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# ENERGY PORTAL magazine

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## Hidajet Bišćević

Croatian Ambassador to Serbia

**GREEN TRANSITION –  
AN OPPORTUNITY TO  
DEVELOP SUSTAINABLE  
ECOSYSTEMS**

## Rade Mrdak

Green Energy Adviser to  
the Minister of Mining and Energy

**CHANGES IN THE RES  
SEGMENT LEAD TO A  
STABLE POWER SYSTEM**

## Radoslav Marić

Director of MT-KOMEX BH

**THE MT-KOMEX COMPANY  
EXPANDED BUSINESS IN BIH**



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Schneider  
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silver module manufacturer since 2007



Немачка  
сарадња  
DEUTSCHE ZUSAMMENARBEIT



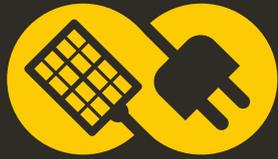
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# WORD OF THE EDITOR



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Dear readers,

Many are already on their way or are getting ready to pack their bags and go on a well-deserved vacation. Although it seems that during the summer, we worry less about energy consumption and the upcoming heating season, the year behind us and the energy crisis that hit us all show us that a safe electricity supply is a priority. That's why we dedicated this issue to renewable energy sources and how to achieve energy independence.

We talked about the changes brought by the amendments to the Law on the Use of Renewable Energy Sources and the preparation of the first auctions with Rade Mrdak, advisor to the Minister of Mining and Energy for green energy.

You will find out how the countries of the region plan to overcome the energy crisis and become energy independent. Ambassador of Croatia in Serbia, Hida-jet Bišćević, talks about the country's goals and how they want to achieve more than 2,500 new MW of installed power from renewable energy sources. There is also an interview with Nikola Rovčanin, executive director of EPCG, who reveals everything about the *Solari* project and the benefits of investing in renewable sources.

Speaking of solar energy, in this issue, you can read an article about the company MT-KOMEX, which expanded its operations and founded a company in Bosnia and Herzegovina. Read how they plan to deal with the challenges brought by the new market.

In the *Opinion* section, you will read what Professor of Electrical Engineering Milenko Đurić, PhD, thinks about renewable energy sources and how the state should help develop and encourage the electricity industry to build medium voltage transmission lines and the necessary transformer stations.

As you are used to, inspiring stories await you in the section *People and Challenges*. Tatjana Živković proudly holds the title of master of umbrellas and tells us what it looks like to keep this craft from being forgotten. There is also a story about the use of industrial waste and how to make ecological candles with a specific scent.

We hope you will enjoy reading this issue of the magazine. As always, we did our best to bring you current topics and interesting stories.

*Nevena Đukić*

Nevena Đukić,  
editor-in-chief



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# GREEN TRANSITION – AN OPPORTUNITY TO DEVELOP SUSTAINABLE ECOSYSTEMS

**T**he Republic of Croatia has been strongly encouraging the use of renewable energy sources (RES) for some time now. According to EUROSTAT data for 2021, RES had a 31.3 per cent share in the country's gross direct consumption. A new national goal of at least a 36.6 per cent share of renewable energy sources in the final gross energy consumption by 2030 has been set. The Croatian Ambassador to Serbia, H.E. Hidajet Bišćević, told us that the European Parliament's and European Council's Directive 2018/2001 from 2018, which promotes the use of energy generated from renewable sources, was incorporated into the Croatian legislation when the country adopted the Law on Renewable Energy Sources and High-Efficiency Cogeneration.

"The law regulates issues important for implementing the energy transition towards the use of RES following the 2030 Energy Development Strategy with projections until 2050 and the Integrated National

Energy and Climate Plan for Croatia, covering the period from 2021 to 2030. These are fundamental acts for implementing the energy policy

in the part that specifically refers to the sale and use of renewable energy in the electricity and heat markets," Ambassador Bišćević said.

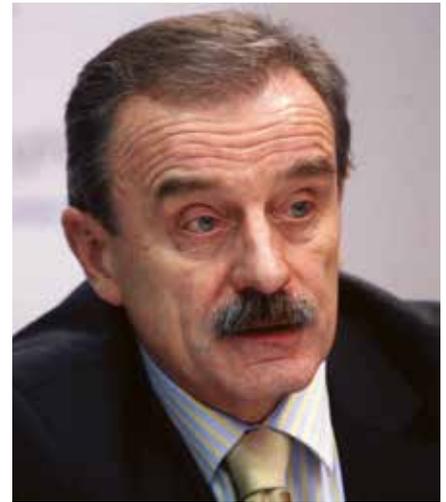
## THE POTENTIAL OF RENEWABLE SOURCES

Croatia's energy development strategy, covering the period until 2030 with projections until 2050, clearly promotes the development of renewable energy sources and foresees more than 2,500 new MW of installed power in renewable energy sources.

"It will mainly be wind and solar energy, but the potential also exists in bioeconomy and geothermal energy. The Strategy also aims at improving the safety of supply and diversification of sources, which we have already achieved by opening the LNG terminal on Krk as a source of natural gas for our and neighboring countries," says Ambassador Bišćević.



We also plan to accomplish ambitious goals with the help of available European financial instruments – the National Recovery and Resilience Plan, the Modernization Fund, the Competitiveness and Cohesion Programme, etc.



Hidajet Bišćević  
Croatian Ambassador to Serbia

**How is the use of renewable sources regulated by the Law on Renewable Energy Sources?**

– Transparent and unambiguous rules have been put in place to calculate the share of energy from renewable sources, define these sources, fulfil reporting obligations to the European Commission, as well as prescribing the possibility of cooperation on joint projects with other EU Member States and the statistical transfer of the share of renewable energy. The regulation also stipulates possibilities for incentivizing the use of renewa-

ble energy so that the shortcomings of the energy market in the development of new production facilities are eliminated, and clear rules, scope and dynamics of support are implemented following the possibilities of planning the development, construction, and modernization of energy systems. A straightforward procedure for the certification of privileged energy producers is implemented too. It prescribes drafting a manual on administrative procedures and obtaining permits to construct facilities to produce energy from renewable sources. It regulates issues of guarantee of origin, establishing and managing a renewable energy sources register, transferring energy from RES to gas and heating systems, and increasing use in the heating and cooling sector.

**How much the country subsidizes projects related to the use of solar, geothermal and sea energy?**

– Croatia plans to continue providing incentives for the production of electricity from RES until 2030 to reduce CO2 emissions in the energy sector, which also implies increasing production and ensuring a greater quantity of electricity for the country’s needs. Croatia has to improve its power system to achieve that goal and meet all the technical prerequisites for the planned growth.

The National Recovery and Resilience Plan foresees allocation of 400 million euros for the revitalization,

modernization, and digitization of the electric power system. In this way, better access to new power plants will facilitate electricity production capacity from renewable sources by 1,500 MW by the end of 2024. There is also the Modernization Fund intended for the decarbonization of industry in the form of support for investments in the modernization of the energy system and the improvement of energy efficiency.

In the new Competitiveness and Cohesion Programme covering the financial period from 2021 to 2027, 279 million euros have been allocated for the energy sector, including micro solar plants and heat pumps. The funds are intended for citizens to ensure their self-sustainability energy-wise while reducing financial expenses for energy consumption in households.

**How much did EU membership contribute to Croatia’s environmental protection and sustainable development progress?**

– At the time when the country was in the process of joining the EU, Croatia used a lot of technical assistance from TAIEX in the transfer of the know-how related to climate change needed for the establishment of the EU system of trading, monitoring and reporting on greenhouse gas emissions (EU ETS).



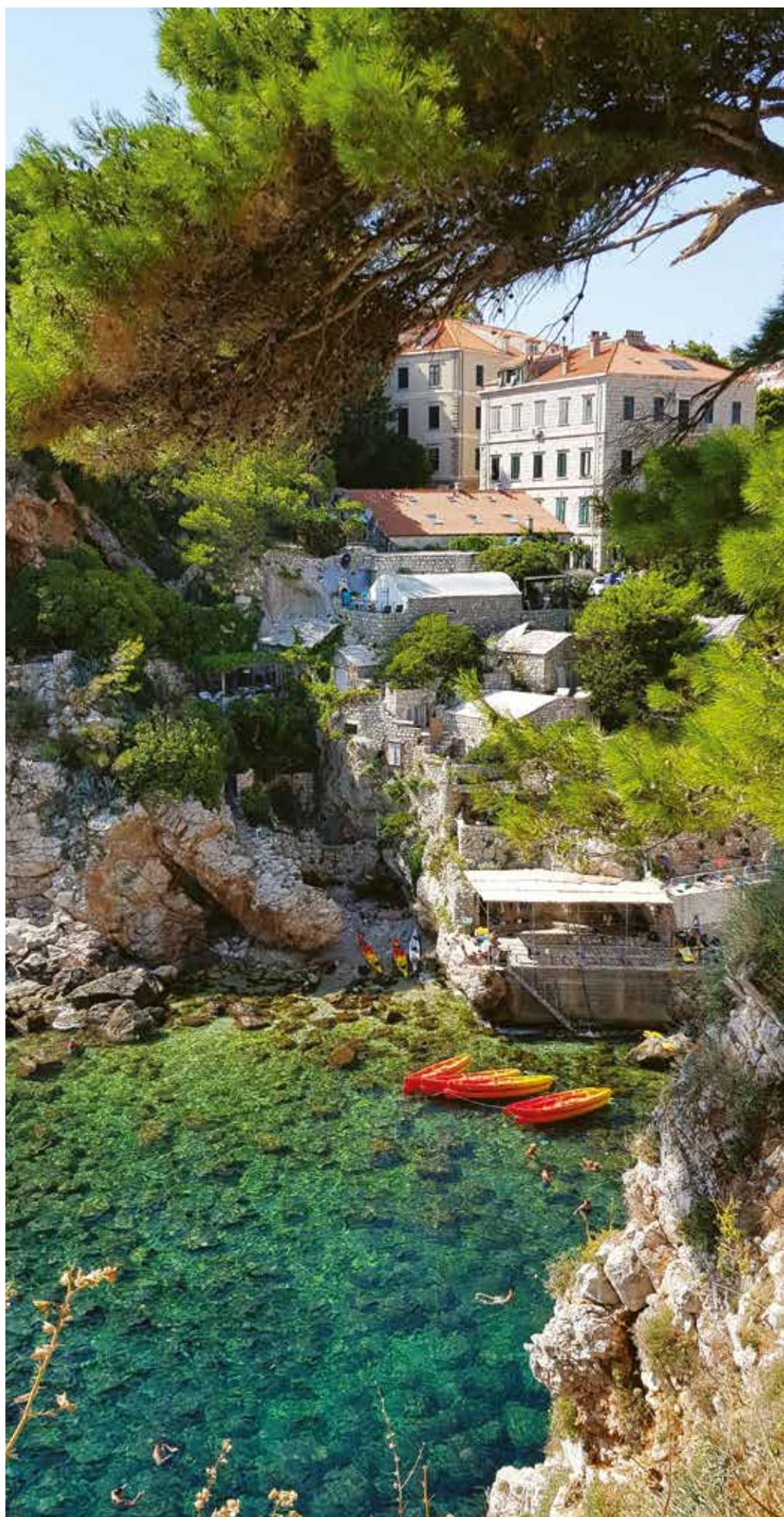
We have also established important cooperation with Slovenia due to the smaller language barrier. Even after Croatia joined the EU, the TAEIX instrument was still used to implement EU legislation. During the adoption and implementation of EU legislation, the Member States participate in the Commission's technical meetings where the fulfilment of all obligations, including the new ones prescribed by secondary EU legislation, are discussed. It is a good opportunity to exchange experiences and best practices, contributing to successfully implementing environmental protection and sustainable development policies.

