuli to the economy and employment. We are protecting the environment and the climate and have the chance to enhance the quality of life of our citizens in the municipalities and regions. At the same time, new opportunities for the economy and businesses are emerging", says the ambassador Lutterotti pointing out that in 2011 klimaaktiv was recognised as a European best-practice example in the category "Going Green: Concrete Solutions from the Public Sector" in the context of the European Public Sector Award (EPSA).

All other Austrian cities also put great emphasis on the quality of life for locals and the quality of experiences for visitors and perform very well in the before mentioned categories. So surely Vienna is an excellent place to live, but it is only fair to say that life in other cities such as Graz, Salzburg or Innsbruck is equally comfortable, maybe even more.

**EP** *At the beginning of 2018 the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BML-FUW) has become the Federal Ministry for Sustainability and Tourism. What is the most important aspect that entwines all these sectors?*

**Nikolaus Lutterotti** The BMNT has indeed an extensive broad authority, covering agriculture, forestry, water, environment, mining, energy and tourism. However, when you have a closer look at these responsibilities, you will realise that they are essential for sustainable life and for the development of the rural areas. All these fields of work are linked, and they deal with the resources of our livelihood. You need clean air, soil and water to produce healthy food in our agriculture and you need sustainable forests to construct houses, furniture and biomass. Forests are responsible for cleaning the air, water and they produce oxygen. Green energy production saves CO<sub>2</sub> emissions and creates new jobs in the



countryside. So, the BMNT is indeed a Ministry of Sustainability.

**EP** *What are the most essential elements of the 2017 Waste Prevention Programme?*

**Nikolaus Lutterotti** The action areas under the Waste Prevention Programme 2017 are the prevention of construction and demolition waste, waste prevention in enterprises, organisations and households, as well as making it possible to reuse a product. Waste prevention is a concept that is designed to impact mainly on planning, production and demand fulfilment. For each action area, there are huge packages of measures.

Just to give some examples such are promotion of low waste construction techniques and pilot projects, promoting to repair, reuse and recycling designs in design curricula, development of reusable packaging, information campaigns for consumers (reusable drinks packaging, carrier bags, eco-labels), incentives for enterprises to prevent feed waste and nationwide campaign creating awareness in households.

You can find more detailed information about the Austrian Waste Prevention Programme on the following website: [www.bmnt.gv.at/umwelt/abfall-ressourcen](http://www.bmnt.gv.at/umwelt/abfall-ressourcen).

**EP** *Recently, many kinds of research have shown that tourism significantly contributes to climate change consequences. Are there data on how much the tourism in your country affects the environment?*

**Nikolaus Lutterotti** Tourism means that people must travel from their home to a holiday destination and this produces emissions. However, most of our guests come from neighbouring countries, so the distances are not too far.

Austria puts great importance on the development of sustainable tourism products. These include the provision of sustainable modes of transport (e.g. “last mile” mobility solutions including free local transportation and guest taxis) as well as the use of local products. In hotels, saving water, energy and waste is a common practice.

Over recent years, the Ministry has supported these initiatives, and together with partners from the public and private sector, it has strengthened Austria’s position as a sustainable and eco-friendly destination for visitors from all around the world.

Tourism and mobility providers are working together to provide sustainable mobility solutions. One example is the transnational umbrella organisation Alpine Pearls, which joins together 25 Alpine villages in their quest for environmentally friendly mobility solutions and climate-friendly holidays. The association was the result of two successive





EU projects (Alps Mobility and Alps Mobility II) which originated in an initiative by the Ministry. In the context of climate change, reduction measures such as the reduction of emissions and measures for resource efficiency are essential. In the development of a new Master plan for Austrian tourism, the Ministry also focuses on the challenges posed by climate change. This Master plan for the continued growth of sustainable and competitive tourism will be presented in the first quarter of 2019.

**EP** *The Green Electricity Act 2012 served as a further incentive to expand the number of facilities producing green electricity to boost the share of electricity consumption generated by*

**Austria puts great importance on the development of sustainable tourism products** which include the provision of sustainable modes of transport as well as the use of local products, whereas saving water, energy and waste is a common practice in hotels





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**renewables to 85 % by the year 2020. How far have you come in reaching this goal?**

**Nikolaus Lutterotti** In 2017 the decisions were made for the Amendment to the Green Electricity Act. The core elements of the amendment are - apart from administrative simplifications - among other things a new envelope for investments in PV facilities and stores to the amount of a total of € 30 million as well as special budgets for the immediate contracting for small-scale hydropower (in total 3.5 million €) and wind energy (45 million €). Furthermore, the annual funds for small-scale hydropower stations have been increased. For biogas plants of the more efficient second generation 11.7 million € per year have been made available for five years, with contracts being limited to a duration of three years.

Moreover, a change in the ELWOG (Electricity Act) enables the joint use of energy generation plants, in particular, photovoltaic plants in apartment buildings.

**EP Austria's objective is to equip 80 % of Austrian households with intelligent meters, also known as smart meters, in the years ahead. How many households have been equipped through this plan up to this moment?**

**Nikolaus Lutterotti** The EU member states together decided that there should be a blanket roll-out of intelligent, i.e. smart, meters in Europe by 2020. For Austria, the Federal Minister of Science, Research and Economy decided that 95% of meters must be replaced by smart meters by 2019.



## ECOTOURISM IN AUSTRIA

Austria's deep-rooted environmental awareness is the basis for eco-tourism. Another important prerequisite is Austria's very attractive cultural landscapes, which shape and enrich its touristic offer. To preserve this offer, it is essential to focus on a sustainable form of tourism, which ensures the protection of the natural and cultural resources in the long run. At the moment, Austria is one of the world's best destinations for sustainable tourism, and this has been recognized and commended by the World Economic Forum in the Travel & Tourism Competitiveness Report.

In Austria, there are a huge number and variety of affordable places for the environmentally conscious visitor to stay, from B&Bs and guesthouses to campsites and mountain huts or farm holiday. More than 180 accommodations have achieved the standards of the Österreichische Umweltzeichen – Austrian Eco-label – a scheme promoted by BMNT that attaches particular importance to efficient waste and energy management, easy-to-use recycling systems, minimizing the use of packaging and using seasonal, local, organic food, sustainable materials in bedrooms and 'soft chemistry' to clean bathrooms.

Austria has the largest number of eco-friendly mountain huts and chalets in Europe. The 40-bed Adolf Nossberger hut in Carinthia's Schober Mountains is one of 63 that have achieved the Austrian Alpine Association's Seal of Environmental Excellence. It uses solar-charged batteries to power low-energy light bulbs, sustainably sourced wood for heating and a combination of filtration and composting to process toilet waste. It goes without saying that owner Roland Hummer sources food from local suppliers and minimizes the amount of packaging used. This shows that in terms of ecotourism, it is also necessary to enforce stronger cooperation between tourism, agriculture and the culinary sector.





The rollout of Smart Meters is a challenging process on a technological, organisational and business level. Minimum requirements of the Austrian smart meter rollout are high security and privacy standards - smart meters can only transmit the overall electricity consumption of a household, not individual devices in a bid to protect personal data.

Meters must also have a customer interface and a remote ability to make daily meter readouts available to consumers via a consumption visualisation portal.

From the existing 6.150.000 units in December 2017, around 12% were already installed and progress is fast.

**EP** *According to your country's experience and achieved goals, what renewable technology would give the fastest and cheapest result in reaching this goal in Serbia?*

**Nikolaus Lutterotti** Every country is different. I am not a professional, so it is difficult to advise Serbia. However, Serbia is a contracting party to the Energy Community, an international organisation which brings together the European Union and its neighbours to create an integrated pan-European energy market. For detailing this process, you need not only the top experts but also the broad public participation in your country. Some of the underlying strengths of Serbia are obvious anyway. You have mountains and rivers for small hydropower plants, a great opportunity for Serbia if you plan the plants well.

Serbia has a significant potential for using the wind to produce electricity. Your agriculture is very strong and important. It could mean a more extensive usage of agricultural residues given the necessary support and investments.



**EP** *In Austria, waste separation percentage is among the highest in the world. What was the most influential in achieving the high rates of recycling and waste separations?*

**Nikolaus Lutterotti** The most important thing is that consumers change their habits and mentality. Waste separation must be implemented in the souls of the people. So, the most important thing is education and awareness-raising. Starting projects in kindergartens, primary schools and high schools is crucial.

Information campaigns through supermarkets are necessary to avoid the incredible flood of plastic bags in supermarkets here. When I go shopping, I get five times more plastic bags as needed.

Interviewed by: Tamara Zjacic



# VINEYARDS AND SOLAR PANELS SUNBATHING ON FRUSKA GORA

Even though California and Vojvodina are miles apart, they have at least one similarity – a Silicon Valley.

The Silicon Valley in California was named after developed high-tech industry in this American region. Its “godfather” was the fact that the base chemical element that is used for producing chips is silicon. This element is used for producing solar panels as well. After the panels are put on the roofs of the houses in the district “Solar Valley”, will the amount of silicon per square meter be bigger on our or their side of Atlantic?

Bathed in sun rays, the “Solar Valley”, a closed type settlement, is located in Miseluk, a city part of Novi Sad on the Danube riverbank that belongs to the Srem district. The project is being developed by the company “Termo-inzenjering”. The first phase has already been completed, and ten families have found the roof above their heads.

## THE GARDEN OF URBAN HOUSING

The following data testifies that the “Solar Valley” is indeed the garden of urban living:

- houses occupy only 26% of the area
- vehicular traffic uses below 5% of the area
- private courtyards occupy 17% of the area
- space devoted to common areas: green areas, pedestrian and bicycle paths, bio-gardens, outdoor contents account for over 52% of the area

The location, energy efficiency, renewable energy, bio gardens and green rooftops, shared space for the inhabitants of the settlement, professional management, central floor heating, technical maintenance service... Thanks to its many unusual characteristics, the "Solar Valley" is an ideal residential solution for different people.

Could you imagine that a surplus of several hundred euros per year remains in your wallet because your house

The starting point for the development of the "Solar Valley" was the consideration of the target group. **The settlement is primarily intended for people with a certain level of awareness and understanding of contemporary trends in the way of life and work** and with the need for housing that supports it

replacement of spare parts and equipment after expiration and maintenance of sub-station and external installations.

In addition to high energy comfort, the stimuli for interested clients are the overall concept of the settlement, high-quality materials, the way of construction, modern aesthetics and functional organisation. The inhabitants of the "Solar Valley" can entertain themselves and do sports

#### FROM THE ACADEMY TO THE INVESTMENT

The areas of Energy Efficiency (EE) and Renewable Energy Sources (RES) are not unknown to Nikola Dzolev either on business or academic level. Within the fourth phase of the KfW program under the name "Reconstruction of the district heating system in Serbia" he cooperated with more than 20 heating plants and obtained the title of master on the topic of EE and RES at the Department of Energy and Process Engineering at the Faculty of Technical Sciences. At the same faculty, he received his Ph.D. from the Department of Environmental Engineering and Safety at Work.



is designed to save energy? It is not difficult, especially if you know that such homes were built in the "Solar Valley".

Heating, cooling and preparation of sanitary hot water are done by using eco-friendly clean energy sources - solar collectors and heat pumps. Houses have B-class energy efficiency labels.

"Termo-inzenjering" does not leave its customers at the moment when they give them the keys of the new home. The price of the heat comfort includes the system maintenance service which covers customary service,

In the next phase, the population of the "Solar Valley" will become richer for **more than 35 families**

in the gym and other open-air areas and stretch in the yoga centre. Those who want to grow their food have bio-gardens at their disposal. Plots for rent are equipped with a central irrigation system and are located in the domains



In addition to high energy comfort, the stimuli for interested clients are the overall concept of the settlement, **high-quality materials**, the way of construction, **modern aesthetics** and **functional organisation**

**THE "SOLAR VALLEY" IS THE AWARD-WINNING FAMILY PROJECT!**

The family company "Termo-inzenjering" was founded in 1991. The focus of its business is the design and construction of thermo-technical installations. Apart from Nikola, the backbone of "Termo-inzenjering" are his father Mitko and brother Igor. These two mechanical engineers and one construction engineer started to develop the settlement focused on housing types that are not represented enough on the market. The architects Maja Momirov, Slobodan Jovic and Nebojsa Jovin contributed to the implementation of their vision. The first phase investor was Mitko Dzolevic.

The "Solar Valley" distinguishes from the other closed type settlements by its organisation, priorities and other contents, which have already won significant international recognitions, such as the second prize in the category Urban Designs and Realization at the 26th International Urban Planning Salon in Nis.

of the settlement with the highest level of insolation. The rest of the bio-gardens that are not in the process of renting will be managed by the settlement administration as well as other green areas.

“Some people find themselves in one aspect of the project, some in another, but everyone, according to their priorities, could find something that would be appealing to them. The resort is only 5 minutes’ drive from Liman, University and Strand – the city beach and some minutes longer from the city centre. Customers are additionally attracted to peace, privacy, natural environment and provided parking spaces because there are less and less of them in the city”, said Nikola Dzolev, one of the project’s initiators.

The starting point for the development of the “Solar Valley” was the consideration of the target group. The settlement is primarily intended for people with a certain level of awareness and understanding of contemporary trends in the way of life and work and with the need for housing that supports it. “A significant topic within the framework of this concept is the provision of a certain measure of both privacy and community feelings. It has been achieved by developing spatial zoning through several different levels of the private sphere, which is reflected in the existence of closed yards, a series of bio-gardens as semi-public spaces

**Heating, cooling and preparation of sanitary hot water are done by using eco-friendly clean energy sources – solar collectors and heat pumps**

and a network of pedestrian and bicycle paths for connecting the open public contents”, Dzolev emphasised.

In the next phase, the population of the “Solar Valley” will become richer for more than 35 families. “The tenants’ impressions are fantastic, just the way we wanted it. Their satisfaction and the support of people who follow the realisation of the project mean a lot to us. Positive reactions during the construction period, which required a lot of energy and commitment, made it easier for us to complete the whole process. By the end of the first phase, which besides the construction of facilities included the comprehensive equipping of the entire place with infrastructure (electricity, water, sewerage, optics, streets ...), we provided the necessary basis for further development of the settlement within the second phase. I believe that this has dramatically helped the urban development of Miseluk and encouraged other investors with a similar vision”, Nikola concluded. On the



**Thanks to its many unusual characteristics, the “Solar Valley” is an ideal residential solution for different people**

land of about 3.6 hectares, a total of 112 housing units will be constructed, which will range from 73 to 166 square meters. The total net area of the living space will be 12,500 square meters. Within the settlement, there will also be business spaces as well as administrative and commercial buildings of total net area greater than 1,000 square meters.

Prepared by: Jelena Kozbasic



GREEN  
MONTENEGRO

**W**ithin the framework of negotiations with the European Union, Montenegro has recently opened Chapter 27 covering the protection of the environment. The Minister of Sustainable Development and Tourism of this neighbouring country, Pavle Radulovic, and one of the key political helmsmen on the way to closing of this important chapter, revealed to us the future direction of Montenegro's environmental policy, favourite landmarks of his homeland, means to solve the problems with waste, but also the weak points in the preservation of the natural surroundings. The Minister will join efforts with his associates and the entire nation to improve the health of the environment.

**EP** *Considering that Montenegro has recently opened Chapter 27, what are your further plans regarding environmental protection?*

**Pavle Radulovic** We are pleased and proud to have opened Chapter 27 and to continue the fulfilment of the European agenda, but this Chapter indeed has a deeper meaning for me. I expect that, aside from working on the most pressing infrastructure projects, we change our habits to create a healthier environment. In the Negotiating positions document, steps toward fulfilling the obligations are set, with a focus on difficulties in implementation. For the application of specific regulations of the EU acquis, we requested transitional periods, because the implementation of EU legislation in the field of Environment is not an easy and quick process, as we plan it to be adequately performed. We will continue the work on the construction of the wastewater treatment plant, the infrastructure in the field of waste management and remediation of industrial pollution along with many other activities. The establishment of the Natura 2000 protected areas network, which is one of the conditions for the closure of Chapter 27 for all former candidate countries, is

also among our priorities. To achieve all this, we need a significant number of professional and dedicated staff, and we will undoubtedly be working on it. However, the Member States of the European Union have "rewarded" our previous efforts in Brussels on December 10th.