**Croatia is strategically focused on clean energy, but you are partly supplied with electricity from the Krško nuclear power plant. What is the future of this power plant?**

– Croatia has been investing a lot of effort into incentivizing energy production from renewable sources and new technologies and developing a grid to transfer this energy. We own half of the nuclear power plant in Slovenia, and Croatia has nothing against nuclear energy as a low-carbon energy source. About 16 per cent of our electricity is produced by the Krško nuclear power plant, and we are interested in being included in the Krško 2 project if the Slovenian side decides to invite us. We believe nuclear energy is clean energy, doesn't produce CO<sub>2</sub> emissions, and can significantly contribute to reaching our climate goals and decarbonizing the economy.

**Due to its geographical position, Croatia has great potential in the use of solar energy. What is happening with the solarization process in Croatia? How is the development of solar power plants implemented on the islands?**

– Solar energy is becoming increasingly important in Croatia's energy mix. There are more and more solar power plants, and a plan to build more of them on our islands, which were in large part encouraged by





The National Recovery and Resilience Plan foresees allocation of 400 million euros for the revitalization, modernization and digitization of the electric power system

the Split Declaration launched at the time when Croatia held the presidency of the EU and at the time when we started to seriously contemplate about our energy self-sustainability, considering that energy is produced from renewable sources. Hrvatska Elektroprivreda (HEP) opened a solar power plant on the island of Vis, and HEP and private investors are drafting more and more similar projects. In addition to large-scale projects, it

is also essential for us to encourage self-sustainability and the installation of solar panels on roofs. That's why we set aside 60 million euros towards micro solar and heat pump incentives under the auspices of the Competitiveness and Cohesion Programme, which EU funds finance from the regional development fund.

**Croatia has low greenhouse gas emissions, while per capita emissions are among the lowest in the EU. How did you achieve this? What is your plan for achieving the goal of zero greenhouse gas emissions in the future?**

– Croatia's commitment to green policies is visible in its strategic framework covering national, energy and climate policies. Following the European Green Deal, several strategic documents were adopted that are adapted to the principles of sustainability and highlight concrete measures, the implementation of which will result in achieving the set goals related to reducing greenhouse gas emissions, boosting energy efficiency, and using renewable energy sources. All

three goals significantly contribute to the decarbonization of our economy. Equally important is the development of new technologies, especially those that can ensure emissions reduction in energy-intensive industries.

A significant step towards the implementation of green policies and decarbonization was made thanks to the so-called NET ZERO SCENARIO for the energy sector, which, after the European Green Deal and Fit for 55, has paved the way for achieving even greater CO<sub>2</sub> cutbacks. Furthermore, in March 2022, the Croatian hydrogen strategy, covering the period until 2050, was adopted, which underlines the production, storage and use of hydrogen as one of the crucial elements for the decarbonization of industry and the energy sector.

The plan is to further invest in the green and digital transition and the transformation of the economy to reduce CO<sub>2</sub> emissions. We also plan to accomplish ambitious goals with the help of available European financial instruments – the National Recovery and Resilience Plan, the

A significant step towards the implementation of green policies and decarbonization was done thanks to the so-called NET ZERO SCENARIO for the energy sector, which, after the European Green Deal and Fit for 55, has paved the way for achieving even greater CO<sub>2</sub> cutbacks



need to transition to a low-carbon economy. It is important to note that this situation provides a good argument for how necessary it is to expedite the transition because, in this way, we would reduce the future vulnerability of citizens and entrepreneurs to price fluctuations due to the import of energy products, and their competitiveness would increase.

**The entire region is going through an energy transition, recognized as a strategic priority worldwide. How do you face the challenges of the energy crisis?**

– To ensure energy transition, under the auspices of the green transition, Croatia believes that the economy must be strong and competitive, and it is extremely important to increase the resilience of the energy system and security of supply, reduce dependence on third countries, and foster sustainable energy development.

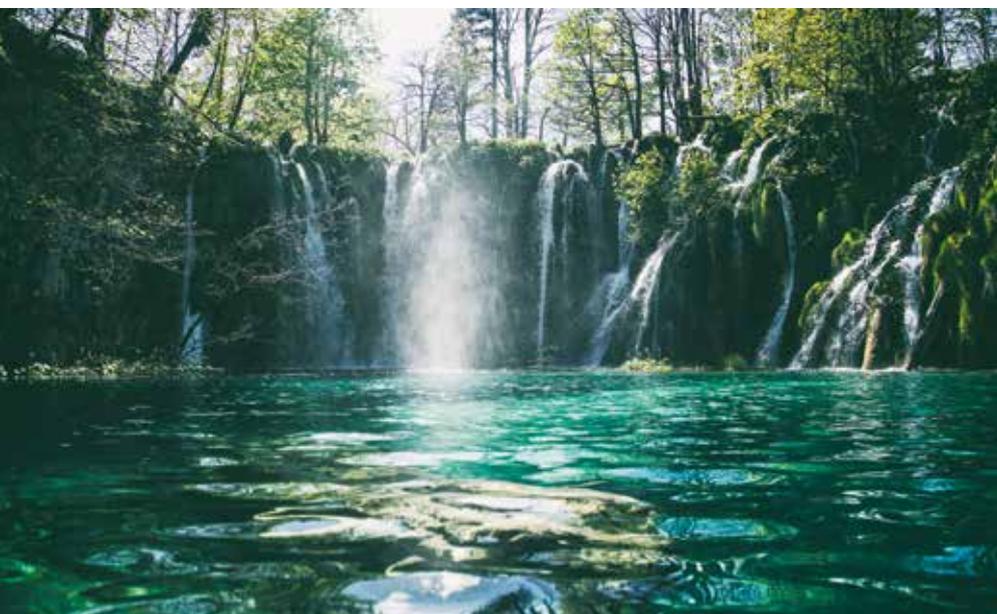
We would also like to mention the need to accelerate the green and energy transition in parallel with boosting competitiveness, to enable further growth and progress. At the

Modernization Fund, the Competitiveness and Cohesion Programme, etc.

Strong intersectoral coordination and dialogue during the development of national strategies seriously affected acquiring the needed level of knowledge and recognizing the importance of sectoral measures related to lower greenhouse gas emissions. We also need to improve the

communication between the state administration bodies that develop green policy and transition strategies and action plans, the business sector, and other national and local stakeholders, which we have been working on.

The war in Ukraine has exacerbated the energy crisis, which may negatively affect the perception of citizens and business people and the



same time, the EU, including Croatia, remain committed to lofty climate ambitions and goals while respecting the circumstances of the Member States.

Croatia has introduced measures to mitigate the impact on citizens and the business sector. Interventions were made regarding fuel prices to reduce pressure on the entire economy. We have continuously enacted regulations and limited fuel prices, which helped citizens and companies to buy fuel at more affordable prices. Additional measures were also implemented, which, together with all the strategic moves that Croatia undertakes, will put citizens and the industry at ease regarding quantities and prices. We also capped the electricity and heating prices for households and businesses.

At the same time, a strategic decision was made to increase the capacity of the LNG terminal to 6.1 BCM (billion cubic meters), which ensures stability in terms of gas transport and supplies in Croatia and the EU.

We are aware of the ongoing crisis and the situation in the EU and the world and continue to monitor it. Despite the energy crisis, and with our European partners, we remain committed to implementing the green energy transition to achieve

the ultimate goal – a climate-neutral Europe by 2050.

**Serbia is on its way to becoming an EU member. What is your advice to Serbia for making faster progress on that road?**

– It would help if you worked on increasing the awareness of both citizens and the corporate sector about the green energy transition so that each individual can see their role in the process and encourage greater investments and business opportunities.

In terms of climate change, the TRATOLOW project (Transition towards low emissions and climate-resilient economy in the Western Balkans and Türkiye) launched by the European Commission to help the countries of the Western Balkans and Türkiye with climate protection and adaptation to climate change will help.

With the Brdo Declaration, adopted at the Brdo Summit in October 2021, which was attended by the Western Balkan state and government representatives, the EU Member States confirmed the implementation of the Green Agenda Action Plan, which was drawn up by the Commission and by which the countries of the Western Balkans committed themselves to strongly focus on sustainable development, resource efficiency, nature protection and climate in all their economic activities and align them with EU goals. The leaders of the 27 EU Member States promised to provide technical and financial assistance for the development of Green Agenda policies which consists of five pillars, one of which is decarbonization, with an indicative deadline of 2025 for compliance with the European Climate Law and achieving climate neutrality.

Accordingly, regarding environmental and climate protection, Serbia should continue to work on the Green Agenda Action Plan to expedite its accession to the EU.

Interviewed by: Mirjana Vujadinović Tomevski



# CHANGES IN THE RES SEGMENT LEAD TO A STABLE POWER SYSTEM

**T**he long-awaited Law on Amendments to the Law on the Use of Renewable Energy Sources resolves the issue of numerous requests for the connection of new solar and wind power plants to the national power grid without jeopardizing the safety of the power system. Rade Mrdak, Green Energy Adviser to the Minister of Mining and Energy, explains how the changes will help to reach the target of 1,000 MW for wind farms and 300 MW for solar farms over the next three years and whether households will now benefit more from the introduced limitations of power generated by solar plants.

## **What do the adopted amendments to the Law on the Use of Renewable Energy Sources bring us?**

– The new amendments to the Law on the Use of RES brought us the improvement of the regulatory framework in this area, while the amendments prescribed the rules that should solve the 20 GW requirements for connecting wind power plants and solar power plants to the national power grid. This capacity exceeds the total installed capacity of all power plants in Serbia by three times which have been built over decades. Without changes in the Law, system operators would be legally obligated to connect capacities that cannot be integrated into the system. It would cause severe financial and technical problems for our operators to ensure the system's safe and

reliable functioning. That's why we envisioned the possibility that if the operator of the transmission system, in a transparent and public procedure and with the consent of the independent Republic of Serbia Energy Agency, assesses that there is no physically available capacity for the integration of RES power plants, they can temporarily implement the measure which postpones their connection. However, exceptions to this rule do not apply to operators who have already acquired certain rights in the connection procedure. There are about 5 GW of such projects, as well as those investors who do not want to postpone the connection but are ready to provide additional balancing capacity them-

selves or through another market participant. In practice, these additional capacities will be battery storage.

Other changes pertain to solving the issue of balancing responsibility for producers using RES. Now the guaranteed supplier will not assume the balance responsibility for all producers; only those who have received incentives and only temporary, i.e. until the intraday market comes to life, either through the domestic stock exchange or through the merger with the European single market. Commercial projects will have to resolve the balance liability commercially. Finally, we made changes related to prosumers by limiting the maximum capacity for households and commercial customers



Prosumers are considered only those end customers who install solar panels up to 10.8 kW for households or up to 150 kW for other categories of end customers



in line with European practice. Prosumers are considered only those end customers who install solar panels up to 10.8 kW for households or up to 150 kW for other categories of end customers. In this way, we directed the prosumer concept towards small customers who should reap the benefits of this model. Big consumers need to be active buyers with greater responsibilities.

**Why did the draft amendments to the Law stipulate a limit for prosumers, and will this push ordinary citizens to abandon the prosumer concept?**

– The amendments to the Law on the Use of Renewable Energy Sources stipulate that the limit for prosumers is 10.8 kW, so with this solution, we have

covered 97 per cent of households that mostly install solar panels of up to 10 kW power. The purpose of this limit is to help citizens balance the electricity production from solar panels with their consumption and to demotivate them to use electricity from the power grid, at a higher price, during winter for heating as this electricity is still mostly obtained from coal, which can negate the positive effects of the installation solar panels. We believe that citizens will not abandon the prosumer concept because the profitability of solar panels will continue to grow.

**When will a by-law stipulating active buyer's rights and obligations be adopted?**

**RADE MRDAK got his undergraduate diploma and obtained his master's degree from the Faculty of Law in Belgrade, as well as passed the bar exam. He is an experienced legal advisor who specializes in energy issues. Mr Mrdak assisted in drafting the Law on Energy and the Law on the Use of Renewable Energy Sources, in preparing numerous decrees and regulations governing renewable energy sources, as well as worked on projects and in working groups for monitoring and implementing energy policies. With his knowledge and experience, he contributes to developing the energy sector and promoting renewable energy sources.**



The Ministry of Mining and Energy, as the line authority for conducting the auction, plans to launch auctions for wind power plants and solar power plants this month



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### PROSUMER ELECTRICITY BILLS

The Ministry is actively working to change tax regulations in favor of prosumers. Earlier this year, thanks to the good cooperation with the Ministry of Finance, the VAT Law was amended to accommodate this. VAT is now calculated on net electricity and not on the electricity received.

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– The Ministry of Mining and Energy is preparing amendments to the Law on Energy, including provisions for active buyers. We want to regulate this issue adequately and enable the industry to valorize all the benefits of self-supply through its production with the help of this new concept. If we adopt the amendments to the Law on Energy by the year-end as planned, we believe that by June 2024, we will have all by-laws ready to implement the active buyer concept.

**The launch of an organized intraday electricity market in Serbia was announced for June. What benefits does it bring us, and how will it work?**

– Intraday electricity trading should be launched in June. The organized intraday market is particularly important

for the energy transition, as it is crucial for integrating variable renewable energy sources into the system and market. Everyone in this business and of this profession knows that the unpredictability of electricity production from variable renewable energy sources is the main challenge for the stable and safe operation of the power system. Their higher use in the system also increases the costs of their integration. The intraday market is one of the key tools that enable market participants to reduce errors in the forecast of electricity production from variable renewable energy sources, which reduces the level of reserves required to balance the system, as well as the costs for engaging those resources while creating prerequisites for a greater share of renewable energy sources.

ces. Trading on the organized intraday market, together with day-ahead trading, will transparently provide investors and existing market participants with a complete picture of the short-term market of the Republic of Serbia and give reliable price signals that will be the basis for the development of flexibility services, which are also very important for the energy transition.

**When can we expect the first auctions to take place?**

– On June 1, the Serbian government adopted all by-laws required for conducting auctions. The Ministry of Mining and Energy, as the line authority for conducting the auction, plans to launch auctions for wind power plants and solar power plants this month. These will be the first aucti-



The intraday market is one of the key tools that enable market participants to reduce errors in the forecast of electricity production from variable renewable energy sources

ons in Serbia and the countries of the Energy Community in terms of awarding market premiums, just like in the EU. Furthermore, we have drafted a three-year plan for auctions that covers the period until 2025, which should triple the existing capacities. The plan is to allocate 1,000 MW for wind power plants and 300 MW for solar power plants in the next three years, which, if implemented according to plan, will irrevocably change our energy mix, making it more modern and greener.

**When will the Ministry of Mining and Energy announce a competition for subsidies within the program of energy rehabilitation of family houses and apartments?**

– On June 1 of this year, the Ministry launched a public call for the allocation of subsidies to citizens under the auspices of the energy renovation programme of family houses and apartments. This programme will provide subsidies for the installation of solar panels, as well as for the replacement of doors and windows, building fronts, and roofs. First, a call is launched for local self-governments, which will then launch public calls for contractors and, after selection, for citizens. Unlike previous years, the public call for citizens will be open all year round, so they can apply at any time. Municipalities and the state will bear 50 per cent of the costs (25 per cent on each side) and citizens the other 50. The new public call envisages better conditions for economically devastated areas and municipalities with a high level of air pollution, for which minimum participation of 15 and 20 per cent is foreseen, which means that the state will participate in a higher percentage. Also, citizens who opt for more energy efficiency measures can receive up to 65 per cent of subsidies. In the previous three calls, 20,000 citizens received subsidies, and with the new public call and programme, we expect another 50,000 households to receive subsidies.

Interviewed by: Milica Radičević





## FARMLAND – HOME TO SOLAR PANELS AND CROPS

**S**olar power plants require that the land on which they are installed be accessible and sunny and that there are transmission lines nearby to release the generated energy into the power grid. Taking into account the above requirements, agricultural land is the most suitable area for installing such power plants. And while discussing the importance of renewable energy sources, environmental protection, or energy security, we must not ignore the importance of agricultural production. Urban planning and

climate change have questioned the security of this sector's survival, which is why converting every hectare of agricultural land into space for the construction of solar power plants represents an additional burden.

To find a solution that would ensure the satisfaction of all involved parties, scientists are constantly developing and improving agrovoltaiacs, that is, a system that allows solar panels and plants to be grown on the same piece of land. This system involves placing solar panels above the crops.

Once installed, these solar panels leave about 90 per cent of the surface free, which can also be used for growing crops. Not only do such solar panels leave enough room for the agricultural sector, but they can be collaborators in safer cultivation.

Namely, solar power plants protect crops from bad weather such as hail, showers, wind and strong sun rays. An additional reduction of CO<sub>2</sub> emissions is achieved, provided the irrigation system is connected to the supply of power generated by the installed panels.

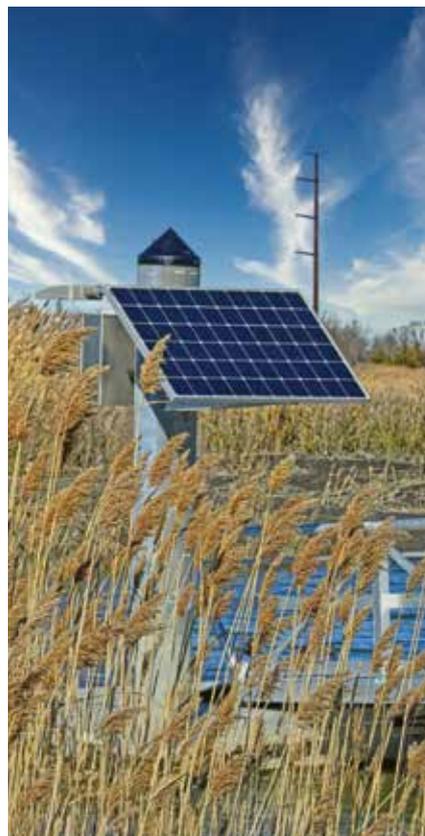


## ROOFS AS AN OBLIGATORY SURFACE FOR SOLAR PANELS

The Berlin Solar Law (Berliner Solargesetz) from 2021 stipulates that the installation of solar panels on new roofs will be mandatory in Berlin as of 2023. As of January 1 of this year, the relevant regulation came into force and applied to all new buildings and existing buildings that have had their roofs renovated. The law stipulates that 30 per cent of the roof must be covered with solar panels. Tokyo residents will have to abide by similar regulations from April 2025, when all new houses of sizes up to 2,000 square meters will have to have solar panels installed on their roofs. So far, this decision relates to 50 construction companies that are industry leaders in this city.



Once installed, these solar panels leave about 90 per cent of the surface free, which can also be used for growing crops. Not only do such solar panels leave enough room for the agricultural sector, but they can be collaborators in safer cultivation



In this way, with careful planning and design of such a power plant, we can grow almost all agricultural plants on condition that we have chosen the appropriate panels and placed them at a sufficient height and a proper angle. It has been proven eggplant, cabbage, broccoli, artichoke, aromatic herbs and flowers, sugar beet, and other plants can be grown under such panels.

In terms of the usual solar panels, which are opaque, this kind of area is most suitable for growing those plants that do not need a large amount of sunlight. However, regular solar panels can be installed at greater angles to allow more light to pass between them. Also, the technology allows that the angle of installation is not fixed. Still, they can be turned, creating a larger or smaller shade following the sun's position throughout the day.



## SOLAR PANELS ON FRENCH PARKING LOTS

At the end of last year, the French Senate approved a law based on which solar panels will have to be installed above all major parking lots in the country. Starting from July 2023, parking lots with a capacity of between 80 and 400 parking spaces have a five-year deadline to do this, while the deadlines for larger parking lots have been shortened to three years. Each canopy will have to have panels installed on at least half of the surface. The electricity obtained from this source will power both nearby buildings and electric vehicles in parking lots.

Innovative solutions also focus on perfecting transparent panels – solar windows, like greenhouses, would let in large amounts of sunlight. They have already been used in practice. In Greece, a greenhouse with solar windows was made for a vineyard. They absorb UV rays, which the plants do not need, and let those useful for their growth through.

Although a solar power plant needs the sun's energy, temperatures that are too high can have the opposite effect, i.e. they can reduce their production capacity. Planting certain species under the panels can reduce their temperature, a mutual benefit.

The United Nations have recognized investing effort in finding ways to save water, food, and energy as one

of the most important factors of sustainable development because these three resources are the key to the survival of life on our planet. Due to population growth, higher demand for food requires greater amounts of water and energy. On the one hand, energy is used to irrigate crops during the entire cycle – from their growth to processing to a final product. On the other hand, fresh water is already an endangered resource of which agriculture is its biggest consumer and is still very much needed to produce energy from many sources. Agrovoltatics could play an important role in reducing the risk of the abovementioned resources. Solar power plants do not require water to operate. At the same time, they can produce the energy needed for irrigation to avoid using energy obtained from those sources that need a large amount of





Last year, on an area of 770 hectares, the construction of the agrosolar power plant was started capacity of 660 megawatts, the first in our country region and the largest in Europe, namely in Serbia, in Kula

water. All of this is possible to achieve by installing panels on agricultural areas where they would occupy a minimum of space and thus would not jeopardize the cultivation of crops.

Agrovoltaics is implemented worldwide by installing smaller or larger solar power plants, especially in Asia. In Europe, the construction of such a system has begun in central Italy, which will be the country's largest system of this kind and supply over 100,000 households with power. Fodder will be grown in this area, and olive trees will be planted around the power plant. The state also plans to provide additional incentives for developing this type of agriculture.

Last year, the construction of another such power plant, the first in our region and the largest in Europe began

in Serbia. The town of Kula will get an agrosolar power plant spanning 770 hectares, with a capacity of 660 megawatts. Its size is validated by the fact that it will meet the power demand of 200,000 households. Our country can boast more similar projects, which, while considering energy and environmental protection, also care for agriculture. These are solar power plants like Solaris Energy, installed in Kladovo, and DeLasol, installed in the municipality of Lapovo, the largest bifacial solar power plant installed on soil in Serbia. The grazing of sheep is possible on the agricultural land where the power plants are located, which is very important for farmers due to the declining number of available grazing areas for their animals.