**EP** *Chapter 27 covers many different topics. Regarding the current situation in Montenegro, in which area you achieved the most, and which field, as the weakest point, would be most challenging to implement?*

**Pavle Radulovic** To what extent we have progressed shows the fact that in this field in the last seven years we brought about 50 laws harmonised with the European Union, 15 strategies, and confirmed about 40 international conventions. We continue to focus on the construction of modern facilities for the wastewater and waste management, together with the development of water supply and sewerage network in all Montenegrin municipalities.

We signed the Contract for the construction project of the wastewater treatment plant, sewerage networks, and facilities for sewage sludge for our capital city worth more than 50 million euros.

When it comes to waste management, we are establishing a system based on selection, prevention, recycling, and reuse. In all Montenegrin municipalities, we will continue with the construction of transfer stations, recycling yards, and other supporting infrastructure.

The introduction of separate waste collection system is necessary for the valorisation of dry waste - paper, cardboard, plastic, and metal. In this way, the amount of waste disposed at landfills will be reduced, and it will provide the opportunity for all of us to think of waste as an important resource, and to make a personal contribution to environmental protection in a simple way. We will follow the latest European solutions in the reduction and gradual elimination of the use of plastic products.



**Pavle Radulovic**, Minister of Sustainable Development and Tourism of Montenegro

Montenegro has been an industrial country for long, so it is not easy to repair and clean everything left from that system. For this reason, the project we are implementing with the World Bank worth 50 million euros is vital, and it is aimed at rehabilitation of four ecological black points. The construction of the Brodogradiliste site has started, and in early 2019 the rehabilitation of the landfills Gradac and Maljevac will begin.

We are also working on the concept for the location of the Aluminum Plant Podgorica. Upon completion of these projects, the decades-old problem of the historical industrial pollution in Montenegro will be solved.

At the same time, we care about air pollution; therefore, we have established a national network for monitoring air quality at seven measuring stations. Data can be followed in real time on the website of the Environmental Protection Agency of Montenegro.

At the end of March 2018, the conceptual solution for the ecological reconstruction of TPP “Pljevlja” contract was signed, which is after 36 years of the plant’s operation the most significant environmental project. At the same time, we will work on the reconstruction and development of the secondary district heating network as a permanent solution to air pollution in Pljevlja.

As a result of the efforts made to preserve the variety of our biodiversity, around 13% of the Montenegrin territory is currently protected.

Pavle Radulovic is an economist. He was born in 1975 in Podgorica. Radulovic started his professional career in Podgorica working in several international organisations on projects financed by international institutions. In March 2007, he took over the position of the city manager of the capital Podgorica. He was the executive director and member of Board of Directors of the Water Polo World League in 2009, a member of the Board of Directors of the sports club “Buducnost,” and also of the Swimming and Water Polo Association of Montenegro and the National Council for Sustainable Development. He worked as an advisor to the executive director and as a commercial director of the company “Jugopetrol” in Kotor. He is a fan of sports and music and plays the guitar.

We hope that people will change their attitude towards nature because our habits are often a stumbling block. Plastic bags that “decorate” the treetops in riverbeds are not only an ugly sight but also extremely harmful to the environment and health. That is why we will also be committed to educating the population.



**EP** *Sustainable tourism is becoming increasingly popular in the context of the fight against climate change. Do you know of some examples of this practice in your country?*

**Pavle Radulovic** The Tourism Development Strategy defines creation of sustainable touristic products until 2020. I would single out several projects, primarily solar catamaran, whose first implementation phase will soon begin. The concept is designed as regular passenger transportation, and it is particularly important to us because tourists will surely love to use it. It will reduce the traffic jams in the bay. The positive aspect is also the speed of the transport itself. According to the investors, only 18 minutes will be needed for the Herceg Novi-Tivat trip. We expect that the entire project will be in operation in 2020. I would like to mention that the Ministry of Sustainable Development and Tourism, in partnership with the United Nations Development Program (UNDP), has been implementing the Development of the





Due to its diverse **flora and fauna, endemic species, high mountain peaks, lakes and springs, spectacular canyons and caves, Montenegro displays an impressive picture to all visitors**

Low Carbon Tourism program in Montenegro for already four years now, with the aim to use different instruments for the so-called greening of tourist offer and reduction of carbon footprint in tourism sector. Through the support program, about 1 million euros have been allocated so far for green tourism projects.

The project for the purchase of an electric bus for the National Park Durmitor will certainly affect the reduction of traffic jams and the removal of the accompanying adverse effects that traffic has. It will reflect positively on the image of the national parks. This form of transport was recognised by hotels in Budva and Ulcinj, and the tourist organisation Cetinje.

An example of good practice and implementation of energy efficiency measures is the reconstruction of small hotels in Mojkovac, Podgorica, Herceg Novi, Ulcinj, and Niksic, which use the most advanced heating and cooling systems, solar panels and LED lighting. In this way, they reduce the costs of electricity, but also the level of carbon dioxide emissions.

Rural communities in Montenegro have great opportunities to use such a practice. On pasture hills in Pluzine and Zabljak, 40 solar systems were placed for the production of electricity on the roofs of households that got the electricity for the first time! Solar panels will contribute to the creation of better work and livelihood conditions for the farmers and livestock farmers who take cattle to pastures. In addition to the traditional role they have, Montenegrin pasture hills are an important part of the tourist offer. Mountain villages, which are almost entirely cut off

from urban life, are located below the majestic peaks of the Montenegrin mountains, at an altitude of 1800 m and above. They are the perfect starting point for walking and hiking tours.

Today, the image of a desirable tourist destination in the 21st century is being built through the festival tourism among other things. Montenegro is highly positioned on the European map of important events. Around 150,000 guests from all over the world came to our country last year for the music. Together with artists, we strive to raise environmental awareness. All our big festivals are green, including the Sea Dance festival. Our goal is to reduce the amount of waste in the camps, achieve a high recycling rate, develop awareness and level of knowledge about cli-





Montenegro has established a national network for **monitoring air quality** at seven measuring stations

mate change and environmental protection and promote sustainable means of transport.

Today we have 20 hotels in Montenegro with a green certificate, and yet as many in the process of acquiring one of the internationally recognised certificates of sustainable business. Certified hotels are energy efficient; they recycle waste, use renewable energy, have a responsible attitude towards the employees and the local community, and are less harmful to the environment. Hotels and apartments with green certificates implement numerous environmental protection measures, operate cost-effectively, preserve natural resources and are essential partners in the fight against the harmful effects of climate change.

Sports tourism is also an important segment of the tourist offer. After renovation, Sports Center Moraca in Podgorica has been converted into a multifunctional energy-efficient building.

**EP** *Montenegro is rich in natural resources and varied biodiversity. What are the mechanisms for their protection? Is the awareness of citizens of nature conservation developed?*

**Pavle Radulovic** Biodiversity is now under considerable pressure from various factors, while many biological species are on the verge of extinction. Montenegro is an important centre of biodiversity in the Balkans and Europe, with many specific ecosystems in which flora and fauna have a large number of species of international importance. By ratification of the Convention on Biological Diversity, which is the primary international legal instrument for the protection of



global biodiversity, a consensus has been made that biodiversity provides us not only with material wealth but also spiritual and that it is the foundation of a healthy environment and sustainable development.

As for the development of the awareness of Montenegro, Ministry of Sustainable Development and Tourism is continuously working on its improvement. Through the organisation of a series of workshops on sustainable development in cooperation with municipalities, non-governmental organisations, as well as companies in Montenegro, the focus is placed on the obstacles to sustainable development and how to overcome them, the preservation and improvement of the environment. Teacher Training for teachers in primary and secondary schools is being carried out on how to incorporate sustainable development into regular classes. Volunteers in Montenegro often and

## THE MEANS FROM THE ECO-FUND WILL BE ALLOCATED TO THE SECTORS FROM WHICH THEY WERE OBTAINED

At the end of November, the Government of Montenegro decided to establish Eco-Fund. Pavle Radulovic says that Eco-Fund is a crucial mechanism for targeted support to programs and projects in the field of environmental protection, climate change and energy efficiency at the national and local level. This money will provide support to projects that should be the driving force of economic and infrastructural development of Montenegro. Particularly positive effects on the creation of new green jobs, tax policy and the sustainable use of natural resources are expected, all following the highest environmental standards.

“Eco-Fund will collect the funds for its operations on the polluter pays principle from payments, fees, and taxes from entities that harm the environment. The critical change in the system is that the revenues, which have been collected so far under these grounds, will go to the Eco-Fund account. The means will be allocated to the sectors from which they were obtained. If, for example, Eco-fund has revenue from the fees for CO<sub>2</sub> emissions from cars, it will be used for projects that support sustainable forms of transport.

Besides, Eco-Fund will also work on establishing cooperation with international and financial organisations. The available funds will be directed to the public and private sectors, as well as to individuals and households, and will be allocated according to openly and publicly defined procedures,” says Pavle Radulovic, adding that the support of Eco-Fund will depend on the project type.

Through educational programs and informing the public, the fund will try to motivate citizens and businesspeople in Montenegro to act responsibly towards the environment and thus contribute to the achievement of goals in the field of environmental protection and sustainable development. Considering that the establishment and functioning of the Eco-fund requires additional knowledge, the Ministry of Sustainable Development and Tourism has provided expert assistance from the United Nations Development Program (UNDP), which will work on the institutional and technical strengthening of this fund in the future as the fundamental institution in the field of environment and climate change.

## EP What is your favourite national park and what a tourist in Montenegro should not miss out?

**Pavle Radulovic** Because of its identity, historical, cultural and literary significance for Montenegro, I single out national park Lovcen with Cetinje and its surroundings. To climb to the top, where our wise and unique Njegos sleeps in the Mausoleum, to look at the lake, the sea, at the Montenegrin stone, fills the lungs in each of us with a sharp breath that tightens your chest. The pride and humbleness you feel on the cliffs at the same time are worth every “trouble” that we all still carry in these Balkan countries.

Many important moments in my life are connected to Skadar Lake, the rare wetland habitat and cryptodepression included in the Ramsar List. I believe that the historical and natural distinctiveness of Lake Skadar is yet to be revealed and will surely fascinate the tourists. Lake Biograd, one of the largest glacial lakes, is surrounded by the rainforest with over 50 species of trees.

Montenegro is undoubtedly one of the most exciting places in the world, due to its specific geography and mentality of people. Due to its diverse flora and fauna, endemic species, high mountain peaks, lakes and springs, spectacular canyons and caves, Montenegro displays an impressive picture to all the visitors. In addition to exceptional, attractive beaches, Montenegro is known for its unique national parks and nature parks, as well as an extensive network of scenic roads for visitors travelling by motor vehicles and the system of paths in the wilderness for hikers and cyclists. It covers the entire country.

Regarding the nature-based tourism, Montenegro has managed to become a leader in the Mediterranean market. We have five national parks.

Mountain villages, which are almost entirely cut off from urban life, at an altitude of 1800 m and above, are the perfect starting point for walking and hiking tours



on their initiative organise cleaning campaigns at certain sites, schools celebrate April 22nd - Earth Day, and other environmental dates. Likewise, literary and art competitions for schoolchildren are held regularly on the topic of preservation and protection of the environment.



Since 1980, Durmitor has been on the World Heritage List under the protection of UNESCO. In this territory alone around 1,325 species of plants can be found, 122 of which are endemic. The forests of Durmitor ring are inhabited by brown bear, wolf, wild boar, chamois, and lots of birds.

The Tara river is the longest river in Montenegro, and Tara canyon is the second deepest in the world after Colorado. Pine forests with endemic black pine and beech forests are especially interesting.

Different civilisations merged here, forever making Montenegro the crossroad of culture and history. A medieval fortress Ulcinj surrounded by many romantic legends and stories of the people who visited, defended and conquered it, such as the Don Quixote's love for Dulcinea, is situated in the south of the country. The following is Bar, the centre of early medieval culture and the largest port in this part of the Adriatic. Today, it is a Mediterranean-oriental city due to the influence of all those civilisations for which it was an irreplaceable coastal centre. If we continue towards the north, we can find the ruins of the famous monastery on the cape Ratac, where Helen of Anjou raised the basilica from which one of the highest medieval towns Nehaj can be seen. It was built by the Venetians and fortified by the Turks. The exquisite architecture and mixture of Gothic, Romanesque, Renaissance and Baroque style make Kotor, the city under UNESCO protection, along with Dubrovnik, the most interesting town on the eastern Adriatic coast. Montenegro's most northern Adriatic town Herceg Novi, gradually raised above the beautiful entrance to the Bay of Kotor, remembers Spanish, French, Austro-Hungarian, Venetian, and Ottoman empires, and the influence of all these civilisations is still felt in its culture today. Becici beach, like geography and history show, was declared the most beautiful European beach as far back as 1930.

In Cetinje, which was once the capital, you should visit the Cetinje monastery and the court of the Petrovic dynasty, where among other things, you can find the first billiard table in the Balkans. In the immediate vicinity is the National Park Lovcen. A visit to the Mausoleum-the

**“Plastic bags that “decorate” the treetops of riverbeds are not only an ugly sight but also extremely harmful to the environment and health. That is why we will also be committed to the education of the population”**



symbol of Montenegrin identity and Njegusi, famous for its cheese and ham, is a must.

**EP** *Both the Montenegrin and Serbian public is aware of citizens' concerns about the construction of small hydropower plants. The current case lately, is that of river Cijevna that flows through Montenegro and Albania. Its canyon is recognised as an area of exceptional natural value according to the Council of Europe's criteria, and according to the Berne Convention, as a potential Emerald habitat. Could the eventual implementation of construction projects of small hydropower plants in Albania affect the Montenegrin protected area, and if there is a danger, what steps are possible at the political level to prevent the damage?*

**Pavle Radulovic** Upon learning that individual works are being carried out on the Albanian side of the Cijevna River,





**“Given the fact that we do not have processing capacities for certain types of waste, such as plastic, paper, tires, batteries and accumulators, glass, we need to focus on the export”**

the Ministry of Sustainable Development and Tourism has sent a request for information and documentation under the provisions of the Espoo Convention. As this is part of an international treaty, information was also requested using diplomatic channels, through the Ministry of Foreign Affairs.

After Albania submits the requested documentation, it will be available to all relevant authorities in Montenegro and the general public, so that we get familiarised with the project, but also to assess the potential transboundary impact on the environment of Montenegro.



tem is being worked on. Data from the Statistical Office and Nature Conservation and Environmental Protection Agency vary from 3 to 8 per cent.

We should mention Montenegro’s peculiarity that does not work in our favour. Given the fact that we do not have processing capacities for certain types of waste, such as plastic, paper, tires, batteries and accumulators, glass, we need to focus on the export, which makes this whole story about recycling significantly more expensive and less attractive. Of course, we’re looking for a way out of this situation, and one of the measures is the establishment of the so-called “extended producer responsibility,” which would help solve the problems of the particular types of waste. In addition, through their local waste management plans, municipalities have committed to achieving specific goals concerning recycling.

Concerning Chapter 27, Montenegro must achieve a certain recycling degree. Building the necessary infrastructure in all municipalities and the establishment of four regional centres for waste management, as well as the involvement of all of us at both local and national level, is the necessary condition for the realisation of the plans.

Interview by: Jelena Kozbasic

As in all previous cases of cross-border consultations carried out in Montenegro, the public will be duly informed.

**EP** *One of the important aspects of environmental protection is waste management. How much waste is recycled in Montenegro?*

**Pavle Radulović** Considering the extent of the problem, our European obligations and conduct of the part of the citizens, I have recently said that we should “declare war” to waste. Both personally and as a minister, I am incredibly interested in resolving this topic finally.

There is no reliable information about the recycling degree, although the establishment of the reporting sys-



## Solar Energy for Agricultural Holding or Private House

**D**o you know how much solar energy reaches the Earth per year? It is estimated that the power of the Sun that reaches our planet is 105 times higher than the capacity of all power plants on the planet. While the possibilities of using solar energy on a global scale are enormous, the exact potential varies from country to country. The fact that Serbia has a significantly higher number of hours of solar radiation than most European countries enables us to turn to the most abundant and cheapest source of energy known to humankind.

The owner of a farm at Fruska gora got the idea to install a solar power plant. The idea originated from the desire

that the products made on this property owing to energy from renewable sources have a green ecological footprint.

The purpose of a small solar power plant, which is placed on the roof of this farm, is to use the produced quantity of electricity from renewable sources for its own consumption. The power plant is of great significance not only for the owner but also for the households nearby, since by connecting to the distribution cabinet the necessary electricity for the surrounding households can be provided.