Prepared by: Katarina Vuinac

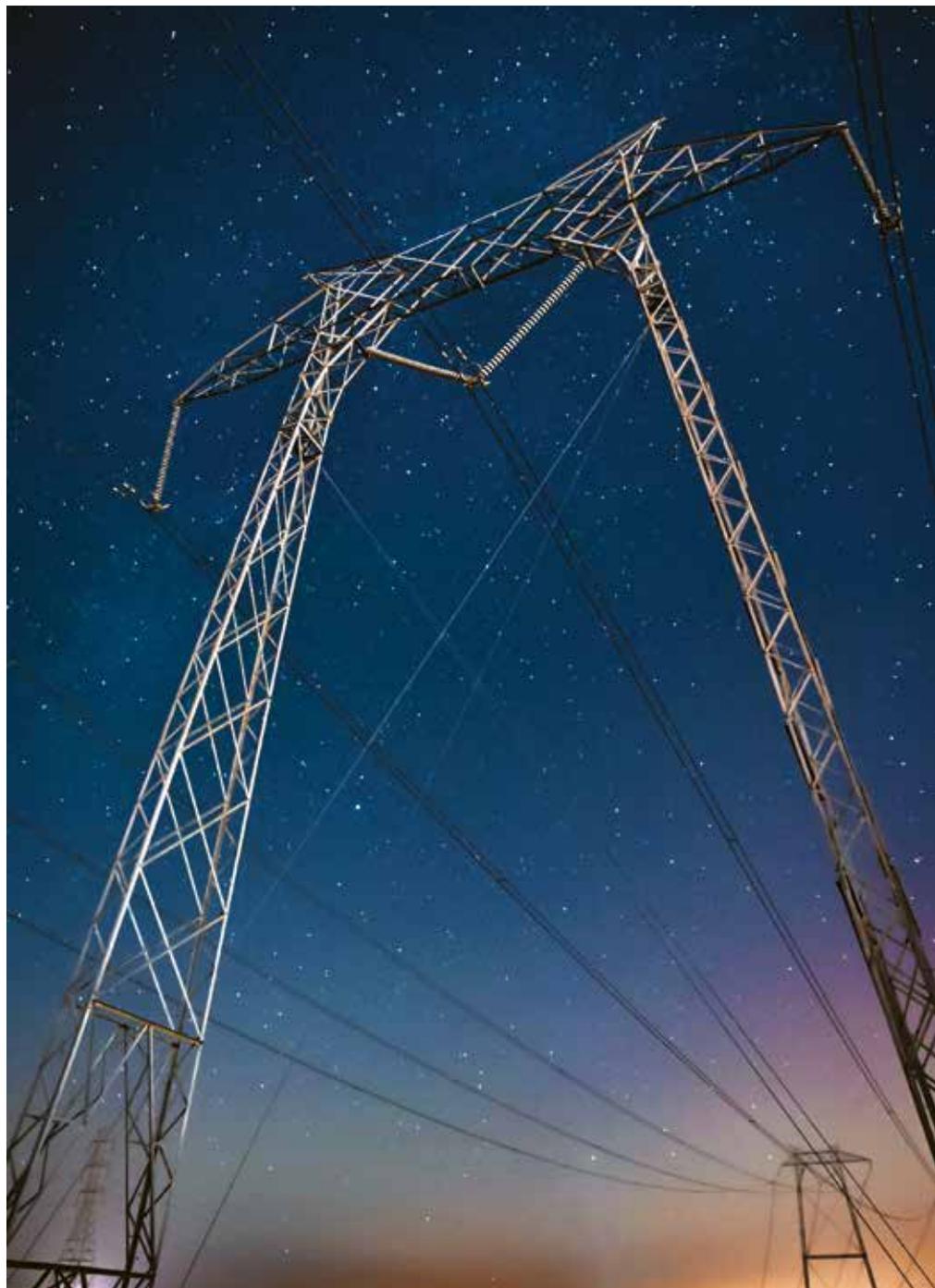


# ELECTRIC POWER DISTRIBUTION OF SERBIA – CHALLENGES OF CONNECTING PROSUMERS TO THE POWER GRID

**S**ince the Law on the Use of Renewable Energy Sources in Serbia was adopted in April 2021, there has been a strong interest in installing solar panels. An increasing number of citizens and companies use the opportunity to produce electricity for their own needs and to distribute the surplus to the national power grid and thus become prosumers.

The prosumer concept focuses, first and foremost, on households and small businesses. At the same time, large industrial consumers will have the opportunity to self-supply with the help of the active buyer concept.

The installation of solar panels in households is also supported through the subsidy programme for boosting energy efficiency for family houses and residential buildings, which the Ministry of Mining and Energy implements together with local governments, which incentivizes citizens to decide to produce electricity.



The interest is strong, and the procedure for establishing a connection has been significantly expedited compared to the beginning of the application period



## A multitude of connection requests

Elektrodistribucija Srbija (The Electric Power Distribution of Serbia Company) has received numerous requests from producers who generate electricity from renewable energy sources to connect to the national power grid.

With the passing of amendments to the Law on the Use of Renewable Energy Sources, the new Law comes into force, which prescribes limits for the connection of capacities to produce electricity from renewable sources to avoid overloading the distribution and transmission grids.

Predrag Matić, director of the Planning and Investments Directorate at Elektrodistribucija Srbije d.o.o. says that the prosumer concept was practically introduced in April 2021, while the current amendments to the Law have supplemented and developed it. In his company, the initial interest in the concept was shown in November 2021, after adopting the Decree on Criteria, Conditions and Manner of Calculation of Receivables and Liabilities between Prosumers and Suppliers.

“We can say that the interest is strong, and the procedure for establishing a connection has been significantly expedited compared to the beginning of the application period. So, for example, in April of this year alone, we connected 200 new users to the grid and entered them into the Prosumer Registry,” explains Mr Matić.

## Novelties that the Law amendments bring

The amendments mentioned above to the Law stipulate several changes related to the category of prosumers. Predrag Matić says they have no significant influence on citizens who want to install a solar power plant as they are more related to the industry in the prosumer segment.

“Citizens’ interest is not expected to decrease. The only essential change that the power plant’s installed power limit is determined at 10.8 kW for households. The current average for connected users is 8 kW, so it is essential to increase the threshold to make it more profitable to install solar panels,” Mr Matić adds.

An increasing number of solar power plants, like all capacities generated from renewable energy sources, must be connected to the distribution grid after construction. Any new power plant, be it solar, wind power, biogas or hydropower, affects the grid. As a responsible company, Elektrodistribucija Srbije, says Predrag Matić, checks all technical prerequisites for connection to the grid of each production facility, drafts connection studies in which criteria are checked based on operating and grid rules, etc.

He especially underlines the fact that everyone is ready for challenges when it comes to connecting new prosumers to the grid.

**PREDRAG MATIĆ** graduated in electrical engineering from the University of Novi Sad’s Faculty of Electrical Engineering, Department of Electrical Engineering and Computer Science/ Department of Energy. In 1995, he started working for the Elektrovojvodina Novi Sad Public Enterprise – Energotehnika Južna Bačka on the construction and maintenance of power facilities, after which, in 2002, he became a part of the management of PD Elektrovojvodina Novi Sad’s Energy Sector. In June 2017, he was transferred to the management of EPS Distribucija d.o.o. Belgrade, Directorate for Planning and Investments, where he occupied the position of chief professional associate, only later to become a specialist in the Directorate for Planning and Investments in January 2019. In April 2021, he was appointed Director of the Directorate for Planning and Investments of Elektrodistribucija Srbije d.o.o. Belgrade.

When asked if he expects Elektrodistribucija to change the operating rules this year, which will define the possibility of connecting power plants with a battery system, Matić says that that is a matter of laws and by-laws, which comes under the jurisdiction of the Ministry of Mining and Energy and does not relate to operating rules. He adds that Elektrodistribucija Srbije must adopt new operating rules only after the prerequisites are met.

Prepared by: Milica Radičević



# EMPOWERING CITIZENS TO BECOME PROSUMERS OF SOLAR ENERGY

**S**erbia is making significant strides toward a cleaner and more efficient energy future with the support of the German government within the framework of the German Development Cooperation program.

PROMOTION OF RENEWABLE ENERGY AND ENERGY EFFICIENCY IN SERBIA is a project implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in cooperation with the Serbian Ministry of Mining and Energy, which aims to develop the prosumer model further and familiarize the citizens with this new concept in the Serbian power supply system.

This initiative contributes to transforming the Serbian energy landscape and empowers citizens to actively participate in the energy transition.



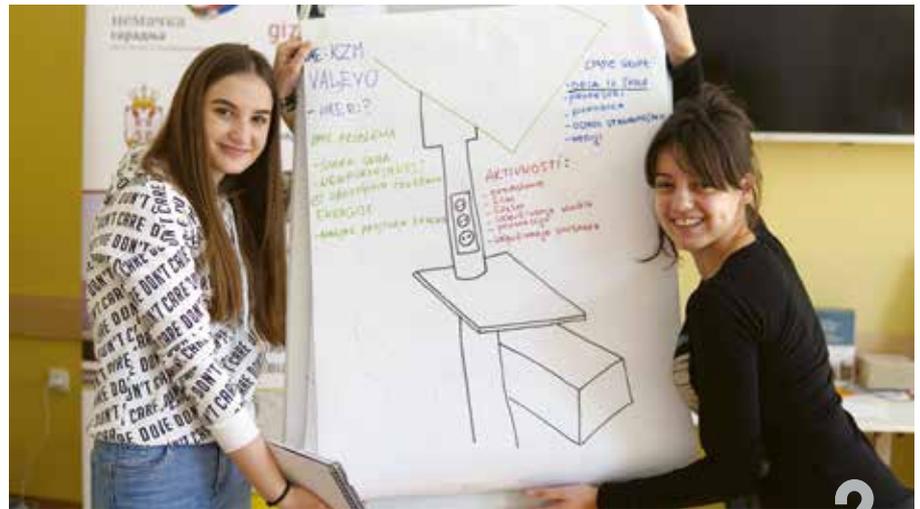
The greatest contribution to energy sustainability is given when investing in a solar power plant is done after implementing energy efficiency measures. Electricity consumption and thermal energy losses should be reduced, coupled with more efficient

The ceremonial signing of the cooperation agreement in the city municipality of Novi Pazar for the implementation of pilot projects and support for prosumers.

cooling and heating systems, and only then self-production of clean energy should come into focus.

The prosumer model, introduced only last year, allows households, housing communities, and businesses to become clean energy producers for their consumption while maintaining the ability to use electricity from the distribution grid when “the Sun isn’t shining,” i.e., when there is no production, or it is insufficient. Also, prosumers can transfer their surplus clean energy to the grid through a two-way meter.

The decentralization and democratization of electricity generation allow citizens to contribute directly to decarbonization and environmental protection. Serbia has excellent potential for solar energy use – up to 30–40 per cent more insolation than Germany – but is far from the installed capacities that exist there. Fortunately, in the last ten years, prices of photovoltaics have dropped significantly, and the path to mass adoption of solar power plants is becoming shorter and easier, at least in terms of affordability.



2

is consumed directly, during the time of day when production from the solar power plant is highest, which requires certain changes in habits. With good planning of the capacity of the rooftop solar power plant, adjusted consumption, and the subsidies for PV systems offered by the Ministry in cooperation with local self-governments, households can pay off their power plants in less than eight years, and their lifespan is at least 25 years. With the expected increase in electricity prices, this will only be shortened further.

Participants presenting their project ideas during the second cycle of the Solar Camp for Young Leaders, organized in cooperation with the Vojvodina Environmental Movement and the Eco Center Radulovački from Sremski Karlovci.

The “Solartech to the People” course was organized in cooperation with the Elektropionir energy cooperative.