To make the products entirely ecological, the owner has entrusted his idea to the company “MT-KOMEX” from Belgrade, which built a small solar power plant. It is mounted on a substructure manufactured by the German company of aluminium mounting systems - *K2 system*, and semi-crystal solar panels (Power 272 W) made by *Luxor solar* are installed on the substructure. In order to transform the DC, which is generated in solar panels, into alternating current - which consumers use – the company installed *Fronius inverter Symo 10kv*, which has 2mpp trackers. The inverter is tied to a single smart meter in the system so that the owner of the facility can track the overall electricity consumption in the facility and of various consumers, as well as the contribution of the solar power plant during its exploitation.

The engineers of the company “MT-KOMEX”, with many years of experience in mechanical engineering and welding projects, also have the expertise and relevant knowledge when it comes to the construction of solar power plants. They have been trained and certified for installing photovoltaic modules with associated equipment, as well as for voltage converters and inverters, and they have proven their expertise with this unique project at Fruska gora.

However, if your dream is to have a self-sustainable house designed to operate independently of infrastructure services such as electricity, gas, water, sewage system and telecommunication services, this is the company you are looking for.

The company “MT-KOMEX” will provide you with the most up-to-date and the highest-quality equipment that meets your expectations. The best example for such a starting point is the construction of a self-sustainable house in Sumarice in Kragujevac. *Fronius* inverter and the smart meter are in charge of smooth energy flow in this house. This modern facility receives its “clean energy” by the exploitation of *Canadian* solar panels of 10 kW.

Special sales offer for *Eco 25 & 27* and *Symo 15.0-20.0* inverters is currently underway and every buyer of one of these models can expect savings of 135 Euro.

This offer will last until March 31, 2019, and, please contact “MT-KOMEX”, the official distributor of this manufacturer, for all the information on *Fronius* inverters and discount for certain types of inverters, via e-mail at [info@mt-komex.co.rs](mailto:info@mt-komex.co.rs).

Prepared by: Sofija Nikolic





# ABB- Backbone of Industrial Digitalization in Serbia

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**Milan Jevremovic**, Industry Segment Manager at ABB, Serbia

**A**t the end of the 1980s, two prominent engineering companies Brown Boveri and Asea decided to join forces and resources. This capital enterprise was named ABB, and the newly formed company has added exactly three decades to 100 years long history of its founders, diligently writing the future of industrial digitalization.

ABB is an inventive technological leader in the field of electric power networks, electrical equipment, industrial automation, robotics and motion, serving customers in utilities, industry and transport and infrastructure globally. The company emphasises two clear goals: bringing electricity from any power plant to any plug and automation of industry from natural resources to finished products. ABB now operates in more than 100 countries with about 147,000 employees.

Milan Jevremovic, Industry Segment Manager at ABB Serbia, gave us the answers to the questions about the energy efficiency solutions, the expansion of ABB's network of electric chargers and ABB solar systems and solutions.

**EP** *ABB has been present for 28 years in Serbia. Which are ABB's leading products in Serbia and what solutions have been proven to be most efficient when it comes to energy saving?*

**Milan Jevremovic** ABB operates in 3 sectors in Serbia: Energy, Industry, and Infrastructure and Transport. For





**"The number of solar inverters we installed exceeds 1.8 million, and the total power of solar plants in which ABB participated is over 20 GW"**

each of these sectors, ABB can offer a wide portfolio of products. Switchgears, medium and high voltage devices, relay protection and transformers have the most significant market share in the field of Energy.

When it comes to the Industry sector, ABB is best known for its electric motors in Serbia. In addition to electric motors, we are the leaders in the domestic market in the field of frequency regulators with more than 200 MW of installed devices. It is estimated that they achieve daily savings in energy consumption of around 15 per cent of installed engine power. As far as the processing industry is concerned, there is also a complete portfolio of measurement and analytic devices as well as distributed control systems. In the last two years, robotics and advanced automation systems that support the development of Industry 4.0 are particularly prominent.

In the Infrastructure and Transport sector, our company is mostly present with low-voltage equipment and distribution facilities, but also with a complete offer for

electrical installations in modern residential, office and commercial facilities.

**EP** *What are the solutions which ABB can offer for improving energy efficiency in different types of industrial plants?*

**Milan Jevremovic** In addition to the already mentioned products which directly or indirectly influence the reduction in energy consumption, ABB has comprehensive solutions and services for improving energy efficiency for almost every type of industry. As the best example, I would like to mention a project for monitoring and managing the quality of coal that is being dug in the Kolubara Mining Basin in to improve the efficiency of boiler operation in the thermal power plants 'Nikola Tesla'. Several excavators dig coal at the same time at different locations on the open-pit mine 'Tamnava'. Coal is of varying quality, and the goal is to send homogenised coal of the necessary calorific value to the power plant in Obrenovac. The software tracks geological information on the locations where excavators work compares them with online data provided by analysers on excavators and conveyor belts and harmonises the final quality of coal which is delivered. If necessary, the software also allows the takeover of the coal from the warehouse to achieve the required quality of coal which is loaded into the wagons and delivered to the power plant. The combustion in the boiler is much better, the efficiency is higher, and the

**ABB IN SERBIA**

In 2018, ABB celebrated 28 years of existence in Serbia. As one of the leading companies in the field of industrial technologies, it always helps customers to improve the use of electricity, increase industrial productivity and reduce the negative impact on the environment.

ABB Ltd based in Belgrade is in charge of the entire range of ABB products and systems on the territory of the Republic of Serbia. Thanks to its structural organisation concerning the industries it serves, ABB has developed cooperation with local partners and customers, it is in charge of commissioning, servicing and maintenance of ABB's equipment and systems, as well as adequate training for users. ABB in Serbia considers concern of the community as one of the important business segments. Through various activities and projects, they support the university community, as well as various humanitarian organisations and institutions. The concern for sustainability is reflected in the way they hire their suppliers, access potential risks, behave in the social community in which they work, while at the same time they struggle to ensure the health, safety and security of their employees, contractors and others who are influenced by their work.



emission of harmful gases is lower when using the coal which has a constant quality. This is a unique project of this type in the world in which experts from PE Elektroprivreda Srbije, the Faculty of Mining and Geology, and the engineering team of ABB for open-pits from Germany worked together to come up with the best and most optimal solution. The implementation of this project is currently underway.

**EP** *ABB currently has the fastest charger for electric vehicles. How many chargers of that type have been installed so far and where?*

**Milan Jevremovic** ABB in its offer has Terra fast chargers, but the word fastest is not appropriate here. The charging speed depends not only on the power of the charger but also on the system of an electric vehicle that controls the charging. The power of ABB fast chargers goes from 50 kW, which is in practice currently shown as a minimum, up to 60kW chargers for charging the buses and tracks. When it comes to the prevalence of our chargers, it is enough to say that we have more than 6,000 electric chargers and systems installed in more than 100 countries in the world.

**EP** *What are the other advantages of ABB chargers apart from the fact that your chargers are technological state of the art?*

**Milan Jevremovic** The basic model Terra 54 is a universal fast charger for all types of electric vehicles that exist today. Key parts of the charger are also ABB products that contribute to the reliability of the product itself. The small weight of the basic model, which is about 350 kg, is the result of excellent modular construction and technology.



In addition to electric motors, we are the leaders in the domestic market in the field of frequency regulators with **more than 200 MW of installed devices**

Terra 54 has five power modules that allow charging even in a case of failure of one of the modules. ABB can remotely monitor the operating parameters of each ABB's fast charger in the world which has been put into operation and provide service and technical support to all their customers. The Terra fast charger stands out from the others since we have developed a unique design for people with disabilities, which is one of the conditions for placing on the market of the United States of America.

**EP** *What type of training do you organise for servicers?*

**Milan Jevremovic** ABB has its customer service, and it also provides training for partners who want to service

ABB chargers. The training includes the training for hardware and software parts of the chargers, and after completing the training, the certified service provider can independently perform the inspection of the charger, to put it into operation and to perform service and maintenance during the exploitation.

**EP** *How many ABB's chargers have been installed in Serbia and what is the prognosis for the further development of the network in Serbia?*

**Milan Jevremovic** So far, several slow chargers and one fast charger with remote monitoring system have been installed in Serbia. The fast charger is at the location of the company Porsche SCG in Belgrade. The development of a network of chargers in Serbia will depend on the needs and possibilities, the incentive measures, as well as the traffic development strategy that envisages the reduction of the impact of exhaust gases. Projects in this area are complex and require proper technological and economic assessments. Initial investments are not small and include support for state-owned or private-owned charging

**Milan Jevremovic** This is connected with the development of the infrastructure network of electric chargers as well as the aforementioned subsidies and incentives for the purchase of electric cars. It would be amazing if electric vehicles would become an everyday sight on our streets, but this will only happen once we get full support and benefits from the state.

In 2012, Estonia developed a national network, precisely with ABB fast chargers, and it gave an excellent example

**The software tracks geological information on the locations where excavators work compares them with online data provided by analysis on excavators and conveyor belts and harmonises the final quality of coal which is delivered**



networks, various types of subsidies and incentives for the purchase of electric vehicles. The most important ones are the savings that the entire system brings and the reduction of emissions greenhouse gases. Given the fact that Serbia connects the East and the West, it is necessary to develop its network of electric chargers, so that everyone who drives electric cars, buses and hopefully trucks, can quickly and easily charge their vehicles.

**EP** *When are electric cars expected to become a common sight on Serbian roads, as in the countries of the European Union?*

to other countries. One fast charger of 50kW DC/22kW AC was installed at a distance of about 50 km on each main and highway in Estonia. In addition to those, additional 500 slow AC chargers were installed in governmental institutions.

To inspire and motivate the others, ABB Serbia purchased an electric car last year for its own needs and installed an electric charger in front of the offices in Belgrade. By our example, we wanted to demonstrate the necessity of spreading both corporate and individual awareness on the protection of the environment.

**EP** *One gets the impression is that the use of solar energy fairly represented in Serbia, and among other things in your product range there are solar systems as well. What is the future of solar energy?*

**Milan Jevremovic** Solar energy still has great potential although most countries abolished incentives. The price of electricity has increased, and this trend will continue in the future due to the growing demand. At the same time,

**“We are most proud of 2 largest solar power plants constructed with ABB inverters – Solaris 1 and Solaris 2, each has the power of almost 1MW and the power plants on the roof I would single out is the solar power plant at the IKEA department store and it has the power of 300kW”**

**EP** *How many solar projects have you done so far and on which of them are you most proud of?*

**Milan Jevremovic** ABB has been one of the world leaders in solar power projects since 1990, primarily in the field of solar inverters, but also in distribution plants and transformer stations for this purpose. The number of solar inverters we installed exceeds 1.8 million, and the total power of solar plants in which ABB participated is over 20 GW.



the price of solar panels and other equipment needed for the construction of a solar power plant fell when compared to the situation five years ago. By building a solar power plant, which would serve exclusively for the supply of a household or an industrial facility, one can expect a return on investment in about seven years. Taking into account the lifetime of solar panels is about 25 years, and also that the price of electricity will continue to rise, solar energy in future have a significant place in the overall electricity production in future.

ABB manufactured more than 70 per cent of inverters installed on all solar power plants in Serbia. We are most proud of 2 largest solar power plants constructed with ABB inverters – Solaris 1 and Solaris 2, each has the power of almost 1MW, and the power plants on the roof I would single out is the solar power plant at the IKEA department store, and it has the power of 300kW.

**EP** *Many large urban areas are trying to adopt the concept of smart cities, and Belgrade has also taken this route. What*

**solutions could you offer in construction?**

**Milan Jevremovic** In meeting the latest trends in the global market, ABB offers its solutions in the construction industry that manage the electricity consumption and load by the patented system. The aim is to reduce the operating costs, increase energy efficiency, security and reliability.

ABB Ability™ EDCS is ABB's innovative cloud platform designed to monitor, optimise and control the electrical system. Monitoring tracks the performance of the facility, monitors the electrical system and allocates costs. Analysis of relevant information improve and maximize the utilisation of resources, and thus one makes the right business decisions related to the consumption and maintenance of the equipment and systems. The control is performed by adjusting alerts for key system parameters, and the consumption is remotely controlled to save energy in a simple way.

The ABB portfolio has got the state of the art equipment that supports connection to the ABB Ability platform. In addition to installing new systems, old installations can be upgraded and connected to the cloud platform.

**EP** Last year, ABB presented ABB free@ home systems, the systems of home automation for new and existing facilities

**at Metropole Hotel in Belgrade. Why should customers choose your system?**

**Milan Jevremovic** ABB free@home has proven as an exceptional product on the market, primarily because of its reliability and simplicity. There are many interested users among the owners of private dwellings, but also among the investors of larger residential units which they equipped with the home automation system even before the sale of apartments, thus offering a higher level of comfort to their customers.

ABB system does not require you to hire the professionals for the installation and programming. It is simple for a user, and it retains multi-functionality. An increasing number of satisfied users are enjoying smart homes equipped with the ABB automation system.

Interview by: Nevena Djukic





**PRESENTING** JUMP INN HOTEL

THE BEST, RIGHT NEXT  
TO THE CITY CENTRE



Visitors of the most popular booking website Booking.com bestowed it 9.3 points out of 10. On the site Hotels.com got 4.6 ratings out of 5, while at the TripAdvisor.com list of 86 hotels by guests' choice it holds the 4th position.

Belgrade's Jump Inn hotel has earned this excellent status thanks to the high ratings given by the guests for its location, comfort, cleanliness, friendliness of the staff and numerous services. Although the recommendations offer a good insight into the service quality, one can get a fair impression of the hotel, located near the cultural and historical center of the capital, only by stepping into the 1924 building designed by the Russian architect Nikolay Vasilyev, who is also known for his building project of the Military Museum at Kalemegdan.

Location, location, location – goes the English phrase, but the Jump Inn hotel owners know about it too. This condition which implicates that the facility should be situated

as close to the sights so that guests can do sightseeing on foot, while having the business part of the city at a short distance, has been met when the hotel moved into the building at the address in the former Zagrebacka street, that now bears the name of Koca Popovic. A short but picturesque street is one of the rare roads in Belgrade that has been keeping its appearance for almost a century. The charm of this destination does not come to an end. Tourists and business guests who are staying at the Jump Inn hotel can enjoy in a unique atmosphere of the famous Savamala district featuring numerous restaurants, bars, galleries and exhibition areas with various amenities.

The hotel was opened four years ago and the increase in the number of overnight stays by 25% each year grew out of continuous listening to the needs of guests, constant improvement of the hotel's services and refining of the offer. Having welcomed so far more than 65,000 tourists from all over the world, they have raised the bar when

it comes to the Belgrade's hotel offer. A large number of domestic and foreign tourists, as well as business people, mainly from Europe, most especially from Turkey, Germany, Sweden, the Russian Federation, Greece, Israel and Italy, gave high grades to the hotel's services and atmosphere which made the Jump Inn hotel stand out as one of the best-ranked hotels of top category in Belgrade.

## Care about guests in the first place

There is no doubt that a guest will enjoy in the ambience of any room or suit which he chooses since all accommodations are designed to satisfy different tastes and needs. Each of 49 rooms available to guests is characterised by a high standard, specially designed details and a combination of modern and antique furniture. If the guest feels like having a walk around the city, he or she won't be wondering about what to see first. Guest Relation Agent is there for providing all necessary information about the sights and number of tourist attractions, not only in Belgrade but throughout Serbia, and also for organising the sightseeing tour according to the particular interest of the guest.

Based on the choice of the hotel guests, at the top of their list, apart from city centre and Kalemegdan, are river cruising and visits to museums. The visitors from the Netherlands and Great Britain seem to be very interested in running along the river Sava and riding e-bike which can be rented at the hotel.

## Care about resources at a special place

Since the building, having become a cosy home to the Jump Inn hotel, is under protection of the Republic Institute for the Protection of Monuments of Cultural Heritage, radical measures for improving its energy efficiency such are



façade renovation, and wall insulation weren't an option. Still, the hotel management introduced some measures which haven't affected the look of the building. They replaced parts of the windows and installed sensors which resulted in reducing the bills for heating and cooling.