3

Another advantage that citizens can have as prosumers is financial savings, as they can produce a significant amount of electricity for their needs and buy less from the power utility. The greatest savings are made when most of the self-produced electricity

Decentralization and democratization of electricity production enable citizens to contribute to decarbonization and environmental protection directly

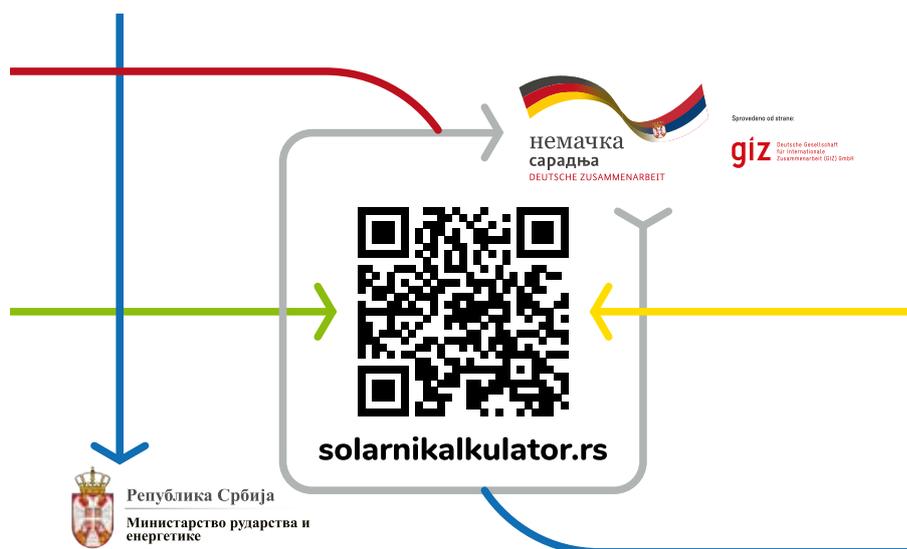


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Training sessions for PV installers were organized in Kać in cooperation with the company Energy Net.

Households have an additional advantage – they can create “kilowatt-hour stocks” at a time when their solar power plant production is greater than their consumption, and they can hand over the excess kilowatt-hours to the distribution network, which the distribution operator records through net-metering. Prosumers can use their “stocks” by the end of the accounting period, which lasts from April of one year to the end of March of the following year. However, this practice creates pressure on the network and the supplier because surpluses are created at the time of the year when consumption in the entire system is lower, and the “stocks” are used up when consumption is the highest and electricity production is the most expensive. Hence, the sustainability of this calculation method is in question.

Although solar energy is renewable, it is also a variable source of energy. Production in the solar power plant is only possible during the day, and



5

The Solar Calculator is a digital platform that estimates the optimal capacity and dimensions of a roof solar power plant and its investment value.

even then, when it is cloudy, it drops significantly. When prosumers lack enough self-produced electricity, they can get the necessary energy from the grid. But what happens when prosumers have surpluses and many of them at the same time? All surpluses

of clean energy go into the grid as a priority source in the energy mix, and the power utility company then supplements this from their production in thermal and hydropower plants.

In theory, more electricity may be produced from renewables than consumed at that moment within a distribution network, which would require transferring the excess electricity to the transmission network and further diverting electricity where there is a demand for it.

Planning electricity production and managing the distribution



# 6

A training course for vocational schoolteachers was held at the “Mihajlo Pupin” secondary technical school in Kula, organized in cooperation with the Society for Renewable Energy from Kula.

system in the framework of the democratization of electricity production and the increasing participation of renewables in the energy mix are becoming increasingly complex for the Serbian power supply system and require adjustments.

The decarbonization imperative and the high level of readiness of citizens and businesses to invest in their clean energy production require swift action of competent institutions and give momentum to the energy transition in Serbia.

Primarily focusing on the multiple benefits that Serbian citizens will have from using self-produced electricity from solar energy but also considering the limitations that the power supply system currently faces, this German Development Cooperation project considers many of the perceived challenges in the transition to a sustainable energy future.

Through cooperation with relevant institutions and organizations at the national, regional, and local levels, we reach our project goals through several lines of action: activities aimed at raising awareness of the benefits of using solar energy, improving the legal and technical framework for using renewables, piloting technical solutions and financing models, as well as strengthening the capacity of relevant target groups – representatives of institutions in the field of energy policy, experts from the power supply system, energy managers, the educational system, the civil sector, and the media.

GIZ



# 7

The winning team of the IT competition for the best software solution in the field of solar energy, “RE-Hack the future,” organized in cooperation with the Science and Technology Park Novi Sad.

With good planning of the capacity of the rooftop solar power plant, adjusted consumption, and the subsidies for PV systems, households can pay off their power plants in less than eight years, and their lifespan is at least 25 years



# MULTIPLE BENEFITS OF BIOGAS – FROM ENERGY TO FERTILIZER

There are currently 39 biogas power plants operating in Serbia. We are also working on an assessment of the real potential in the construction of biogas plants in Serbia. Still, according to the first assumptions, we are talking about significantly more plants than 39

**R**enewable energy sources have become an inevitable topic, especially in the last year, yet it seems that contemplating them is reduced to very few sources. Solar energy could take the first place as a source available for wider use, which requires a relatively simpler and cheaper installation, followed by wind energy, with a more demanding installation process, but with great potential, which has been receiving more and more investments. However, a frequently mentioned source, hydro energy, is often found in a negative context in terms of jeopardizing the environment. The mentioned sources are the ones that most often come to mind when talking about renewable energy. Thanks to its geographical characteristics, Serbia has a significant potential for obtaining energy from such sources. One of the potentials is biogas, which has not garnered enough attention yet and whose usefulness goes furt-

her than producing energy. We asked electrical engineer Goran Knežević to explain what biogas is, its generation process and its advantages compared to other renewable sources.

Biogas is a mixture of gases created by the decomposition of organic matter without the presence of oxygen. This process is called anaerobic digestion, and it could be compared to the process of digesting food in a cow's stomach. Biogas can be produced from almost all organic residues, whether from farms, agricultural holdings, industries, the service sector, or food chains. In this way, in addition to solving the problem of supplying cleaner energy, biogas also solves the problem of waste. On the one hand, farms that generate organic waste for free or at extremely low prices can solve the waste disposal problem. At the same time, on the other, thanks to biogas plants, there is the possibility of transforming waste into electricity and heating/cooling energy, or biomethane.

Biogas power plants operate 24/7 and are only stopped for scheduled maintenance and servicing. They operate for 8,000–8,300 hours per year, and during that time, a power plant with a capacity of 1 MW produces 8,000–8,300 MWh of electricity



**GORAN KNEŽEVIĆ** graduated in electrical engineering at the Faculty of Technical Sciences in Novi Sad. He has been dealing with biogas since 2010 when the first regulation defining the renewable energy sector in Serbia was passed. He successfully managed the construction of one of the first three biogas power plants in our country, after which he was also the manager of that power plant until 2015. Goran Knežević is also one of the initiators of establishing the association called Biogas Serbia, which was formed in 2012 to represent, develop and improve the entire sector. He is also a member of the Board of Directors of Biogas Serbia.



Biogas' contribution to the reduction of environmental pollution is shown by the fact that burning biogas prevents the emission of methane into the atmosphere, a gas with a greenhouse effect that is 22 times more pronounced than carbon dioxide. By upgrading biogas to the biometer level, carbon dioxide is released that can be used in greenhouses or, say, the carbonated beverage industry.

In explaining the biogas production process, we should mention that animal and vegetable waste contains a high percentage of proteins, fats and carbohydrates. During the anaerobic decomposition of such substances, which can be divided into four stages, namely hydrolysis, acidogenesis,



acetogenesis and methanogenesis, a considerable amount of gas with a high percentage of methane (40-65 per cent by volume) is produced, which is called biogas (medium thermal power 16.2 - 19.8 MJ/Nm<sup>3</sup>).

“The decomposition process begins with the mechanical shredding of raw materials, fed several times a day into hermetically sealed tanks, so-called fermenters (digesters). The whole process takes place at a constant temperature, usually in the range of 36-42°C. The capacity of the fermenter is sufficient to keep the raw material in them for 30-60 days, which allows the bacteria to generate biogas efficiently. After it has been produced, biogas is purified and then transported to the so-called cogenerator. A cogenerator is a device created by connecting a gas engine and an electricity generator. In this way, electrical and thermal energy is produced (thermal energy is a consequence of cooling the cogenerator). The electrical energy is then measured and handed over to the Electric Power Industry of Serbia (EPS), and the heating/cooling energy can be used for own needs, or further sale,” explains Goran.

There are currently 39 biogas power plants operating in Serbia. We are also working on an assessment of the real potential in the construction of biogas plants in Serbia. Still, according to the first assumption, we are talking about significantly more plants than 39.

Suppose biogas power plants are compared with other types of renewable sources. In that case, they are far more efficient and predictable in producing electricity, which also means that the balancing costs for their operation are negligible. Biogas power plants operate 24/7 and are only stopped for scheduled maintenance and servicing. They operate for 8,000-8,300 hours per year, and during that time, a power plant with a capacity of 1 MW produces 8,000-8,300 MWh of electricity. For comparison, a mini-hydro power plant of



the same capacity can produce about 3,500 MWh of electricity per year, a wind farm of the same capacity can produce about 2,000 MWh of electricity per year, and a solar power plant of the same capacity can produce about 1,250 MWh of electricity per year.

Although there are significant advantages of biogas, it should be noted that biogas plants are more expensive compared to other plants of renewable sources.

“This is understandable because the production process is far more complex, and, unlike other plants, biogas power plants are the only ones that need raw materials to produce electricity. On the other hand, this, at first glance, bad feature opens

unfathomable possibilities for solving environmental problems and disposing of organic waste while at the same time reducing Serbia’s dependence on the import of natural gas, which should be our strategic commitment,” says Goran Knežević.

## Processing of biogas into methane and fertilizer

If biogas is purified to the biomethane level, there is no electricity and heat production. In this case, biomethane can be used like natural gas, i.e. in all industries. The advantages of this kind of processing are reflected in the fact that almost 100 per cent of

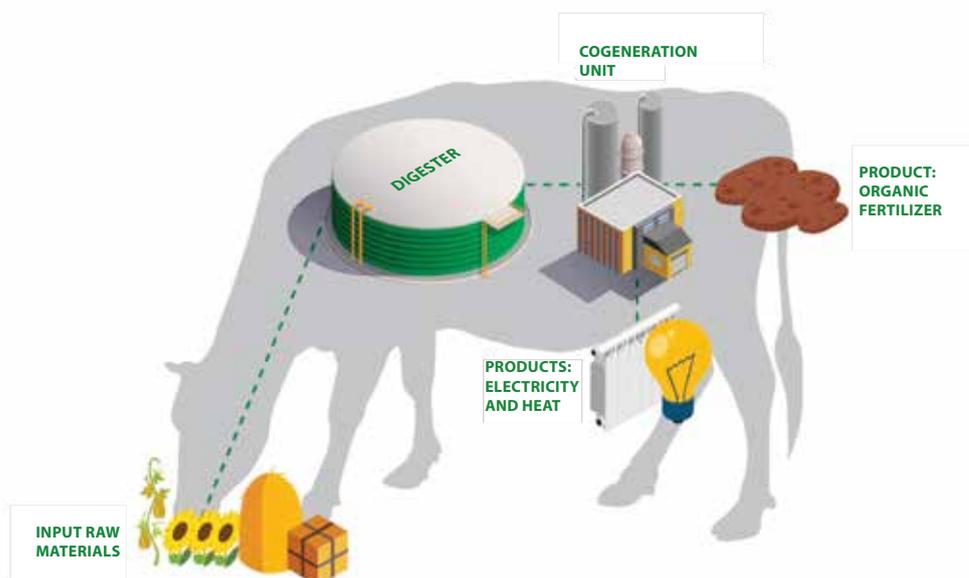


the energy from biogas is used in this way. When the legal regulation that allows the injection of biomethane into the national gas grid is adopted, the construction of new production capacities will reduce Serbia's dependence on importing natural gas. Four hundred biogas plants are enough to fill the gas storage in Banatski Dvor, whose capacity is 800 million cubic metres. These quantities are sufficient to meet the total needs of the population for thermal energy during the heating season.