Besides, they tapped into renewable energy sources and following from this the solar collectors were installed, and when they built in the calorimeter, it was possible to measure amounts of heat generated in the collectors. The solar collectors are used for heating of sanitary water or as an additional source of heating energy. Their usage brings in the reduction of heat energy bill up to 70%. This turn to solar power was set off by a financial benefit as well as a contribution to environmental protection. Having in mind the estimates, in two to three years it is expected to get the complete return on the investment.

The hotel also has contractors in the recycling industry, so they are obliged to do waste separation according to







counts – at the hotel restaurant, on dry cleaning service and conference room rental. There is also free Wi-Fi Internet connection at the hotel and free coffee and tea in the room.

This hotel is recognised as a corporative event venue thanks to the excellent facilities and latest equipment of the conference rooms, which allowed for long term cooperation and close relationship with a number of the companies to be established regarding conferences, seminars and educations.

There are two modern conference rooms with natural light, air-conditioning, high-tech equipment and free access to the Internet which are at guests' disposal within the business package. The smaller conference room Milan is suitable for various conferences and meetings for the number of attendants that do not exceed 25 people, whereas the bigger room Victor can accommodate up to 95 peo-



waste categories in order to increase the process efficiency. They also installed grease separator unit which is emptied every three months by a company specialized in this field. This is only a small section which the hotel management have chosen for its contribution to environmental protection.

All hotel guests get a notification that water dissipation is a complete wastage of a valuable resource, and if they want to take part in reducing the amount of water consumption, they can be involved merely by letting the hotel staff know that they don't want their towels and sheets changed on a daily basis.

## Business package

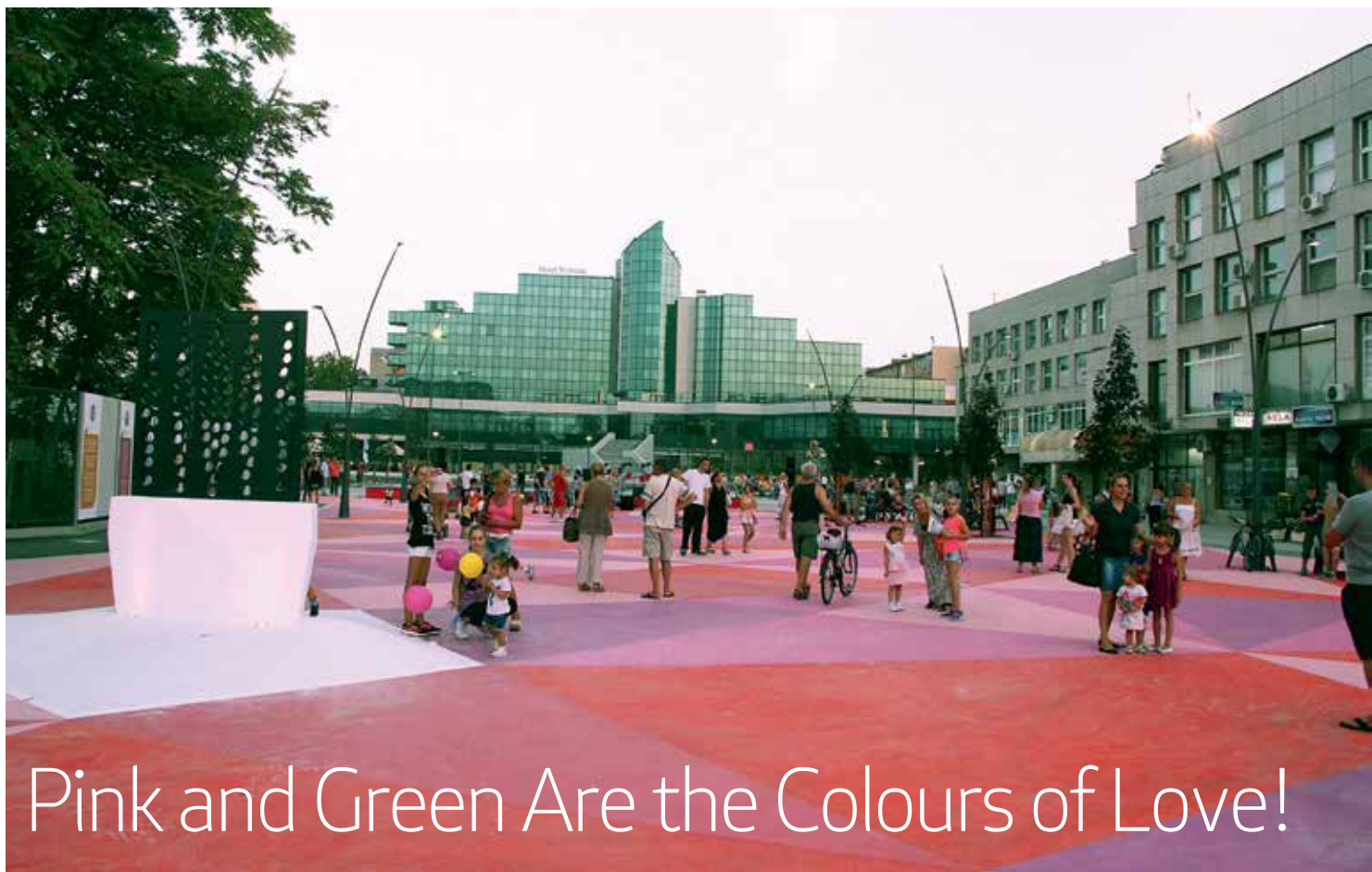
Apart from special accommodation price and a free room upgrade, within the business package guest can enjoy an early check-in, late check-out, as well as additional dis-

ple. Both rooms are ideal for conferences, symposiums, seminars, training sessions and presentations, corporative meetings, press conferences and other purposes too. The lobby is great for coffee breaks, cocktails, etc.

## Special offers

Upon every season change or an important holiday, there is a special offer for accommodation at this hotel, so for the winter they made a package "Winter and X-mas Relax". When it comes to guests who like to plan their travel and accommodation way ahead, there is a package "Early book discount" whereas for guest who would like to stay over for more night there is a package called "The longer you stay, the less you pay". Also, they have special prices as well as other benefits for corporative clients who make their reservations for their guests at the hotel Jump Inn.

Prepared by: Tamara Zjacic



# Pink and Green Are the Colours of Love!



Nebojsa Zelenovic, Mayor of Sabac

S abac is located in the north of northeastern Serbia, and it covers an area of 795 square kilometres inhabited by around 130 thousand people.

Its citizens speak proudly about towns' past – significant uprising battles, the first primary school in the country after Turkish rule, the flourishing economy of the city destroyed by the Second World War, famous people... Inhabitants of Sabac are also “bragging” about the present times – tourist events, the sports association with the most members in the region and the bohemian spirit for which Sabac is symbolically called “little Paris”.

Not all of the towns' glory has been left in the past and the project of “Sava Park” is evidence of that. Its realisation will contribute to the greening of 300 hectares on the banks of the Sava, which will provide shelter from city bustle to the citizens.

Who could give us a better insight into the life in Sabac than the Mayor himself? Nebojsa Zelenovic has been the head of the city since 2014 and talking with him we have found out more about the cultural centre of the Macva district.

**EP** *What makes Sabac stand out from other cities in Serbia?*

**Nebojsa Zelenovic** Sabac is by far an unusual city for Serbia. The authorities of Sabac renounced the part of its power in decision making and transferred it to the hands of the citizens - they directly declare how the money collected from

the property tax will be spent. We are committed to investing in culture – compared to other Serbian towns and municipalities, Sabac gives most for those purposes, even seven per cent. On top of everything, it is the only city where the ruling party doesn't rule the city.

**EP Sabac has huge agricultural potentials. How do you invest in the development of those capacities?**

**Nebojsa Zelenovic** Irrigation proved itself to be the most cost-effective economical measurement which has been

**Compared to other Serbian towns and municipalities Sabac is giving the most to culture, even seven per cent**

best shown in the case of producers of strawberries from Pocerina. Producers began cultivation of this fruit at few hundreds of hectares. In 2008, the City of Sabac decided to help them by subsidizing the cost of digging deep wells. When they got the main condition for the high-quality strawberries – water for irrigation, the expansion of production has started. Now strawberry spreads out at more than 1200 hectares. The City of Sabac gave half of the money needed for digging wells, respectively 20 euros per meter. Ever since then, more than 500 wells were dug and, during the season, the fruit growers earn more than 15 million euros from strawberries.

We have been investing for years in the improving of the genetic composition of cattle, crops and vegetables.

**EP Over the past few years, Sabac had a series of projects which were promoting sustainable development. Which projects are current and which ones are in the beginning?**

**Nebojsa Zelenovic** The best example for promoting sustainable development would be our Detailed Regulation Plan of "Sava Park". A 4.5-kilometre long park along the Sava River will be designed and built to meet the highest standards of sustainability. The planned objects must use clean energy in a certain percentage. A system of canals that follow the soil formation was designed to drain the terrain.

The city also adopted a decision on the making of Sustainable Urban Mobility Plan. Sabac is hand in hand with Krusevac, a pioneer in this field. This kind of plans are being made in Europe for a long time so we will implement their methodology. Promoting the sustainable types of mobility such as walking, biking and reduction of private cars' domination on the streets will decrease carbon dioxide emissions and improve public and environmental health and the result will be nicer, pleasant and safe streets. The plan will give solutions to a different arrangement of public space, modification of street regime, widening the pedes-

trian zone, restriction on parking use in the streets, the introduction of public transport and bicycle paths, greening of the streets and increasing the safety of all of the participants in the traffic. The ultimate goal of all of these measures would be life quality enhancement for all of the citizens.

In addition, the project of insulation of residential buildings covers more than 90,000 square meters. The Public Utility Company "Toplana-Sabac" plans the realization of the project of remote control and management of district heating substations in district heating. The



### **FOUNTAIN, GREENERY AND PINK CONCRETE BROUGHT LIFE BACK TO THE SQUARE IN SABAC!**

The Sabac Square of the Victims of Fascism with its unusual design competes with many European spaces used for the same purpose. After thirty years of dysfunctional existence, a two-month reconstruction of the city core was completed in 2015. At that particular place, thousands of citizens were shot during the Second World War to whom the square was devoted. The pink and red colours of the space symbolize at the same time the honouring of ancestors and their shed blood, but also the joy of life and the pursuit of the brighter future.

The ambient is further enriched with greenery. The noise of children from the playground there also emphasises its vigour. There is a fountain as well. Since the nozzles are located beneath the floor and are covered by a grid, they can be shut off if necessary and the central city area can be used unhindered. The initial steps towards sustainable urban mobility have been made by Sabac right here. The first bicycle path in the town extends along the edge of the square. The inhabitants of Sabac made the first turn of the pedals on this track on the same day when the square was open to the public. Serbian urbanists once evaluated the reconstruction project as one of the most avant-gardes on the soil of our country. Its designers were young architects of the Public Enterprise "Plan".



The arrival of the Japanese company "Yazaki" to Sabac is **the largest greenfield investment in Serbia**

The one-stop-shop system allows investors to complete **all jobs in one place** with the support of an efficient local administration

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project results would be savings in heat distribution, decreasing fossil fuel consumption and cutting down carbon dioxide emissions.

**EP** *The main focus of this issue is clean energy. Tell us about the estimation of potentials of your municipality in this field.*

**Nebojsa Zelenovic** The city adopted the document Energy policy of the town of Sabac. It is defined that Sabac should achieve energy independence from fossil fuels by 2050, which is in line with strategic documents on the level of Serbia and in accordance with the EU directives. We have renewable energy sources such as biomass, geothermal, and waste energy and solar energy at our disposal. Their amount is sufficient for the city to be independent of the dirty fuels by 2050.

**EP** *Is Sabac investing in clean energy?*

**Nebojsa Zelenovic** The projects in the field of biomass and waste energy exploitation speak in favour of this. The project of thermal insulation of existing buildings should be also mentioned because energy savings could be considered the renewable source of the highest potential. For example, thermo-insulated housing objects have proven that it is possible to achieve a reduction in consumption between 40 and 55 per cent. Heating bills for apartments in thermally insulated units where owners can manage their own consumption are up to 2.5 times lower than the bills in cities where heating is

charged on a flat rate and where it is not worked on improving the isolation.

**EP** *What is your opinion – how much are the citizens of Sabac aware when it comes to ecology? Does your municipality strive to improve their ecological awareness?*

**Nebojsa Zelenovic** After the project of thermal insulation of residential buildings, which the city supported by subsidizing 50 per cent of the costs, citizens' awareness has been raised and there are examples showing that they have become proactive in applying energy efficiency measures. Some residential communities have gone a step further by investing in replacing lighting in buildings and installing LED lights. In addition, the appointment for citizens' consultation with experts on how to save energy and what measures to use to reduce energy consumption has been introduced in the Public Utility Company "Toplana-Sabac". In the last six months, more than 150 citizens discussed the improvement

### WHO IS NEBOJSA ZELENOVIC ?

Nebojsa Zelenovic was born in Sabac, where he has finished the elementary and high school, in 1975. He graduated from the Law Faculty in Belgrade. Nebojsa was head of the Department for Social Activities of the City Administration of Sabac (2009-2010) and director of the Branch Office for the Macva region of the Republic Health Fund (2011-2012). He was a member of the National Assembly of the Republic of Serbia from 2012 to 2014. He was elected Mayor of Sabac at the City Assembly in 2014 and the citizens reelected him in 2016.

of energy efficiency in their facilities with the engineers of the heating plant. We conducted a survey in the suburban settlement Letnjikovac, in which a wood chips boiler was installed and put into operation. More than 100 households have expressed interest to participate in its construction and to join a small district heating network that will use some of the renewable energy sources such as biomass or geothermal energy, using thermal insulation of homes as energy efficiency measures.

**EP** *In October, an event called “Klimaton” was held in Sabac, during which young experts sought solutions for environmental problems. It was organized under the auspices of the Serbian Chamber of Commerce and the United Nations Development Program (UNDP). How did this cooperation happen?*

**Nebojsa Zelenovic** The Startit Center successfully works in Sabac for almost a year with the city’s full support. We want to open the space for young people who are close to the startup community or are part of it and deal with smart solutions in order to be active members of the local community. Thus, this event, which was organized by Startit Center, came to us, where we could hear exceptional solutions for waste management in the territory of the town of Sabac.

**EP** *Why should investors invest in Sabac?*

**Nebojsa Zelenovic** Sabac is the best place for investments in Serbia, which is confirmed by numerous awards in the

The “Financial Times” has also ranked our city on the list of **ten European micro cities** for 2018 and 2019, according to a foreign direct investment strategy

past period. We are double champions of local development in the competition organized by NALED and Radio Television of Serbia under the auspices of the Ministry of Public Administration and local self-government and in partnership with the Development Agency of Serbia. The “Financial Times”, a prestigious international magazine focusing on economics, has also ranked our city on the list of ten European micro cities for 2018 and 2019, according to a foreign direct investment strategy. The Sabac Free Zone is also the recipient of two awards for new investment and training of the workforce. Sabac has the largest industrial zone in our country, which spans 600 hectares. By purchasing a plot, investors get land fully equipped with infrastructure. The Japanese company “Yazaki”, whose arrival to Sabac is the largest greenfield investment in Serbia, is also operating here. We are fastest in issuing use and building permits, and we have established a one-stop-shop system for investors that enables them to complete all jobs in one place with the help of efficient local administration.

Interview by: Milan Zlatanovic



## PET FOOD MANUFACTURERS ARE EXPERIMENTING WITH INSECTS INSTEAD OF MEAT

It is now a well-established fact that there is a link between human meat consumption and climate change, thanks to the CO<sub>2</sub> and methane emissions that come from raising and transporting cattle and pigs. Since pets are responsible for 20 per cent of global meat consumption, some pet food manufacturers are turning to insects instead of beef to make their products.

According to the BBC, one pet food manufacturer says that 40 per cent of its new product is made from black soldier flies, which are an excellent source of sustainable protein. The food comes from UK startup, but does it meet your dog's nutritional needs?



Pet diet expert at the Royal Veterinary College, Aarti Kathrani, says that the flies can be a useful part of your pet's diet, but more research is needed.

"Insects can be a very useful source of protein," Kathrani said. "More studies are needed to show how much of these nutrients can actually be absorbed by a dog's body— but some studies suggest that insects can provide nutrients for dogs."

Since they use a smaller percentage of water and land, flies do produce protein more efficiently than cows. However, the environmental effects of feeding your dog instead of meaty food go much deeper.

Analysis results showed that when societies become wealthier, people opt to muscle meat rather than meat from internal organs. Those organs, also known as offal, are just as nutritious, so it gets made into pet food. Which concludes that dog food is just as sustainable (or

unsustainable) as human meat consumption.

And, if we wean dogs off of meat and switch them to insects, what would we do with the offal?

Insects in cat food can be a different story as cats to be more picky with their food because they can't make taurine, an essential amino acid. They do get their taurine from meat and fish, but Dr. Kathrani says that there are insects that also contain taurine and could be useful for a feline diet.

In addition to, other competitors have popped up in the pet food market that incorporating fly protein, including Insectdog, Entomapetfood, EnviroFlight, Chippin Wilderharrier.

Source: [Inhabitat](#)

## SWISS SOLAR ROOFS COULD PRODUCE 83% OF ALL POWER DEMAND

Solar panels installed on every roof across Switzerland could produce 83% of the nation's entire electricity demand.

That's the calculation made by the Swiss Federal Office of Energy, which worked out potential generation by combining maps from Swisstopo with weather data from Swiss Meteo.

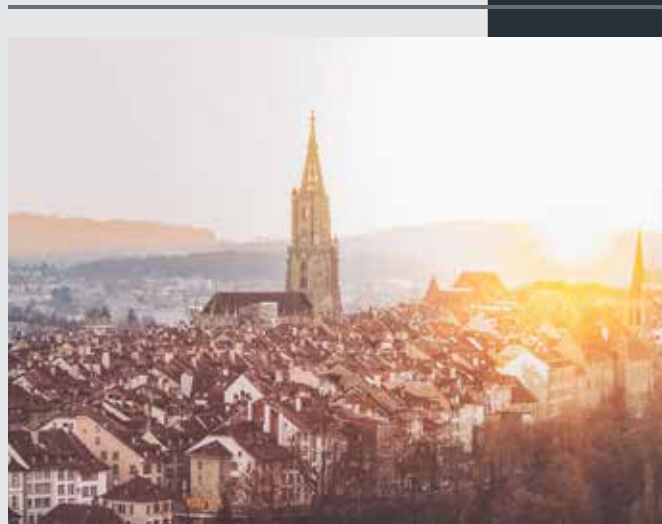
It worked out a countrywide rollout of panels would produce around 50tWh of electricity a year – total annual demand is 60tWh.

The estimated covering the nation's roofs would cost around CHF100 billion (£76.7bn), about 15% of Switzerland's annual GDP.

At a price of CHF0.08 (£0.06) per kWh, the Swiss Federal Office of Energy estimates these solar panels together could produce CHF4 billion (£3.1bn) worth of electricity in their first year and CHF108 billion (£82.8bn) over their 30-year lifetime.

Every year Switzerland currently produces 64tWh of power and consumes around 60tWh.

Source: [Energy Live News](#)



## SEEDS ON THE MOON STARTED TO SPROUT FOR THE FIRST TIME – BUT QUICKLY DIED

China has taken a major step toward long-term space exploration. Earlier this month, the Chinese moon probe 4 carried a container with cotton, mustard and potato seeds, yeast and fruit fly eggs to the moon's far side (facing away from Earth), and early this week, the China National Space Administration said that those seeds started to sprout. Unfortunately, temperatures dropped and killed the plants.

According to the BBC, the project was designed by 28 Chinese universities, and the experiment was contained within a canister 7 inches tall and weighing about 6.5 pounds. It was designed to test photosynthesis and respiration, which are processes that produce energy.

The plants were in a sealed container on the lunar lander, and the hope was that the crops would form a mini-biosphere. Inside the container, the organisms had a supply of air, water nutrients to help them grow. The scientists said that keeping it at the right temperature was a challenge, because of the wild temperature swings on the moon, which ultimately killed the first sprout.

If the experiment worked, astronauts could potentially begin to harvest their own food in space. That would be incredibly useful for long-term space because they wouldn't have to return to Earth to resupply. Although the sprout died, the experiment is a move toward this goal.

But could these experiments contaminate the moon? Generally, scientists don't believe this is something we need to worry about, especially because there have

been containers of human waste on the moon for 50 years thanks to the Apollo astronauts.

The consensus among experts is that the sprout was "good news." Fred Watson, astronomer-at-large at the Australian Astronomical Observatory, said that it could be a positive development for future space exploration.

"It suggests that there might not be insurmountable problems for astronauts in future trying to grow their own crops on the moon in a controlled environment," Watson said. "I think there's certainly a great deal of interest in using the moon as a staging post, particularly for flights to Mars, because it's relatively near the Earth."

Source: [Inhabitat](#)



## LONDON TO CREATE 'WORLD'S MOST ADVANCED' AIR QUALITY MONITORING NETWORK

London Mayor Sadiq Khan has announced the launch of what is claimed to be the world's most advanced and comprehensive air quality monitoring network.

The city is collaborating with Environmental Defense Fund Europe (EDFE) and Google Earth Outreach for the Breathe London project, which will use a range of fixed and mobile sensors to build a real-time, hyperlocal image of the capital's air quality.

They have equipped two of their Street View cars with air quality sensors, which will take pollution readings approximately every 30 at tens of thousands of locations across London.

A total of 100 fixed sensor pods will be mounted on lampposts and buildings close to known air quality hotspots and sensitive locations such as schools and nurseries.

The data, which will be available for public access, will provide "an unprecedented level of detail" about London's air quality crisis and deliver new insight into the sources of pollution.

The project, devised by City Hall and the C40 Cities, is being delivered by a consortium led by EDFE and funded by the Children's Investment Fund Foundation (CIFF).

Khan said: "London's filthy air is a public health crisis that leads to thousands of premature deaths in the capital every year as well as stunting the development of young lungs and increasing cases of respiratory illness. An issue this large and complex requires bold and innovative action so I'm proud that we're leading the world in establishing this new monitoring network – allowing Londoners to see the levels of pollution at a local level. This real-time data will also help us learn more about London's toxic air and help us to put the right policies in place to continue our clean-up efforts."

Source: [Energy Live News](#)



## UKRAINE TO BUILD ITS LARGEST EVER WIND FARM

Ukraine is to build its largest ever wind farm.

The European Bank for Reconstruction and Development (EBRD) has issued a loan of €150 million (£130m) to the country for the construction.

Upon completion, the 250MW project will generate enough renewable electricity to power around 100,000 houses, while also reducing carbon dioxide emissions by 470,000 tonnes annually.

EBRD President Suma Chakrabarti said: "This shows that Ukraine's commitment to carry out energy sector reforms is increasing the investor confidence needed to achieve the country's energy transition. This project is good news for Ukraine, investors and for the planet."

Source: [Energy Live News](#)



## GOLF IS NOT AS GREEN AS GRASS TEEN FINDS GOLF BALLS ARE A MAJOR SOURCE OF PLASTIC WASTE IN OUR OCEANS

The plastic waste in our oceans is a major environmental problem thanks to humans tossing out single-use items like take-out containers, plastic straws, water bottles plastic bags. But there is also an unexpected source of plastic waste that a teenage diver recently discovered — golf balls.

When 16-year-old Alex Weber was swimming in a small cove near Carmel, California two years ago, she looked down and discovered there were so many white golf balls in the water that she couldn't see the sand.

Weber immediately decided to pick up as many as she could. Over the next few months, she and her father hauled hundreds of pounds of golf balls out of the water and stored them in the garage. But with five coastal golf courses nearby, golfers continued to hit the balls into the ocean.

Eventually, Weber discovered Matt Savoca, a Stanford University scientist who studies plastic waste in the oceans. The teen emailed Savoca and invited him to look at her stash, which featured thousands of golf balls.

Weber's haul impressed Savoca, and he told her that she should write a scientific paper, but Weber didn't know how to do that. So the two ended up working together, and he started diving with her. They also brought kayaks so they could take the golf balls back to land.

After grabbing the golf balls, Savoca said they would put them on the kayak, and Weber explained that the kayaks were "so filled with plastic" that they had to tow them by swimming them to shore. The biggest threat to the pair while they were recovering the golf balls wasn't the sharks in the water. Instead, it was golf balls flying from the nearby courses right into the spot where they were collecting.

Golf balls are coated with a thin polyurethane shell, and overtime as the shells degrade, they emit toxic chemicals. The balls also degrade into microplastic pieces that marine animals eat.

Since the first discovery, Weber continues to collect golf balls and manages The Plastic Pick-Up to encourage eliminating ocean pollution.

Weber said, "If a person could see what we see underwater, it would not be acceptable."

Source: [Inhabitat](#)





## PORSCHE'S FIRST EV TO COME WITH THREE YEARS OF FREE CHARGING

German carmaker Porsche announced that buyers of its new all-electric Taycan model will get three years of free charging at stations across the United States.

The deal is part of a tie-up with Electrify America which operates almost 500 highway charging stations spread across the U.S. Each Taycan owner will now receive three years of unlimited charges of up to 30-minutes at each use.

Porsche has said its battery technology used in the Taycan car will be able to absorb charging rates of up to 350 kilowatts, almost three times greater than the current crop of Tesla batteries.

It said in a statement Monday that Porsche drivers using Electrify America's fast charging points, will become the fastest at recharging across today's car market, and a quick charge of 4 minutes would allow drivers to add 60 miles of range.

President and CEO of Porsche Cars North America Klaus Zellmer said that Electrify America's agreement with Porsche will provide a national infrastructure of fast charging that "frees Taycan owners from range anxiety."

The news release also unveiled Porsche-designed home chargers, noting that 95 per cent of charging occurs at home or work. All 191 U.S. dealers of Porsche cars will also install fast-charging points.

Porsche confirmed to CNBC last week it plans to double its production plan on the electric car it hasn't even released yet.

The German carmaker known for its sports cars and racing heritage said stronger-than-expected demand has led it to boost production on the Taycan from 20,000 to 40,000 units.

There is no official sticker price for the Porsche Taycan but it was reported in December that the car will come in three variants, ranging from \$90,000 to \$140,000.

That places Porsche's new offering squarely in the same pricing category of Tesla's more expensive models.

The Taycan will reportedly be unveiled at the 2019 Frankfurt Motor Show in September with showrooms receiving the vehicle by early 2020.



Source: [CNBC](#)

## SAMSONITE PACKS ITS SUITCASES FOR A SUSTAINABLE TRIP

Samsonite has introduced a new sustainable material that involves knitting together recycled plastic.

The travel luggage company says its innovative Neoknit product will enable a new generation of sustainable luggage to be made – it works by threading 100% recycled plastic bottle yarn together, the cuts needed on each panel and helping reduce the amount of waste produced during the manufacture of the bag.

Samsonite says products made of the material can be recycled again and again into new bags, enabling a fully circular process.

Don Wilson, Design Director Europe, said: "At Samsonite, we have been curious about the knitting technique for some time. We have seen the benefits of its usage in the apparel and shoe industry and when you think about it, it is a really smart way to produce a durable fabric product. With the Neoknit collection, we are really pushing the boundaries of construction and what it means to create bags in a more sustainable way."

Source: [Energy Live News](#)



“IF EVERYONE  
DOES A LITTLE,  
WE WILL  
ACHIEVE ONLY  
A LITTLE”

**D**o you think that small acts of individuals plunge into the river of synergy and reflect onto the society as a whole? You are not lonely in perceiving our world functioning this way. We are prone to comfort ourselves into the self-sufficiency of our small deeds for which we would like that they can indeed move mountains.

However, contrary to this general opinion, there are as well those who believe that thinking that we would achieve a great progress if every individual gives a small contribution is misleading. This is how our interlocutor Mirko Popovic feels about decisions that we are making on both personal and social level. He is an independent consultant on environmental protection, sustainable development and good management. Instead of making small steps such as turning off our computer when we are not using it, Mirko talks about the right measurements that give more significant results so we could thrive towards a low-carbon economy.

**EP** *What is the biggest obstacle for Serbia in environmental protection?*

**Mirko Popovic** It is hard to give a simple answer to this question. Nevertheless, it is important to reassess what is the biggest obstacle in protecting and preventing environmental degradation. I would remind you that about 2.5 million of citizens of Serbia inhale excessively polluted air, that almost a half is not connected to the sewage system, that 123 local governments are using dumps or, to put it nicely, non-sanitary landfills for waste disposal and that 40 local



**Mirko Popovic**, independent consultant on environmental protection, sustainable development and good management

**Mirko Popovic** was born in Gornji Milanovac in 1979. He has been active in the civil sector since 2003. He has collaborated with numerous civil society organisations, international organisations and public administration. He is one of the founders of the Coalition 27. He is the activist of environmental protection and actively supports the implementation of the Aarhus Convention and the adoption of European Union standards and norms in the field of environment, climate and energy policy. He is the author of several public policy analysis in the field of environmental protection, energy policy and good governance.





The most demanding areas of the Chapter 27 are **waste and wastewater management, industrial pollution and air pollution**. At the same time, those are the **most expensive areas**

governments have not sent their data to Serbian Environmental Protection Agency. Around 70 per cent of those dumps are not included in the planning documents. The system of the regional centres for waste management is not working. Only 7 per cent of our land is under protection.

So, the biggest problem is irresponsibility; degradation and pollution of the environment are only the consequences. The regulations in the field of environmental protection are disrespected and the institutions and authorities that are in charge of law enforcement do not bear any responsibility. There is no doubt that this is the biggest issue. Ever since 2009, when we adopted a set of environmental protection laws, we have had 4 structural changes in the ministry and 5 ministers. It is impossible to accomplish any significant positive change in such conditions. The environmental protection has not been a priority of a single government for the last 6 year. The regulations are created and implemented in order to satisfy the interest of capital and not the citizens' interest.

There is not enough money to be invested in the environmental protection, still two thirds, collected through an environmental fee, are being spent for other purposes. We are a society that is developing contrary to the principles of

sustainable development, which nowadays means that we have chosen not to develop. One community could make such choice but, in that case, it has to face the terrible consequences.

**EP** Which of the topics in Chapter 27 represents our weakest spot and why?

**Mirko Popovic** In 2017, the Minister of Environmental Protection announced that this negotiating chapter should be opened during June or December of 2018. December has come and that did not happen. Mid-year, the state secretary in the Ministry predicted different deadlines and announced that negotiations should start during 2019. I am reminding you that negotiations with the European Union were officially opened in January of 2014. The constant shift of deadlines does not contribute to the predictability of public policies and responsibility. Just the opposite.

The most demanding areas are waste and wastewater management, industrial pollution and air pollution. In the same time, those are the most expensive areas. However, I believe that lack of finance is not the biggest barrier. It is necessary to make brave and visionary political decisions. The European Union has clearly established that decarbon-

## DECARBONISATION AND ENERGY TRANSITION TOWARDS A LOW-CARBON ECONOMY REPRESENTS COMPREHENSIVE SOCIAL TRANSFORMATION!

At the margins of the conversation on the transition from the production of electricity from petroleum products to the use of clean energy, the notion of a fair energy transition is mentioned. We asked Mirko what does it refer to. He emphasised that it is not exclusively about the transformation of the energy sector.

“For this reason, a fair transition should be seen as a framework in which we advocate for the equality in access to energy resources, the suppression of energy poverty, the right of local communities to be the participants in the planning of the energy future and the owners of renewable energy sources and for creating a social policy that will prevent employees in the fossil sector to become losers of the transition and lose their jobs. The right to work should not be threatened by energy transition and it is necessary to work on the development of programs that will allow coal mining workers to acquire skills and knowledge that will enable them to find their place in the labor market. This requires long-term planning and putting the topic of fair transition on the agenda of decision-makers. In Serbia that is not the case at the moment.”

Photograph: Unsplash

isation is a key development concept. Serbia did not make such a decision. The dependence on fossil fuels and the energy system based on the exploitation of poor-quality lignite are essential obstacles. They should be eliminated at the political level. Technology and standards already exist. It is only necessary to apply them. That is not easy and cannot happen during the night. We have already lost 5 years, counting from the moment when the work on a new energy development strategy began. We have adopted a strategy that represents a defensive wall for further intensive coal exploitation. The contribution to reducing the greenhouse gas emissions that Serbia submitted to the United Nations Framework Convention on Climate Change is an unambitious framework. According to this document, emissions are not reduced, but increased. Environmental policy and negotiations with the European Union cannot and must not be managed with the help of a shell game.