“During electricity production, about 40 per cent of biogas energy is used, while the rest goes to thermal energy and losses. It would not be an inferior solution if the generated heat were fully utilized. In practice,

### TYPICAL COMPOSITION OF BIOGAS BY VOLUME PERCENTAGE

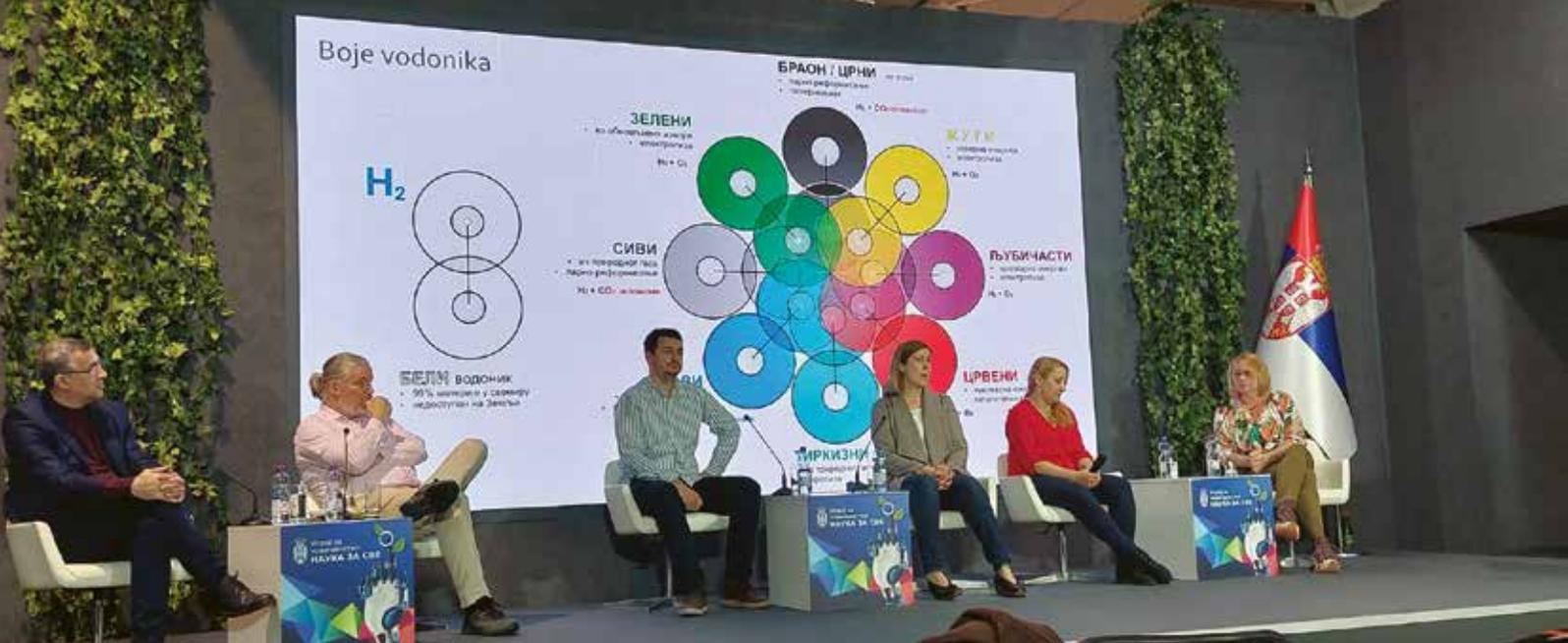
Methane with 45-60 per cent, carbon dioxide with 25-40 per cent, water vapor with 1-6 per cent, oxygen with more than 3 per cent, as well as nitrogen, then ammonia with more than 1 per cent, as well as hydrogen and hydrogen sulfide from 30 up to 20000 ppm.



however, it is often the case that thermal energy is often used very little or not at all,” says Goran.

The benefits that can be reaped from the biogas production do not end with its use for energy. Namely, at the end of the process, the post-fermentation mass can be used as a top-quality fertilizer, common for agricultural land. According to our interlocutor, post-digestate is not an organic fertilizer, but its use is allowed in the production of organic food. Before use, it is necessary to analyze the post-digestate because the quality of the fertilizer directly depends on the type and quality of the input raw materials.

Prepared by: Katarina Vuinac



# HYDROGEN IS THE ENVIRONMENTALLY FRIENDLY FUEL OF THE FUTURE

It has been predicted and recommended that 4 per cent of the total electricity production should have been spent on the production of green hydrogen by 2050

**T**he establishment of the Centre for Excellence for Hydrogen and Renewable Energy, CONVINCe, results from systematic long-term research in materials for use in energy and environmental protection at the Vinča Nuclear Research Institute. The Centre has developed a hydrogen storage method. On a larger scale, the examination of the properties of materials with potential application in solid-state hydrogen storage occupies a special place in the Centre's activities, primarily because of the importance that hydrogen, as an industrial raw material, has today, as well as because of the potential and future role of green hydrogen in energy and decarbonization of industry under the paradigm "hydrogen economy". Existing applications of hydrogen range from the chemical industry, petrochemicals, methanol

production, and hydrogenation of vegetable oils to the steel industry. We spoke with Jasmina Grbović Novaković, head of the CONVINCe of the Vinča Nuclear Research Institute, about the possible future application of hydrogen in the field of transport – large machines, long-range planes, ships, trains and truck transport, the development of hydrogen storage tanks and hydrogen's advantages when used in industry and energy.

"The application of hydrogen is also possible in the energy field (long-term energy storage, continuous sources and isolated stable power supplies, industrial heat sources, etc.). Forecasts contained within the latest analyses of the development of hydrogen energy and possible applications of hydrogen are mainly based on the limitations associated with gaseous storage. This problem can be overcome by storing hydrogen in a

solid state, that is, by chemically binding hydrogen in the form of metal hydrides," says Jasmina Grbović Novaković.

**Researchers have developed a solid-state hydrogen storage tank, the so-called pilot plant. How does it work, and how can the fuel of the future be applied?**

– Storing hydrogen in a solid state is an alternative to conventional storage methods, primarily due to eliminating safety risks. Hydrogen is chemically bound in the material from which it cannot escape without raising the temperature in controlled conditions. The storage density can be very high – with some materials, the density of stored hydrogen corresponds to storage in a gaseous state under a pressure of 600 bar. The tank, which was designed and constructed at the CONVINCe Centre,

Unlike electric vehicles, where electric engines are powered directly by batteries, two scenarios are possible with hydrogen vehicles. The first is the use of hydrogen in modified internal combustion engines, and the second is based on the principle of hydrogen tank-fuel cell coupling



works on the principle of bonding in a solid state, with active hydride powder in the form of pressed cylinders and controlled supply and removal of heat, depending on whether the tank is being filled or emptied. Such a tank is typically coupled with a fuel cell to produce and store electricity.

#### How would a car which runs on solid, i.e. hybrid, hydrogen work?

– Unlike electric vehicles, where electric engines are powered directly by batteries, two scenarios are possible with hydrogen vehicles. The first is the use of hydrogen in modified internal combustion engines, and the second is based on the principle of hydrogen tank-fuel cell coupling. The released electrical energy is used to power the vehicle's electric engine. Existing technological solutions involve using gaseous hydrogen stored in composite bottles under very high pressure. Using solid-state hydrogen tanks eliminates the possibility of explosion due to mechanical damage to the tanks at hundreds of times

lower working pressures, while even mechanical damage and rupture of the tank will not cause significant hydrogen leakage, even if the vehicle catches fire.

#### What is Serbia's potential for the development of hydrogen technologies? How is green hydrogen used in Europe?

– The most technologically developed countries invest in boosting material and human resources to develop hydrogen-based technologies as a primary energy source. Due to its unique properties, hydrogen is recognized as a possible solution in the fight against climate change. Motivated by the fact that the European Union adopted the Hydrogen Strategy for a climate-neutral Europe in 2020, many EU Member States have launched an initiative to adopt national hydrogen strategies, considering the particularities and level of industry, energy and economy development.

First, The European Strategy recognizes green hydrogen and sets

**JASMINA GRBOVIĆ NOVAKOVIĆ** graduated from the Faculty of Physical Chemistry of the University of Belgrade in 1999. She got her master's degree at the same Faculty in 2003 and her doctorate in 2005. She was also given the title of scientific adviser in 2013. The main area of her scientific interest is materials for hydrogen storage and for use in health and environmental protection. Ms Grbović Novaković is the founder and manager of the CONVINCE Centre, which was founded and accredited in 2018 and re-accredited in 2022. She is also the manager of several bilateral scientific projects and a member of the Board of Directors of several international COST campaigns. Furthermore, she is the head of the NATO Science for Peace and Security project and several projects financed by the Serbian Innovation Fund. Last but not least, she is the author or co-author of more than 250 scientific papers published in journals or conference collections of papers and a laureate of several awards.



ambitious goals for the EU to ensure production from electrolyzers with as much as 40 GW of installed power by 2035, which would enable the production of even 10 million tonnes of green hydrogen annually. In terms of hydrogen energy in Serbia, and considering the predominant share of “grey” hydrogen in total production, there is a possibility of switching to “blue” hydrogen in the existing processing capacities in the future. It would be achieved by retrofitting existing capacity to enable efficient CO<sub>2</sub> capture. In our production and technological practice, systems for working with hydrogen have already been designed and implemented in cooperation with the CONVINCE Centre and a domestic company. Considering the achieved “level of technological readiness” in the development of solid-state hydrogen storage tanks for stationary and mobile applications, this solution’s commercialization can also be expected here.

The use of hydrogen for energy storage at this moment can only be achieved with serious investments, as foreseen by the Draft Hydrogen



## ACTIVITIES OF THE CONVINCE CENTRE

Current research and development activities taking place in the CONVINCE CentE are financed by the Innovation Fund and international institutions.

“The plan is to develop hydrogen compressors as part of the required hydrogen infrastructure, a self-sufficient system for stationary power supply based on green hydrogen and renewable energy sources. We are also planning a joint pilot project with the Faculty of Mechanical Engineering in Belgrade to develop an urban light H<sub>2</sub>FC transport vehicle with innovative hydrogen storage technology in chemical hydrides,” Jasmina Grbović Novaković points out.





Strategy of Serbia. There is a possibility of producing hydrogen on farms in the form of blue hydrogen, i.e. with carbon and CO<sub>2</sub> capture. Grey hydrogen, which is currently mostly produced at the industrial level, is immediately consumed during the subsequent technological steps and processes in petrochemicals to produce fertilizers, etc.

**What are the economic benefits of using green hydrogen in industry and energy?**

– If we want to mitigate climate change, the best way is to design alternatives to fossil fuels in energy and production processes. Those alternatives must be technologically feasible, che-

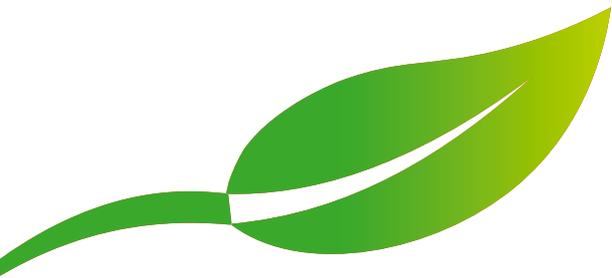
ap, economically justified, and profitable. In this sense, the main obstacle to the transition to a sustainable hydrogen economy is the real cost of production, storage and transportation of green hydrogen. As far as the energy sector is concerned, hydrogen as an energy vector could provide additional stability and durability to the energy system if surpluses in daily production, which are inevitable due to nature and volatility, as well as the growing share of renewable energy sources, were used for hydrogen production. This hydrogen could later be used for load-balancing grids when the need arises.