**EP** *There are numerous studies of the harmfulness of each individual sustainable source of energy. It is certainly minor in comparison to fossil fuels. Yet, looking at all the advantages and disadvantages of pure energy sources, which one would you consider to be the cleanest?*

**Mirko Popovic** Allow me to disagree with you. There are even more studies pointing to the harmfulness of use of fossil fuels. Look at the latest report of the Intergovernmental Panel on Climate Change. Every intervention in the nature affects the quality of the environment and facilities for the

**“We do not increase  
the use of renewable energy  
for the Energy Community,  
but for ourselves”**

production of renewable energy are not an exception. Nevertheless, these effects are incomparable with the impact resulting from the exploration of coal and other fossil fuels. Furthermore, Serbia is dependent on the import of Russian gas.

A poorly planned and poorly implemented wind power plant or hydroelectric power project can inflict irreparable damage. For this reason, attention should first be paid to the process of project planning and implementation, plus - compliance with standards, especially those relating to environmental impact assessment, should be ensured.

Serbia has the potential to use wind, solar and biomass energy that can provide energy transition and decarbonisation of the energy sector. These are three key resources whose further exploitation should facilitate the transformation of the energy sector. Key barriers are not in the domain of economy or availability of resources, their





## ECOLOGY AS AN ESSENTIAL PART OF ALL OTHER POLICIES

It is necessary to pay attention to another fact regarding the policy of environmental protection, which is an extremely multisectoral policy, says Mirko Popovic .

“We cannot expect progress in environmental negotiations if at the same time we do not allow the integration of environmental protection into other policies. Also, progress in environmental negotiations is impossible without the rule of law. I recall that the Stabilisation and Association Agreement, currently the only binding document in the EU accession process, obliges the signatories to enable environmental issues to be fully integrated and linked to the requirements for harmonious social development from the very beginning. In addition, the signatories have committed to developing and strengthening environmental cooperation with the key task of stopping further degradation and improvement of the existing state in the field of environment. This agreement is binding both sides – both Serbia and the European Union. In my opinion, neither side is doing enough. So, we are returning again to the question of responsibility.”

**Serbia has the potential to use wind, solar and biomass energy** that can provide energy transition and decarbonisation of the energy sector

nature is administrative. Without investing in the development of the network it is possible to install about 900 MW wind farms in this moment. The focus should be on biomass utilisation. Biomass is a locally available resource that could, first of all, be used by the local community to transform the district heating system, reduce pollution and cut costs. Energy transition does not only include the electricity generation. At the moment, Serbia has a negative balance when it comes to gas imports and exports of raw wood. Instead of creating opportunities for the exploitation of wind, solar and biomass, Serbia has chosen to pay attention to the development of small hydropower plants. How and when we, as a society, have chosen to follow this strategic development direction? Small hydropower plants make up the production of renewable energy in a negligible percentage and, on the other hand, they inflict irreparable damage to local natural resources, primarily due to the lack of data necessary for project planning.

**EP** *How could the state encourage a higher level of investment in the clean energy sector?*

**Mirko Popovic** First of all, by removing administrative barriers. The quota system for renewables does not respond to a reality. According to the International Renewable Energy Agency (IRENA), the available wind energy potential in Serbia, in 2017, was 29,670.0 MW and the sun was 6,901.7 MW. Both wind and solar energy are becoming a market competitor to the coal fired power plants and, by 2020, it is expected that the price of wind energy will be equalized to the price of energy produced by burning coal, without incentives! What are we waiting for? The current regulatory framework is unfavorable for the development of micro-projects in the field of solar energy. Citizens and small consumers cannot invest in solar panels and expect returns of investments within a reasonable time. It is necessary to introduce the net metering system as soon as possible and allow small consumers to become prosumers (producers and consumers of electricity at the same time). It is costly but investing in the harmonization of thermal power plants with the Directive on large fireplaces also costs. Croatian Municipality of Krizevci implemented a project for the construction of a solar plant of 30 KW. The project was financed by citizens themselves with expected return on investment within 5 to 7 years. Without any incentives. This means that the transition is possible and that the citizens are interested. We are investing in the past instead of investing in the future. Without serious investments in energy efficiency, a serious development of the market of renewable sources will be difficult. Household energy consumption represents almost 50 per cent of total energy consumption, while the intensive energy sector dominates the economy. That is unsustainable.

There is another measure that is necessary. It is a dialogue with stakeholders and enabling citizens to get


information. Let's leave those talks about turning off our computers and mobile chargers when we are not using them out. A long time ago, David MacKay has sent a clear message: "If each one of us does a little, we will achieve a little bit." Informing the citizens about effective measures for improving energy efficiency and efficient use of fuels, especially biomass, in households is needed. If a wood stove is a measure of development, then we chose not to develop.

**EP** *The goal of our country is to consume 27 per cent of the RES energy by 2020. Observing the current situation, does it seem real to you?*

**Mirko Popovic** It does not seem real to me and it does not seem to me that the present authority has a serious intention to achieve that goal. Our relation to the commitments undertaken within the Energy Community is not honest and responsible. We do not increase the use of renewable energy for the Energy Community, but for ourselves. Serbia is far behind the projected targets for 2016. We achieved 20.9 per cent of renewable energy in gross final consumption and 23.8 per cent was projected. The result is lower than it was in base year 2009. Fulfillment of the target for renewable fuels in transport is 0 per cent, and the goal was 10. I will repeat a key requirement once again - responsibility to commitments and citizens.

Interview by: Jelena Kozbasic





# THE FIRST SOLAR PLANT OWNED BY THE CITIZENS IN CROATIA

Even though the price of solar panels is constantly decreasing, a solar plant is still out of most citizens' budget. However, what if we split its construction costs with 52 people and get a 4.5 per cent annual interest rate on the invested funds? Sounds tempting, right? Technological solutions are available, and models of citizen investments are known from before and used for years in states like Germany and Denmark.

## Croatian Citizens Took Energy into Their Own Hands!

Cooperative is a concept and practice developed among Slovenian tribes at the end of the 19th century. It was originally used to describe the village community of goods. All members of the cooperative lived together, and cultivated land that belonged to the community and no one could in-



The plant was put into operation  
in **September 2018**



herit it independently. The development of individualism and the breakthrough of the monetary economy have influenced the “decay” of its original meaning.

Today, more than a hundred years later, the cooperative does not necessarily have a coexistence of its members, nor does it relate exclusively to agricultural activities. In this manner, in the neighbouring country Croatia, the Green Energy Cooperative (ZEZ) operates in the energy sector.

In May 2018, the ZEZ launched a campaign to raise money from citizens to build a photovoltaic power plant in the town of Krizevci. In only ten days, 230,000 kuna (about 31,000 euros) were collected on the principle of microloans.

ZEZ's member, Sanela Mikulcic revealed to us that several months passed from the initial idea to the realisation. During that time, the ZEZ examined the legal framework and the way of involving citizens in such a project. “We were faced with the challenge of designing a legal model that fits into our legislative framework since this was the first collective investment in Croatia. We have also been slowed down by different administrative requirements”, Sanela said.

All individuals and legal entities had the opportunity to invest money in the implementation of the project “Krizevci Sun Roofs” by granting loans to the ZEZ for ten years with a 4.5 per cent interest rate annually. The idea was that the local community would be the most advantageous from the “sunny roofs” so the citizens of Krizevci had a lead over other interested investors. About 30 per cent of the investment came from citizens of the municipality and the surrounding area.

The minimum stake was 1,000 kuna (about 135 euros), and the maximum was limited to 10,000 kuna (about 1,350 euros) in order to include as many “micro-investors” as possible in the project. Fifty-three citizens entirely financed a solar power plant in Krizevci with an average contribution of 580 euros.

The crowning success of the “green energy cooperatives” from Krizevci is a 30kW power plant installed on the roof of the administrative building of the Development Center and the Technology Park. The power plant was put into operation in September 2018. The projected savings for electricity over a one-year period is 36,000 kuna (about 4,850 euros).



Cooperatives encouraged the **development of the local community** and the creation of **green jobs** and gave a positive contribution to the **health of people** and the natural environment



The Green Energy Cooperative (ZEZ) was established in 2013 within the project “Development of Energy Cooperatives in Croatia” implemented by the United Nations Development Program (UNDP) in Croatia. At the end of the project, it continues to act independently. Today ZEZ is an umbrella organisation for the field of energy cooperatives in Croatia and the region. It is one of the co-founders and leader of the Energy Department at the Ethical Finance Co-operation Fund (ZEF). As a member of the Energy Community, the ZEZ coordinates the work of the technical group for the involvement of citizens in the development of renewable energy sources. The mission of this cooperative is to help citizens in the use of clean energy, and its members are experts and activists with long-standing experience. They stimulate the development of socially responsible business in the energy sector, contribute to social equity and support environmental protection. ZEZ is the main bearer and conceptual beginner of “Krivevci Sun Roofs”.

Based on the contract, the user of the power plant pays the consumed energy to the ZEZ. All surplus that is not spent on the site is transferred to the electricity distribution network. Croatian Electric Power Company *Opskrba* buys the surplus. In three months, the Krivevci solar plant produced 5,039 kWh, of which 250 went into the grid.



**Fifty-three citizens entirely financed  
a solar power plant in Krizevci with  
an average contribution of 580 euros**



Money earned from the electricity retailing is being used for repaying the loan with interest to each investor. After the expiration of ten years, the power plant will be transferred to the ownership of the Development Center and the Technology Park Krizevci.

By investing in this project, besides the financial return of funds with interest, the cooperatives encouraged the development of the local community and created green jobs. They also have made a positive contribution to the health of people and the natural environment by reducing the emissions of harmful gases that are the result of the combustion of fossil fuels – and consequently through reducing air pollution. Actively participating in turning towards the future that is characterised by zero emissions and renewable sources, they increased energy independ-

ence and security of Krizevci while at the same time they reduced energy poverty.

The sun's rays replaced one portion of fossil fuels in energy consumption. This contributed to the release of about seven and a half tons of carbon dioxide into the atmosphere less than it would have been the case if the fossil fuels were burned on the place of the solar plant.

Feasibility study for setting up of a solar PV power plant was carried out in partnership with the Regional Energy Agency "Sjever". The organizers of the "Start Something of Your Own" (*Pokreni nesto svoje*) program, the international organization for environmental protection "Greenpeace", the European Federation of Renewable Energy Cooperatives, the European Association "Energy Cities", the town of Krizevci and many more also provided the support to the ZEZ and the citizens.

Croatia's interest in investing in renewables has increased thanks to the example on the use of solar kilowatts from Krizevci.

"We are currently finalising the development of the ZEZ-*Invest* platform, which will facilitate our communication with investors and the presentation of our activities. We also conduct several Horizon projects. Within one of them, named Compile, we strive to apply batteries and monitor the state of the micro network and the use of artificial intelligence in energy management. The plan is to place a charger for electric vehicles, which will use the surplus of produced energy, next to the building", explained Sanela Mikulcic.

Prepared by: Jelena Kozbasic



# Smart Homes and Smart Cities Do not Mean Much Without Smart People



**Professor Branislav Todorovic, Ph.D.**, President of the Serbian Society of HVAC&R and Editor-in-chief of the KGH magazine

**W**e talked to Professor Branislav Todorovic, Ph.D., about the air conditioning, heating and refrigeration sectors, and his project parameters used for calculation in all projects for heating and air conditioning in the former Yugoslavia. We asked him if we can see and experience healthy, sustainable buildings, localities, and cities in Serbia and whether the Serbian economy can produce adequate and high-quality products and systems for ventilation and air conditioning. He revealed to us why he compares buildings with the behaviour of the human organism, and he also advised young colleagues and students.

**EP** *In the beginning, I would like to refer to the ceremony in May which marked the 150<sup>th</sup> anniversary of the Union of Engineers and Technicians of Serbia. On that occasion, you received the Golden Plaque from the Union. How important is this recognition for you, given the fact that you have been a long-term president of the Serbian Society of HVAC&R?*

**Branislav Todorovic** The anniversary of the Union of Engineers and Technicians of Serbia is a grand celebration of the Serbian engineering profession, which was organised in 1868, and began its operations among the first in Europe. The Golden Plaque of such an institution is indeed a great recognition and satisfaction for more than 50 years of my commitment to the engineering profession which dates

Professor Branislav Todorovic, Ph.D., is a regular member of the Academy of Engineering Sciences of Serbia and a winner of an honorary doctorate of the oldest Romanian Technical University Universitati Politehnica Timisoara. He was awarded the gold medal of the European Association REHVA, the Belgrade October Award, the ASHRAE Awards for Teaching Achievement and Plaque for International Activities and the Golden Plaque of the Union of Mechanical and Electrical Engineers of Serbia, where he is an honorary member. He is on the international list of lecturers in the category of "distinguished lecturers," he runs the traditional international conventions of HVAC which are internationally recognized and is hired as a visiting professor at the Nanjing University in China.

Our engineering profession is among the first in Europe which began with organised work as early as 1868 by forming the **Union of Engineers and Technicians of Serbia**

these works, I devoted myself to determining the outside temperatures in Yugoslavia's cities for which it was necessary to provide heating capacities to reach a specified temperature in buildings. It was already observed by that time that the outside temperature had a constant tendency to increase, and now we know that this is due to global warming of the atmosphere. Our famous scientist Milutin Milankovic was suggesting precisely that in his works.

**EP** *What does the HVAC field cover today?*

**Branislav Todorovic** Today, the HVAC field involves many things and cannot be separated from the civil engineering, architecture, healthy environment in facilities designated for working, producing, living or curing. At the opening of this year's HVAC Congress, I pointed out that only medicine is probably more comprehensive and responsible to people, their health and sense of comfort than the HVAC sector today.

**EP** *There is more and more talk about sustainable buildings, settlements, and cities, with zero emissions of carbon dioxide. Will it become a reality in Serbia, or will it only remain a beautiful story?*

**Branislav Todorovic** We, engineers, are confident that our cognition is continually increasing, and HVAC congresses



from selecting my thesis topic and graduation and the work in the field of heating, ventilation and air conditioning, or as it is popularly known in our practice, in the HVAC profession.

**EP** *Your project parameters are used for calculations of all heating and air conditioning projects in former Yugoslavia. How did that come about?*

**Branislav Todorovic** Already my first professional works were related to meteorology, that is climatic conditions. In

and other expert gatherings are an opportunity for direct exchange of knowledge, experience, skills, and preparedness. But that is not enough. It is necessary to adapt not only the school and university programs but also provide opportunities for the realization of knowledge in practice. It once existed in our country, but today it has almost disappeared. HVAC congresses have always been of particular importance because they have been enabling precisely that. Progress is also possible in our country, but it will be significantly be-



hind. There is a lack of domestic factories, laboratories, and practices.

**EP** *How much is the economic sector in Serbia able to produce quality products and systems for ventilation and air conditioning?*

**Branislav Todorovic** There used to be a lot of them once. Today there are private producers in this field, and this was a pleasant surprise for me at the accompanying exhibition organized within the HVAC Congress. They manufacture many spare parts and operate in limited conditions, which includes financial constraints and competition with renowned international equipment manufacturers. If all were to be systematically solved, from professional education, through the creation of the conditions in the field of production, practice, and maintenance to a positive environment for employment, I am convinced that we would successfully be able to catch up with the world. Of course, with a delay.

**EP** *Is it possible to improve energy-inefficient buildings to reduce energy dissipation during winter and overheating in the summer?*

**Branislav Todorovic** Of course. I think that our profession judging by its importance will be the “craft” of the future. In my opinion, perhaps only medicine is more significant. However, buildings and apartments in private ownership will not be able to improve energy efficiency that quickly

until the financial situation of our people is improved. In all likelihood, it will take some time.

**EP** *You often compare a building with a human organism. Explain to us where you see the resemblance.*

**Branislav Todorovic** The human body needs air, or oxygen, also the maintenance of constant body temperature, in which the blood circulates due to a continuous function of the heart which resembles the pumps in heating systems. When the outdoor temperatures are high, “sensors” act on the surface of the skin. The body temperature is then maintained

### PROFESSOR'S MESSAGE TO YOUNG COLLEAGUES AND STUDENTS

“A challenge, whose significance can be measured with the one belonging to medical sciences, is everything that is related to energy, especially concerning environmental conditions, the use of renewable energy sources, the maintenance of living conditions and those on which the healthy environment in buildings and apartments depends. My advice for them would be to dedicate all their attention, if not the life calling itself, to energy, and especially the one that comes from renewable sources”, Professor Todorovic advised young colleagues and students.



business web portal on **clean** energy

by the increased blood circulation towards the surface of the skin where the blood vessels dilate, in this way the heat is transported to the exterior by the evaporation of sweat, or, as the engineers would say, “evaporative cooling” of the body. Whereas at low temperatures, the body is additionally heated by the increased muscle activity or trembling. All of this is controlled and regulated by the hypothalamus, the central system in the centre of the brain.

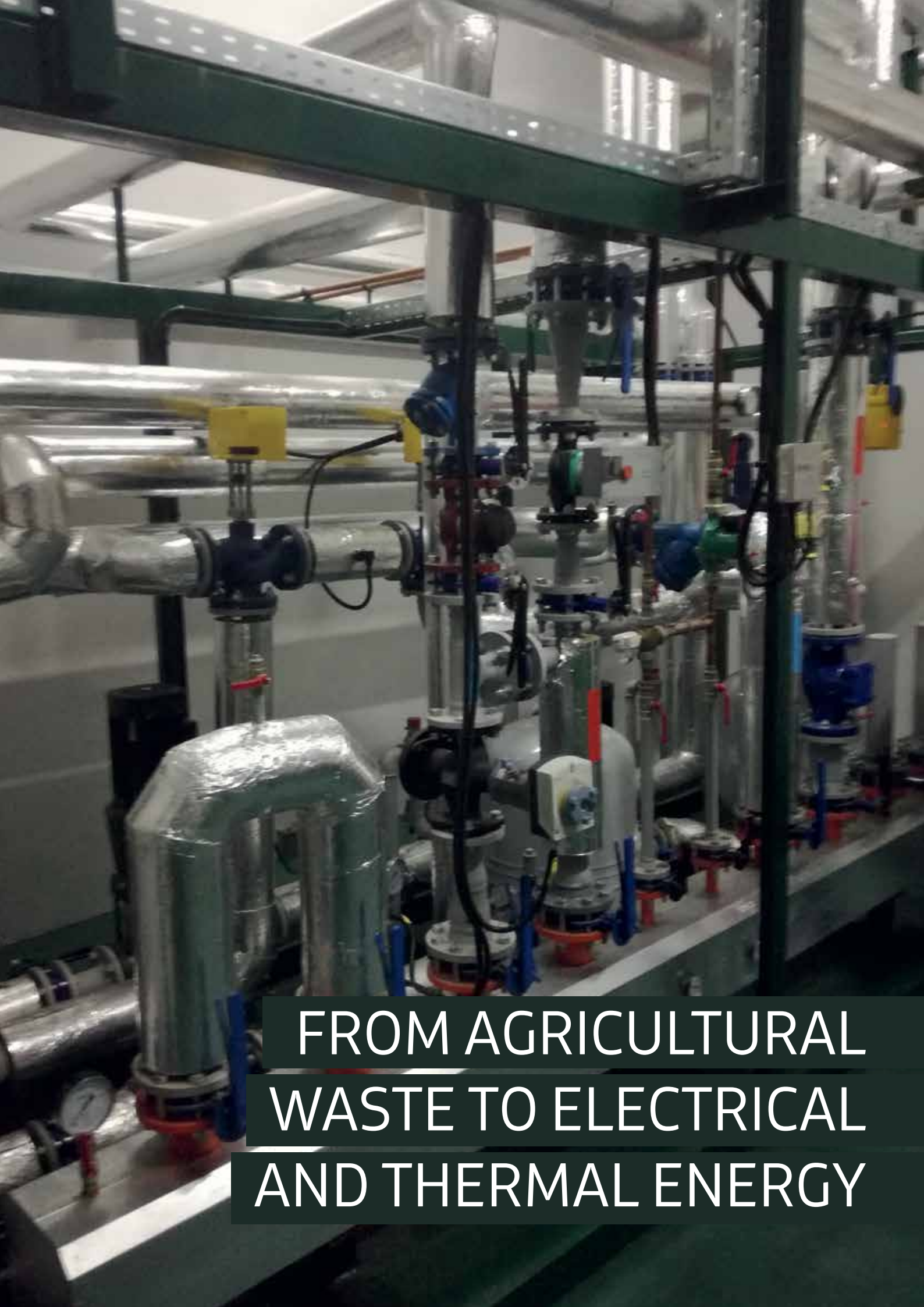


If all were to be systematically solved, **from professional education,** through the creation of the conditions in the field of production, practice, and maintenance **to a positive environment for employment,** I am convinced that we would successfully be able to catch up with the world

**EP** *Your lectures in the last few years are dedicated to smart buildings. You claim that the concept of smart buildings existed thousands of years ago.*

**Branislav Todorovic** The pyramids in Egypt were built before the new era, and every detail is the reflection of wisdom and knowledge. Not to mention that they were erected at a time when there were no computers, electronics and many other technical features that we can boast with today. I completely agree with the claims of many colleagues around the world that smart homes and smart cities do not mean much without smart people who use them or run them.

Interview by: Milisav Pajevic



FROM AGRICULTURAL  
WASTE TO ELECTRICAL  
AND THERMAL ENERGY



**B**y increasing the energy production from renewable sources, Serbia is one step closer to international environmental standards. One of the ways of obtaining energy from renewable sources is the use of biogas plants that occupy an important place in the 21st-century energetics.

The vision and mission of the Center for Energy Efficiency and Sustainable Development (**CEEFOR** ENERGY EFFICIENT SOLUTION) also include protection of the environment, and since their engineers have licenses and knowledge, lately more and more companies and businesses are hiring them for the development of energy audit reports.



ProCredit Bank has hired **CEEFOR** ENERGY EFFICIENT SOLUTION as a consultant for the development of the energy audit report for the construction of a small biogas plant with a 600-kW cogeneration power for the “Bioenergo 808” from Stara Pazova. According to the project, the purpose of the facility is to produce electric and thermal energy by combustion of biogas in a gas engine. Biomass will be mainly produced from corn silage and manure from cattle farms, with the addition of sunroot and biomass that is at disposal. The report aims to determine whether conditions, under which the possibility for construction of the biogas plant and the obtaining of funds from the earmarked credit line of Pro-Credit and KFW banks, are fulfilled.

**CEEFOR** ENERGY EFFICIENT SOLUTION company is also an authorised consultant for Green for Growth Fund and ProCredit bank, as well as for investors „Agro Plus Energo” from Sombor and „Bioelektro NAK” from Cestereg. For the projects’ purposes, the company’s team has developed energy audit reports for the construction of a cogeneration biogas plant with the installed capacity of 999 kW, that is 600 kW. The project of a biogas power plant is based on a closed cycle of substances that enter the renewable energy production process.



The **CEEFOR** ENERGY EFFICIENT SOLUTION team can help you in the development of energy audits, feasibility studies, complete project documentation (Preliminary Design, Conceptual Design, Project for Building Permit, Project for Execution of Works, As-Built Design) and economic and financial analysis.

All information about their consulting services, as well as the possibility for the supervision of the facility and technical control of the project, can be obtained at [info@ceefor.co.rs](mailto:info@ceefor.co.rs)

Prepared by: Sofija Nikolic



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# Integration of National Energy Markets Leads to Safer Future

66



Milos Mladenovic, Executive Director of SEEPEX

SEEPEX represents an organised electricity market in the Republic of Serbia. In its complexity and applied concept, it is a unique market in the South East Europe (SEE) region, and it brings many benefits to both direct participants and the entire Serbian economy. The implemented trading platform EPEX SPOT (the so-called ETS trading platform) offers proven reliability, security, and a recognisable environment to all SEEPEX participants. On the other hand, the achieved prices give a reliable price signal, not only to the participants in the electricity market but also to all potential investors in the Serbian economy.

Executive Director of SEEPEX, Milos Mladenovic, says that Europe's largest clearing house European Commodity Clearing AG (ECC AG) is responsible for the centralised clearing model (financial settlement and payment) with more than 20 European banks participating and which, besides for SEEPEX, performs this function for another 10 European energy markets. It is one of the best and most efficient solutions for financial settlement and physical delivery of electricity implemented in the European Union. The director explained to us that legal and financial legislation was completed as well, as an example of the best European practice applied for the first time in this extent in the region of Southeast Europe. This framework also enabled foreign companies to participate under completely equal conditions in the organised electricity market in Serbia, as

Photographs: (bottom left) by courtesy of Milos Mladenovic, (top) J.E Korpa/Unsplash

well as in all other far more developed markets in Western Europe. It is one of the most important factors of the SEEPEX spot market's success thus far (short-term delivery in Serbia).

**EP** *What is the strategic goal of SEEPEX and which countries in Southeastern Europe are currently included?*

**Milos Mladenovic** The main strategic goal of SEEPEX is to create a strong, stable and liquid market in Southeastern Europe. Of course, our ambitions include connecting with the neighbouring electricity markets (market coupling) as well as joining the MRC project and actively participating in the creation of a day-ahead and intraday market throughout Europe.

In other respects, SEEPEX is currently organising the spot market for Serbia. Aside from the most essential local market members, all the most important companies from the region and the EU that are active in the region of Southeast Europe will also participate in the trading platform. We plan to extend the operation of SEEPEX to some of the neighbouring countries in the region.

**EP** *Partner EPEX SPOT covers the power spot market in France, Germany, Austria, and Switzerland. What kind of experience and knowledge did this partner bring to our market?*

**Milos Mladenovic** EPEX SPOT is the biggest electricity exchange in Europe. As a strategic partner of SEEPEX, it has enabled the implementation of the best European practice in this field, when it comes to the trading platform itself, but also the single European clearing. The ETS trading system mentioned above is entirely the same as in all other markets incorporated in EPEX SPOT, which makes trading more comfortable and provides full security for potential participants. The experience and know-how that SEEPEX gains from EPEX SPOT, contribute to the compliance of the organised market in Serbia with the highest market standards of the most developed countries in EU. Consequently the market becomes attractive to all European companies present in the SEE region.

**EP** *Will the members of the market also be suppliers of electricity from renewable energy sources (RES)?*

**Milos Mladenovic** It is early for precise assumptions and predictions when it comes to RES producers' participation on the market. This is especially true if we consider that the traditional feed-in model is still in effect in our country and that the EPS is the only binding buyer from RES at incentive prices. Also, the installed capacity from the RES in the electric power system of Serbia is now relatively small. It will change with the construction of 500 MW planned



Photograph: Severin On/Unsplash

**The integration of national markets, both at a functional and corporate level, is the only approach that provides a safe and sustainable future for the electricity exchange in the region of Southeast Europe**

wind farms and with putting into operation most of this capacity by the end of 2019.

When some significant changes occur in this field, and announcements are that everything will be going towards the establishment of the incentive model of the market, SEEPEX will undoubtedly be one of the most reliable options for secure and transparent placement of this energy on the market. These changes primarily include the planned transition from the "feed-in" to the "premium feed-in" incentive model, which will undoubtedly contribute to the additional liquidity of the Serbian spot market along with the projected growth of the installed capacity of RES.

Currently, 18 companies are involved on SEEPEX, and the list can be seen at the following link: <http://seepex-spot.com/en/become-a-member/list-of-members>

**EP** *After the conclusion of the agreement on the establishment of inter-regional power exchange in Central and South-Eastern Europe in March this year, it was announced that a joint venture would be created, which would be an essential factor in the electricity market in the day-ahead (spot) field. Why is this particular area day-ahead vital and has the company already been formed?*

**Milos Mladenovic** The spot market is a commonly accepted name for the so-called short-term trade or the type of trade within a time frame day ahead. It means that for the trade agreed today delivery is made during the following day, as well as in a time frame within the day, where the delivery takes place on the very same day of the trade. As for the aforementioned corporate integration project of SEEPEX with the electricity exchange in Hungary - HUPX, ie. more precisely, the establishment of a unique business infrastructure, we expect a far-reaching positive impact, not only at the operational and corporate level regarding the further development of the organized electricity market but also at the strategic and political level for the entire Republic of Serbia. The merger of the business, professional and financial capacity of SEEPEX and HUPX will enable more efficient and cost-effective operation of such a united business infrastructure, although for the full realisation of this project a lot more work will still be needed. I firmly believe that this is an essential step towards further integration of the electricity market in the SEE region, and further joining the single internal EU market. At the same time, this example serves as a guideline for other actors in the region in which direction they should go, first of all, bearing in mind the fragmentation and size of the national markets, which are, in their own right, insufficiently liquid to ensure an efficient and sustainable business.

**EP** *It is clear that the common electricity market is not a novelty in Europe, although the experience that developed countries in many areas have often gives us the impression of unattainability. Could you explain why the common market is better, but also inevitable, for our region as well?*

**Milos Mladenovic** The past experiences and the latest trends in the EU so far, show that for the successful and sustainable functioning of national and regional organised (spot) markets, augmentation of the technical and financial capacity is critical. It provides the necessary liquidity and ensures a stable and robust reference price. Bearing in mind the size of the national markets in the SEE region, it can be said with great certainty that the integration of domestic markets, both at a functional and corporate level, is the only approach that provides a safe and sustainable future for the electricity exchange in this region.

**EP** *At a workshop organised in cooperation with the Serbian Chamber of Commerce in September, you announced the introduction of financial derivatives (futures) in the domestic*

## BENEFITS FROM THE ESTABLISHMENT OF THE SINGLE REGIONAL EXCHANGE

We asked Milos Mladenovic if institutions recognise the importance of the creation of a single regional electricity market as it is a condition for the stable energetics without which there is no sustainable development.

“After the establishment of a single regional electricity market, which is the inevitability that will be found in practice sooner or later, the economy and the citizens of the region will have numerous benefits. Among other things, this includes the improvement of competition in the field of supply, increased offer on the electricity market and the definition of a regional reference wholesale price of electricity. Consequently, there will be an improvement of the complete security of supply as well as the security of the operation of the power system,” says Milos, adding that the impression is that the most important regional factors, primarily at the political level, are not up to par with the whole region. “There are still individual national initiatives for the establishment of the small and fragmented spot markets, although it is quite clear that they cannot provide even essential sustainability, nor achieve a more or less liquid market and obtain a reliable reference price.”



**electricity market from 2019. How will the futures contribute to the stability of this market?**

**Milos Mladenovic** Futures are an entirely new product in the region, and they give a unique perspective of trade on the wholesale electricity market. The introduction of financial derivatives significantly improves the investment framework in the energy sector, as well as in the entire Serbian economy, given that it provides a long-term reference price and the possibility of predicting the movement of electricity prices on the wholesale market in the long run. It is known that for end customers (industry), and manufacturers the biggest threat to the company's success and sustainability of the business itself is the risk of price fluctuation of certain goods. This risk can be mitigated by using financial derivatives, as a sort of an insurance product against electricity price fluctuations, and for a more extended period in the future. The introduction of Serbian futures will indirectly contribute to the increase in liquidity of SEEPEX, which will provide a reference price as the basis for the operation of the Serbian market of financial derivatives.

**EP** *According to what can be heard in unofficial circles, the new increase in electricity price in Serbia is inevitable; just the exact date seems unknown. What are your predictions when it comes to the price increase for households and businesses?*

**Milos Mladenovic** The wholesale price on the stock exchange is formed according to the market principle, depend-

ing on the current supply and demand. In market economies, it is customary for the retail price to follow the trends of the wholesale price change, and therefore it is in close correlation with the situation on the wholesale market. In the Republic of Serbia, the so-called big buyers, i.e., the industry and the economy, whose annual consumption exceeds 30,000 kWh, are required by law to buy electricity on the market. Surely, they are already paying the market price determined by the suppliers, based on the wholesale price increased by certain "regulated" costs (access to the distribution and transmission system, the fee for renewable sources, balancing, margin, excise duty, VAT).

Unlike them, households and small customers still have the right to so-called „guaranteed" supply at a regulated price proposed by EPS and approved by AERS (Energy Agency of the Republic of Serbia). This price is currently much lower than the real market price, and it is difficult to predict when, whether and how much this price will rise.



Big buyers of electricity (the industry and the economy with annual consumption of more than 30,000 kWh) are **already buying electricity on the market for the price determined by the suppliers**

It is evident that the cost depends on many factors that are beyond the market framework. It should be noted that households and small customers already have the right to change the supplier, but it is clear that due to the current pricing policy, no one decides on taking such a step.