**When will Serbia get its first hydrogen strategy, and what is its significance?**

– Following an initiative by the Chamber of Commerce and Industry of Serbia, a team of experts was formed (collaborators of the CONVINCENCE Centre, IHTM and the University of Belgrade’s Faculty of Mechanical Engineering and the Faculty of Technology and Metallurgy) with the view of the Draft Hydrogen Strategy of Serbia, as part of the general Energy Strategy of the Republic of Serbia, being adopted. This draft recognized the importance of science and education in the future energy transition of our country. The current Law on the Use of Renewable Energy Sources from 2021 recognized “renewable”, i.e. green hydrogen, and prescribed incentives for “technologies in early development that use renewable sources”, as well as for “production, transport, storage and use of renewable hydrogen”. The Strategy envisages the creation of an appropriate legal framework, boosting human resources and R&D capacity and decarbonization of the energy sector, in addition to the transport, industry and agriculture sectors. It has been predicted and recommended that 4 per cent of the total electricity production should have been spent on the production of green hydrogen by 2050.

Interviewed by: Mirjana Vujadinović Tomevski





# TODAY, PHOTOVOLTAICS IS CHANGING THE WORLD TO A GREAT EXTENT!

**T**he world we live in is very different from the one we lived in a few decades ago. Thanks to the tireless efforts of scientists, we now have technologies, devices, and gadgets that make our everyday lives much easier. One of the most significant contributions of scientists that is currently impacting us is the conversion of sunlight into electricity through photovoltaics.

The solar industry is one of the fastest-growing industries in the world, and it is estimated that it will continue to develop in the future.

Energetik energija d.o.o. is built on twenty years of experience and passion in the field of photovoltaics. Through partnerships with the most important manufacturers of photovoltaic equipment, they can offer customers more than just a product.

“What sets us apart is not only our range of products and prices; anyone can do that. We are there for our clients when they need us the most, providing

full support and offering different solutions when they need them. We serve as their warehouse when needed, understanding and meeting their specific needs. That’s why at Energetik energija, we don’t just focus on the product range; we develop tools that are essential in the rapidly changing scenario of photovoltaics and provide knowledge that can make life easier for our customers”.

Energy storage is becoming a key factor in renewable energy as it allows energy produced during the day to be stored at night or during periods of low sunlight. This technology has the potential to increase the reliability and stability of solar energy sources significantly and represents a crucial step in achieving a sustainable energy future.

In addition to webinars, educational meetings, and training, another important offering we have developed for our customers this year is the 2023 STORAGE GUIDE. It is a comprehensive document, serving as a tool and an e-book (often considered the favorite reading material of every installer, planner, company, etc.) that greatly facilitates planning and finding solutions for various projects in the short term. In storage guide, we have combined and included the offer of the best battery systems, their combinations and compatibility with inverters, capacities and real powers. With recommendations and our choices for the best possible solutions, this guide

The 2023 STORAGE  
GUIDE has been  
translated into  
Serbian and is  
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To get your 2023 STORAGE GUIDE, simply subscribe to our newsletter through QR code.



In field MESSAGE just write 2023 STORAGE GUIDE and you will get soon your copy on email.

will help absolutely every installer, regardless of their level of knowledge, to find the best solution for their clients and save their time, gain planning speed and client satisfaction.

As each client represents everything to us, it is our epicenter, so we also understand that their epicenters are their customers and in that circle of trust we are always there, thinking in advance how to improve our services, how to help, how to advise and dedicate ourselves to each customer personally and reach the best solutions.

As the development of photovoltaics in the Balkans is rapidly growing and the need for energy storage is an essential part of solar power plants, our 2023 STORAGE GUIDE enables every contractor, regardless of size, to present the best solution to their clients in the shortest possible time.

Energetik energija

# 2023 STORAGE

## GUIDE



energetik



# MY EV ROAD TRIP TO THE SOUTH OF SERBIA

**W**e hear more and more often that electric vehicles are our future, while some of us already consider it to be the present. However, as many divided opinions on the subject or potential reasons as to why they are not a realistic alternative to standard vehicles, there was no way to know the truth until I ventured out to gain first-hand experience. I haven't had the opportunity to drive an electric car until now, so I decided to try it out and find out how things are going.

Considering the infrastructure in Serbia, I was worried about whether I could get to the very south of Serbia without any problems, where my destination was, and I was also concerned about the differences compared to the conventional car I was used to. The chosen route for my first test drive was Belgrade-Vranje.

A journey of about 350 kilometers was ahead of me, and I only knew that traveling by electric car required a bit of planning before the trip itself, primarily because of the locations of the electric chargers. I chose to drive a Hyundai Kona Electric with a battery capacity of 64 kilowatt hours. Planning a trip involves researching the infrastructure network of chargers, where there are two types – AC slow chargers and DC fast chargers.

The difference between these chargers is primarily in the charging speed. DC chargers have a higher



charging power, i.e. they charge faster, and their power can go up to 300 kilowatts, while AC chargers are up to 22 kilowatts at most and are mostly home chargers. They are also found in hotels and other facilities. I started from Zvezdara, where a Charge&GO charger in the Science and Technology Park is available to users of this complex.

The company that operates this charger has its network of electric chargers. In Belgrade, they have AC and DC chargers, and I found out that in Borča, they have a DC charger with a power of 75 kilowatts. Several OMV

Planning a trip involves researching the infrastructure network of chargers, where there are two types – AC slow chargers and DC fast chargers

I relied on the Charge&GO network chargers and their new platform when planning my trip. Charge&GO is a leading company in the field of electromobility in Serbia. They are continuously working on expanding their network of chargers and were, therefore, my first choice



Milica Vučković  
journalist of the Energy Portal



pumps in the city are waiting for the commissioning of higher-power DC chargers. That's why I charged the car's battery at the mentioned AC charger because it was the one closest to me and set off for Vranje. At 90 kilometers from Belgrade, I stopped at the Gazprom Petrol pump in Velika Plana to ensure I had enough electricity to get to the hotel in Vranje.

I topped up the battery, which was only 12 per cent dead by this point. In the same way as in a conventional car, fuel consumption is written in liters. In an electric car, you can monitor the electricity consumption on the dashboard, which was 17 kilowatts per 100 kilometers in my case. I noticed that driving on the open road is less economical than driving in the city, contrary to what we know about diesel and petrol cars.

Since there is not much braking on the highway, the Hyundai Kona drew more electricity, while in the city, where the brakes are frequent, the battery was replenished with each pedal press. This principle is called regenerative braking and means that the battery is discharged but also recovers energy by braking because the engine acts as a generator and produces electricity that is then returned to the battery. It would mean that there is some benefit from city traffic when



you drive this car, which was extremely useful information for me.

Therefore, the range varies from 350 kilometers of driving on the open road up to twice the range if it is a question of city driving where there is always a lot of braking. In Velika Plana, I topped up the car to 95 per cent. Surely someone would ask me why I didn't fully charge the battery when I was already connected to the charger, but there is a logical and economical answer.

There is a 50-kilowatt Charge&GO DC charger at this location. Since I had over 80 per cent of the battery – it was recharged to less than 10 per cent in 20 minutes because the power used to charge the battery dropped to three kilowatts, which was quite slow. Crucial information for new e-drivers: an electric car is set up to 80 per cent of the battery at maximum power,

of acceleration from which the electric one already starts its drive since it has much greater energy losses, such as combustion – as much as 70 per cent are losses. In contrast, an electric vehicle has 20 per cent losses, so it starts faster. Speaking of acceleration, you can reach a speed of 100 km/h in about seven seconds in this car. There is a possibility to set the cruise control, but also the limit. In the second variant, you can add gas, but only up to the speed you have limited.

The factory car is set to a top speed of 177 km/h, but I haven't tried that. On the highway, I was surprised when, when changing to another lane, the car stopped me, keeping me in the lane because I didn't turn on the turn signal. It can confuse you if you change direction without flashing your lights. On top of that, the car is incredibly



and for the remaining 20 per cent, the charging power decreases linearly, which is why I charged the difference between 86 and 95 per cent of the battery for 20 minutes on a DC charger, which would be the situation with any other battery-powered car model.

The next performance that catches the eye is the car's startability, even in eco-mode, which is less startable than the three offered driving styles: eco, comfort and sport. A conventional car needs time to reach the level

Outdoor driving is less economical than city driving, contrary to what we know about diesel and petrol cars





By registering on the Charge&GO platform, you automatically get a lower price on their chargers, and via GPS navigation, you get information about the nearest charger

quiet and silent. When you go from diesel to electric, the silence is really noticeable.

I wasn't afraid of breakdowns because I knew that with an electric car, there is less chance of being left on the side of the road, given that electric cars have 25 moving parts, unlike conventional ones, which have over 1,000, and therefore have a much higher chance of breakdown. I was listening to music and charging my phone, and my air conditioner was working, which affected the battery to some extent – about 6 per cent for the entire route, in my estimation. Considering that I was driving in the spring when the days were warm, the weather conditions had no significant effect on the battery efficiency.

However, I can't wait to see the performance in the winter when the cold weather takes its toll. Apart from the break at Velika Plana, there was no need to stop at another location with chargers, although I certainly prepared a map with chargers in advance. After Belgrade and Velika Plana, I could fill up my car at OMV gas stations in Lapovo and Kruševac, in the urban area, then Niš and finally in Vranje. I arrived at my final destination with 10 per cent of the battery, which would be enough for another 30 to 50 kilometers, depending on the driving itself. At the OMV pump in Vranje, I charged the battery up to 90 per cent in an hour using the Charge&GO DC charger and paid 2,500 dinars for that service. Given that I managed to get

acquainted with the battery capacity, I can say that if we were to charge the battery from zero to 100 percent on the AC charger, it would take between four and five hours, where a minute of charging would cost about 13 dinars on the power charger 22 kilowatts. The situation is different if I charge the battery from zero to 100 per cent on a DC charger. In the first 45 minutes, 80 per cent would be replenished, and even 40 minutes would be needed for the remaining 20 per cent, although already in the first 45 minutes, the car has great mileage autonomy. I have already mentioned this, so it should be understood that this is a simple rule for electric vehicles.

Specifically, on the way back to Belgrade, I charged the entire battery in Lapovo on a 100-kilowatt Charge&GO charger in less than 90 minutes, and the minute was 76 dinars. I must admit that with a gas car, I would definitely pay more for this trip. If I consider that the price per liter of fuel is around 180 dinars and that my previous diesel used an average of 7 liters on such a trip, I get a calculation of around 4300 dinars. With the Hyundai Kona Electric car, this came out to me significantly less. However, if we were to compare city driving, I would get an even better calculation and greater savings precisely because of regenerative braking. While I was driving, I was constantly notified about the current battery capacity and mileage on the screen, and the data matched the real state, which gave me confidence for future drives. When planning my trip, I relied on the Charge&GO network of chargers and their new platform.

Charge&GO is a leading company in the field of electromobility in Serbia. They are continuously working on expanding their network of chargers, which is why they were my first choice. By registering on the Charge&GO platform, you automatically get a lower price on their chargers, and via GPS navigation, you get information about the nearest charger.

Prepared by: Milica Vučković





# MORE ELECTRICITY FROM RENEWABLE SOURCES IN MONTENEGRO

**E**lektroprivreda Crne Gore (EPCG) has embarked on a substantial investment cycle in the segment of renewable energy sources and investments in numerous new green energy projects. One of these is the Solari project, which began producing solar energy, once the Solari 3000+ and Solari 500+ projects were implemented. Applications for the new Solari 5000+ project have also been completed. This project has generated a multitude of positive effects, which are already visible from the financial aspect for households, businesses, individuals and EPCG, and from the aspect of the expectations of the international community regarding the reduction of the emission of harmful gases and the bigger use of renewable energy sources.