**EP** *Do you feel that there has been a change of perception in the general population and that electricity is now more regarded as any other commodity?*

**Milos Mladenovic** There have been significant changes in the very perception of the approach to electricity as a commodity by establishing the functioning market framework, where SEEPEX represents a sort of an "icing on the cake" and a generator of a precise and reliable reference price of electricity. The economy is forced to treat electricity as a market commodity as it directly affects the competitiveness and value of its product on the market, and thus the performance of the particular company.

On the other hand, I think that there has not been a change to households' and small customers' perception, considering that apart from the market aspect, a clear political and social issue is still present in the formation of regulated prices of guaranteed supply. Only by establishing market price, will people start using electricity more rationally and treating it as any other commodity.

Interview by: Tamara Zjadic



# A SMARTER SPACE FOR YOUR INSTALLATION IDEAS

## UK 600 ENCLOSURES

ABB is the world's leading provider of products for electrical installation in buildings. A comprehensive domain knowledge, global experience and continuous innovation enable us to provide optimal solutions for residential buildings. Our solutions help to make your buildings safer, intelligent and equipped for the future.

Thanks to its modular basic set-up, its improved room concept and its numerous smart detail solutions, the newly developed UK600 series of flush-mounted consumer units and media enclosures offers maximum flexibility for every installation idea, no matter how unusual. The detailed solutions of the UK600 make the combi enclosure so flexible that even subsequent changes or additions are possible without much effort. With a multitude of available design doors, the UK600 may also be easily integrated into your room concept.

The enclosures of the UK600 series are available in three basic versions: As a consumer unit, as a pure media enclosure or as a combined variant. The combi enclosure offers a shielded area for media components. This allows you to meet every imaginable installation requirement very quickly and effectively with the UK600 enclosures. Optionally available

connecting elements simplify professional coupling of different enclosures in case of larger space requirements of your installation. We supply the UK600 in five sizes with one to five rows and / or space for 12 to 60 space units. The enclosures may be used with the relevant accessories in massive or hollow-walls. Depending on the type, different accessories are included in the scope of delivery.

The enclosures of the UK600 series come with matching connectors that allow both horizontal and vertical connection of multiple combi enclosures. The connecting element is not only used to accommodate the cables, but also guarantees the correct spacing of the individual enclosures for a gapfree combination of the trim frames.

Our consumer units of the UK600 series convince with their many new and unique technical features. The 200 % extended connection space allows for simple and efficient installation of devices. The removable device support can be placed into the enclosure as required and thus also guarantees simple installation. Smart details such as the cable inlets with integrated terminal fixture and the variable use in massive or hollow-walls emphasize the high flexibility of the enclosure.

With its remarkable interior, the UK600 serves as a comfortable media enclosure. Here, all conceivable devices such as routers or media modules find their safe space. Modular perforated sheet steel plates allow for easy installation of the devices and an integrated swiveling triple socket ensures the power supply.

A special feature of the UK600 consumer unit and media enclosures is the large number of available door variants, where you will find a suitable solution for every room concept. Regardless of whether it is installed to a sober function room or styled living area – with our door variants, your consumer unit becomes a design element. There are no limits to your ideas.

A special highlight of the consumer units and the media enclosures are the various door and frame designs which help you turn them into an attractive design feature in your

home. You can insert your own pictures, pinboards, mirrors, magnetic boards, wooden or stainless steel look panels or LED panels for backlight foils into the design frames.

Our doors with interchangeable design frames enable you – just like an interchangeable picture frame – to equip the frame made of brushed aluminium with a motive of your choice. When closed, the elegant frame sits with a shadow gap of 5 mm in front of the wall. Magnets integrated in the interchangeable design frame keep the door securely closed.

Let your creativity take over. There is a total of six different design variants available. You may choose from a crystal mirror, a grey felt insert as a pinboard, a wood decor or stainless steel look, and a classic removable frame with protective glass and back wall. Here, you may insert individual pictures, photos or e.g. escape plans. Optionally, it is also available with rear LED lighting, which gives you the possibility to insert individual back-light foils to further emphasize the selected motive.

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**Danko Vukovic**, Chairman of the Managing Board of the "Biogas," Association

# FARMERS INTERESTED IN BIOGAS PLANTS

**U**nlike fossil fuels, biogas is a permanently renewable fuel, since it is produced from biomass. The use of biogas helps to improve the country's energy balance and contributes to the conservation of natural resources and environmental protection. Biogas is a very flexible fuel, and it can be used for the production of thermal energy, the combined production of electricity and thermal energy (in a cogeneration plant) or combined production of electrical, thermal and cooling energy (trigeneration).

Since this edition is dedicated to clean energy, we have decided to find out what is happening in the domestic biogas market. Although we know that this fuel is not suf-





## COOPERATIVENESS IN THE BIOGAS SECTOR

There are entire villages in Germany that are engaged in the production of energy from biogas. Their farmers have teamed up, which influenced the construction of a large number of common plants. As many as 9,000 biogas plants are operating in Germany. We asked Danko Vukovic whether our farmers have come to the idea to join together to build common biogas plants. "When we talk about the situation in Germany, we should not forget that the development of the biogas sector in that country started 30 years ago and that it is the strongest European economy and one of the strongest world economic powers. Seen from that point of view, it is quite understandable that Germany is also the leader in the biogas sector. The joining of farmers to invest and construct biogas plants is still in its infancy in our country. An increasing number of agricultural producers who are interested in building biogas plants are contacting our association. One of the latest examples is from the surroundings of Subotica, where several agricultural producers have teamed up into an association and have already begun with plans to build a joint biogas plant."

ficiently present in our country and that its potential is greater than the current use, we asked Danko Vukovic, Chairman of the Managing Board of the "Biogas," Association about the possibilities for the development of the biogas sector in our country. He explained to us how this non-governmental and non-profit association operates and what are their plans for the future.

**EP** "Biogas" Association was founded in 2012 with the aim of developing and stimulating electricity production from biogas. Are you satisfied with the results you have achieved so far?



There are currently **13 biogas plants with a total installed capacity of 14 MW** in Serbia, and **another 14 plants** are under construction

**Danko Vukovic** In 2013, shortly after our establishment, a regulation was passed that practically stopped the development of biogas in Serbia. We have made a study in cooperation with the IFC - World Bank, of the conditions for improving the development of the biogas sector, the arguments of which were also acknowledged by the Ministry of Energy. Precisely these arguments they added to the decree. The passing of the regulation from 2016, which is currently in force, is considered one of our greatest successes. This regulation contributed to the accelerated development of the biogas sector in Serbia.



Our association is continuously working on the improvement of the conditions for the development of the biogas sector, and we are constantly in communication with relevant ministries to achieve the set goals.

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**EP** *Who are the members and partners of your association and what kind of support do you provide to your members?*

**Danko Vukovic** Our association currently has 32 members, and its structure is made up of the owners of power plants, potential investors, academic institutions, and others. The Association regularly organizes panels, seminars, workshops, and practical training. In addition to the educational or informational aspect of our engagement, we are available to our members for advice, as well as for help with communication with relevant ministries, and above all the Ministry of Energy.

**EP** *Does the Ministry rely on your expertise for passing the laws and by-laws, and what type of assistance can you expect from them?*

**Danko Vukovic** We have excellent cooperation with the Ministry of Energy at all levels, and we always try to be objective in all positions, but also to support these views by independent analysis that we make in partnership with the IFC - the World Bank. So far, the Ministry has respected our views and recommendations, and we believe that this will continue in the future.

**EP** *Given that people often do not differentiate biomass power plants from those on biogas, could you explain to us their characteristics?*



The passing of the **regulation from 2016**, which is currently in force, is considered **one of our greatest successes**

**Danko Vukovic** Although both types of power plants use biomass as the “fuel,” the key difference is in the method of operation or the process of electricity generation. In the case of biomass plants (wood, waste, etc.), the substrate combusts and heats the water, and then the water vapour starts up the gas turbine. When it comes to biogas plants, the substrate such as silage, waste from food production or manure, is decomposed into large containers - fermentors at a precisely determined temperature, from which biogas derives as a by-product of the decomposition of organic matter. It contains a high percentage of methane and is further used in conventional internal combustion engines which in this way starts up the generator for generating electricity.

**EP** *About 21 per cent of annual energy in Serbia comes from renewable sources. What is the share of biogas?*

**Danko Vukovic** If we consider all renewable energy sources, including large hydropower plants like Djerdap, the energy share of biogas in RES is negligible because it is only 0.8 per cent. However, if we only consider the RES that are part of the incentive measures, the share of biogas is 11 per cent.

**EP** *What is the planned capacity of this type of power plants according to the strategy of the Republic of Serbia until 2020, and what are your expectations regarding the fulfilment of the action plan for the capacity of biogas plants by the end of 2020?*

**Danko Vukovic** According to the Strategy of the Republic of Serbia, the construction of power plants with a total capacity of 30 MW is planned by 2020. There are currently 13 biogas plants with a total installed capacity of 14 MW in Serbia. Another 14 plants with a capacity of 13 MW will be put into operation, which will make a total of 27 MW of installed ele-

Nekoliko poljoprivrednih proizvođača iz okoline Subotice **udružilo se u zadrugu** i već su **otpočeli sa planovima za izgradnju zajedničke elektrane na biogas**



**EP** *A lot of raw material is needed for the biogas production. How do owners obtain the necessary amount?*

**Danko Vukovic** The types and quantities of raw materials, primarily depend on the micro-location of the power plant. Investors often build biogas plants on existing agricultural and livestock farms where there is a substantial amount of waste materials. The production of agricultural products (e.g., corn silage) for the use in biogas plants is almost entirely economically unprofitable. That is why the owners of biogas plants avoid this type of raw materials as much as possible, and intensively use waste materials and manure.

**EP** *Agricultural residues are mainly used for biogas. What is the additional benefit of using these residues, besides obtaining the heat and electricity?*

**Danko Vukovic** Agricultural residues are not the only raw material for the biogas production, but they are indeed considerably more cost-effective compared to agricultural products, which is precisely the explanation for their popularity. The benefit is primarily economic since these raw materials had no or minimal commercial value until the emergence of biogas plants. Now we use them for the production of electricity and thermal energy.

Also, we should not neglect the ecological aspect of the utilisation of agricultural residues and waste materials, neither the ultimate by-product of the biogas process. It is a high-quality organic fertiliser. The residue and waste from the by-products are converted into a quality benefit through the biogas process.

**EP** *What solutions exist for those clients who cannot make use of all thermal energy from a biogas plant?*

**Danko Vukovic** Solutions for the utilisation of thermal energy are numerous, and which solution the operator of the biogas plant will decide upon, depends on the location of the facility and the investment potential of the operator. The heat from biogas plants is most often used in activities related to agricultural production - drying of cereals, fruits or vegetables, heating in greenhouse production, heating of facilities in livestock production, and more. The heat can also be used in other industrial processes, as well as to be sold to third parties, which significantly depends on the location of a power plant.

Interview by: Nevena Djukic

ctricity. Since the validity of the existing regulation has been extended for an additional year, we believe that the strategic plan of RS will be fully accomplished by 2020.

“Biogas” Association encourages the construction of biogas plants primarily through cooperation with the Ministry of Energy and creation of the incentives for investments, as well as through direct work with investors and potential investors.

**EP** *Does the association have a long-term plan for the development of biogas plants?*

**Danko Vukovic** Our long-term plan is to continue the intensive cooperation with relevant ministries and show the possibilities for improving the business climate for investors in biogas plants. We believe that such a plan, along with the education of potential investors, will lead to a positive development of this sector in the long-term.



MaterniTGenome  
FOR MOTHER'S  
SAFE AND  
PEACEFUL SLEEP

Scientists from the American Center for Molecular Medicine Sequenom, led by Professor Denis Lo, presented the world the first clinically valid non-invasive prenatal DNA test back in 2011. After four years, the same centre launched the first and revolutionary non-invasive prenatal test with the highest level of genetic information. The test was named MaterniTGenome, and it has been available in our country since 2016 thanks to Safe Gene Balkans, the first consulting company of this type in the field of prenatal genetics in Serbia. Biochemist and geneticist Ivana Cvetkovic, a representative of Safe Gene Balkans and a professional consultant for the Sequenom Laboratories, explained the difference between prenatal tests that are done in our country and the one that is done in the American laboratory with which she cooperates.

According to Ivana's words, the analysis of the baby's DNA from the mother's blood cannot be done in Serbia. Due to the reputation of the Sequenom Center for Molecular Medicine in scientific circles, Ivana has chosen that their non-invasive prenatal testing MaterniTGenome, which provides the highest level of genetic information, also becomes available to pregnant women in Serbia. While we are only doing blood sampling, the analysis is done in San Diego.

Although prenatal tests are not a novelty in our country, there is a fundamental difference which separates the MaterniTGenome test from all other analysis, Ivana says.

"There are a lot of non-invasive prenatal tests that have rather aggressive advertising. However, no other test has



Ivana Cvetkovic, MSc., a biochemist, and geneticist graduated from the Faculty of Natural Sciences and Mathematics at the Department of Biochemistry and completed her postgraduate studies at the Institute for Biological Research at the Department of Molecular Biology. She

had professional training in the field of non-invasive prenatal genetics at the Wolfson Institute in London as well as in the United States.

completeness and precision like MaterniTGenome which has been clinically validated in the United States with 100 per cent. Suffice it to say that no other analysis reaches the level of karyotype and must not be recommended to women with high-risk pregnancies, "Ivana explains and adds: "According to its performance and quality, MaterniTGenome is the only non-invasive prenatal karyotype in the world."

Many other variants of non-invasive prenatal tests provide only partial, and in that sense incomplete analysis of only the most common chromosomal diseases such as Down, Edwards or Patau's syndrome, Ivana says. According to the rules of genetic counselling, such analysis can only be used as more accurate and more sensitive variants of the current DOUBLE test.

"The problem is that it is impossible to predict and determine the cause of the chromosomal diseases. It is surprising that a genetic factor, or inheritance, contributes to the occurrence of these diseases in the smallest per-



Unfortunately, chromosomal disorders are a silent threat to pregnancy and mostly occur spontaneously, and without notice, it is, therefore, crucial to perform a **timely DNA analysis from maternal blood** and reliably remove doubt of the presence of anomalies in a newborn



centage. Unfortunately, we could say that chromosomal disorders are a silent threat to pregnancy and mostly occur spontaneously and without notice," Ivana says, pointing out that it is, therefore, crucial to perform a timely DNA analysis from maternal blood and reliably remove doubt of the presence of anomalies in a newborn.

According to the official data, in Europe, on average 1 to 2 per cent of children are born with anomalies, and from the total number of conceptions, the incidence of defects is as high as 15 per cent, with some pregnancies being spontane-



Many other variants of non-invasive prenatal tests provide **only partial**, and in that sense **incomplete analysis** of only the most common chromosomal disorders

ously interrupted and in other cases, the fetus anomaly is timely detected.

According to the Melanoma Gene Database, the frequency of chromosomal disorders throughout the world is uniform. Nevertheless, Ivana points out that the number of children born with chromosomal disorders is the most common in highly developed Scandinavia, since their laws do not require complex genetic testing, and mothers are encouraged to accept a child with a genetic defect the way it is.

When asked what causes genetic mutations and whether there are social groups that are more prone to chromosomal changes, Ivana says that damage to the DNA or chromosomes can occur spontaneously and can be caused by various external factors such as the so-called "genetic code pollutants." These include ionising radiation, automotive exhaust gases, chemical substances such as lead, heavy metals, vinyl chloride, benzene, precursors in the production of drugs, synthetic rubber, paint, pesticides, and styrene. "Besides, researches have shown that insecticides, fungicides, and herbicides are also etiological factors

for induction of alterations in the number and structure of chromosomes," Ivana explains. She states that people that are most subjected to genetic anomalies are from the war-affected areas in which there is an extremely high concentration of various pollutants, and mainly due to prolonged effects of depleted uranium.

Although there is no way to prevent genetic diseases, we can act preventively. Ivana says that the best way is adequate and timely genetic testing. "Pregnant women should not avoid genetic counselling but rather do as much as possible so that potential anomalies can be detected at the earliest stage."

Safe Gene Balkans doesn't have support from the Ministry of Health in the context of subsidy of expensive genetic testing at the Sequenom Laboratory for the time being. However, it is important to talk about genetic changes, Ivana says, because raising the level of awareness contributes to the fact that more people start to decide to have appropriate and timely testing.



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