We spoke with the Director of EPCG, Nikola Rovčanin, about the advantages of investing in solar energy, improving infrastructure, building wind turbines and the Pljevlja Thermal Power Plant operations.



TPP Pljevlja has started implementing an environmental reconstruction project. We are trying to realize this project with our partners and contractors as soon as possible, bearing in mind that Montenegro has to fulfil the environmental requirements necessary to continue with the EU accession process regarding powdery substances, sulfur and nitrogen oxides

**What is the goal of the Solari project, and what are the benefits for the end customer?**

– The beneficiaries of the Solari project are given the opportunity to install the appropriate photovoltaic system, paying it off in equal monthly amounts equal to their average monthly electricity bill. The maximum investment repayment period is 10 years. Users who own a billing metre with power mea-

surement (so-called maxigraph) and want to install a photovoltaic system, in addition to the monthly amount for the repayment of the photovoltaic system, retain the obligation to pay the Engagement of Network Capacity monthly fee, which in the final monthly instalment will be equal to the average monthly electricity bill.

By installing a photovoltaic system, the end user becomes a so-called prosumer, who meets their energy needs from their own source, and any excess/shortage of electricity at a certain moment is handed over/received through the power grid, which is financially balanced out annually. Users pay off the system in equal monthly instalments through a credit arrangement provided by EPCG. In this way, the project's beneficiaries become the owners of a small solar power plant, the capacity of which is designed to approximately (or completely) meet their electricity needs.

**The EPCG Solar Gradnja Company has trained teams that are at the service of consumers to efficiently reach the stage of producing electricity themselves and becoming prosumers. How much solar energy is used, and what is the motivation like?**

– Our staff responding quickly to the rapid energy transition in the market poses a special challenge. EPCG recognized the labor shortage problem and then felt it on its skin. The launch of the Solari 3000+ and Solari



**NIKOLA ROVČANIN** is a law graduate. Since 2009, he has been working at the Pljevlja Waterworks, where he performed the duties of the Managing Board Secretary, head of the General, Legal and Personnel Affairs Department and legal advisor. For more than 10 years, he represented the company before courts and state authorities. Mr Rovčanin was active in trade union organizations at the state and local levels. Since 2014, he has been a councillor in the Assembly of the Municipality of Pljevlja, and he was appointed the executive director of Elektroprivreda Crne Gore on March 24, 2021. In 2021, he was appointed a member of the Board of Directors of the Chamber of Commerce of Montenegro and a member of the Board of Directors of the Association of Managers of Montenegro.

500+ projects actualized this threat, but we were ready for it because we had foreseen it. We arranged for timely training sessions and worked hard on properly training our employees, so today, EPCG Solar Gradnja has a significant number of very good and ready assembly teams to respond to serious challenges when it comes to the installation of photovoltaic systems, whether they are mounted on the roofs of buildings or the ground. New facilities create new jobs, and we see this as an opportunity in our company, not only as a company but also in terms of a broader picture re-



garding social responsibility. I believe that the state must get involved and, through school curriculum and programs for retraining and additional workforce training, enable people to learn, acquire new skills and improve.

**Does the existing infrastructure need to be improved to contribute to the bigger use of renewable energy sources in Montenegro?**

– It is necessary to improve the existing power infrastructure in Montenegro to prepare it to support numerous new green energy sources. There is some concern regarding possible problems in our current transmission system. Nevertheless, I think that we will overcome these problems and that, in parallel with the implementation of the planned projects, the transmission system will develop and be ready to infra-structurally support all newly connected production facilities.

EPCG has managed to overcome the energy crisis by not stopping its investment cycle, but by maintaining the stability of the energy system, without restrictions and by not increasing electricity prices.

**How far did you come with constructing the GVOZD wind farm in Krnovo? What are the next plans?**

– In terms of wind energy, we have a project that entails the construction of the Gvozd wind farm with an installed capacity of 54.6 MW. It will be financed from the credit agreement EPCG will sign with the EBRD. All tender procedures for Gvozd are conducted on the EBRD's electronic procurement portal according to transparent procedures. During the pre-qualification segment of the tender for the procurement of wind generators, which includes the procurement, installation and commissioning of wind generators, received nine offers from renowned global companies, four of which entered the second round of the tender procedure. In the following period, and in

The beneficiaries of the Solari project are given the opportunity to install the appropriate photovoltaic system, paying it off in equal monthly amounts equal to their average monthly electricity bill. The maximum investment repayment period is 10 years



addition to embarking on the second phase of the procurement, which stipulates the procurement, installation and commissioning of wind generators, another tender will be launched for construction works on the plateaus and internal medium voltage network, roads, followed by a tender for connecting the Gvozd wind farm to the power transmission grid. A public call for an implementation consultant will also be launched.

**What is the fate of TE Pljevlja?**

– TPP Pljevlja has started implementing an environmental reconstruction project. We are trying to realize this project with our partners and contractors as soon as possible, bearing in mind that Montenegro has to fulfil the environmental requirements neces-

sary to continue with the EU accession process regarding powdery substances, sulfur and nitrogen oxides. All these systems that we are installing will contribute to that. In this way, Montenegro will position itself as a country with one of the latest thermal energy facilities in the region and beyond.

**You built a solar power plant on the roof and parking lot of the EPCG administration building. Why did you decide to do this, and how much energy is generated in this way?**

– Over a thousand solar panels were installed on the roof of EPCG's administrative building and the parking, and the value of the project was estimated at close to 600,000 euros.

The solar panels were installed as part of the Energy Renovation

and Adaptation of the EPCG AD Nikšić Administration Building project, and the goal is to make the building energy-neutral. The ultimate goal is to provide sufficient electricity to cover the consumption of the company's administrative building. About 40 per cent of energy consumption in the building is covered, i.e. close to 500,000 kWh of electricity per year.



**Could you tell us about new projects you will implement by the year-end?**

– In the previous period, EPCG operated in an unpredictable and unfavorable environment. We had bad weather and geopolitical instability that led to unpredictable disturbances in the electricity market. We tried to work as committed as before, in the best interest of our citizens and the state and overcome all difficulties.

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**ADJUSTING THE LAW**

The green transition process should be implemented quickly, which is a challenge considering the expectations, legislation, directives and obligations of Montenegro.

“From the financial aspect, the challenge of increasing interest rates is also current. If we want to implement large investments, which are valuable, and we want to do that quickly, we must make certain legislation-related interventions. The national legislation was not ready for a quick energy transition, but certain developments have taken place,” says Mr Rovčanin.

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The sharp rise of market electricity prices coincided with the period when EPCG needed significant imports (May–October). In contrast, relatively lower prices followed periods when EPCG was export-oriented (first quarter, November, and December 2022). The prices ranged from 200 – 500 €/MWh monthly, while on the other hand, we had bad weather with the absence of precipitation during the first eight months. About 60 per cent of the average precipitation led the production of electricity at hydroelectric power plants (HPPs) to be at 46.65 per cent, small HPPs “covered” 0.11 per cent, while the Pljevlja thermal power plant produced the rest, i.e. 53.24 per cent of the total of 2,731.7 GWh.

**How successful is Elektroprivreda Crne Gore?**

– EPCG has managed to efficiently manage electricity production, supplying consumers with electricity in an orderly and high-quality manner, operating profitably and maintaining good business relations with all partners.

In a year rife with challenges, EPCG has managed to preserve liquidity and creditworthiness, increase the collection level and the number of regular payers, and keep electricity prices for citizens and businesses at the same level. EPCG's total capital investments amounted to over 47 million euros. Investments have continued to be made in the current year, and the planned investment funds are around 105 million euros. I would like to mention some of the projects that we are implementing – the Gvozd wind farm, Briska Gora solar power plant, construction of HPP Komarnica, installation of the A8 aggregate in HPP Perućica, further implementation of the Solari 5,000+ project, construction of a small hydropower plant Otilovići, hydropower plant Kruševo, Bilečko Lake – HPP Boka and Brana Slano, Dam Vrtac and Vilušić solar power plants.

Interviewed by: Mirjana Vujadinović Tomevski



# BIOMASS IS ONE OF THE MOST IMPORTANT SOURCES OF RENEWABLE ENERGY

Official data show that biomass is one of Serbia's most significant renewable energy potentials, especially regarding agricultural biomass. Unfortunately, its potential is almost untapped.

Serbia ranks fifth in Europe in heat energy production (per megawatt hour), right behind Finland, Lithuania, Denmark and Austria. Gas supply is becoming increasingly challenging, which is why there is a growing interest in renewable

energy sources, and, thus, in the use of biomass.

Using biomass for energy production brings various benefits and opportunities, from new jobs to boosting local and regional economies.

If it is produced sustainably, the amount of carbon dioxide relevant to the climate is zero kilograms. Carbon dioxide released by burning biomass was previously absorbed from the atmosphere by plants through photosynthesis and is returned to the atmosphere either through natural

Using biomass for energy production brings various benefits and opportunities, from new jobs to boosting local and regional economies

decay or fuel production. It practically means that the biomass produced sustainably is carbon neutral, which reduces emissions of harmful gases, lowers energy's environmental impact and brings us one step closer to achieving the goal of carbon neutrality by 2050.

This energy source can also be used in construction. Still, due to

insufficiently developed industrial production, poorly developed policies for the promotion of the circular economy and the public that is inadequately informed about the necessity of the circular economy and sources of financing, the potential of eco-innovations, including those based on biomass, is far from being fully utilized.

For biomass processing plants to function smoothly, we must ensure a reliable agriculture and forestry supply



## Use of biomass

Biomass can be used to generate electricity, biofuel and biogas, as well as for heating, cooking and water heating.

The most widespread use of biomass for heating is the use of pellets, which is very popular due to its high energy efficiency. They are obtained from biomaterials, usually wood.

Biofuels are obtained by processing biomass in production. Thus, bioethanol, an alternative to petrol, is obtained from potatoes, sunflowers, maize and similar biomasses, while biodiesel is obtained from oilseeds and is safe for the environment. Of course, there is also biogas, which is produced by processing animal excrement, solid biomass and sewage waste. It can be used as fuel for generating electricity and heating water and it is an excellent alternative to natural gas.

A biomass energy system can last forever, but its production must be sustainable.

Therefore, close cooperation with the research community and the development of effective laws and regulations are necessary to avoid negative impacts on land fertility, forests and the entire environment due to the greater use of biomass.

For biomass processing plants to function smoothly, we must ensure a reliable agriculture and forestry supply. According to the advice of experts gathered in the National Association for Biomass SERBIO, there has to be close cooperation between the energy sector, the forestry and agriculture administration and farmers and forest owners to ensure a reliable and price-competitive biomass supply. Special attention should be paid to system planning so biomass does not negatively impact the environment.

One of the biggest advantages of biomass is that it can be used continuously, unlike the sun and wind, and some consider it the renewable source of the future.

Prepared by: Milica Radičević



# NEW INVESTMENTS IN RENEWABLE ENERGY SOURCES ARE A SURE WAY TO THE ENERGY TRANSITION

**T**he energy transition is a serious, complex, and long-term process that must be fair. It happens on two tracks – electric power through the construction of new renewable energy sources capacities and reduction of the use of fossil fuels, as well as through the transition of awareness and creating an overall social consensus that the transition to the use of green energy is a useful and necessary process. We talked about this important topic, the relevant Law and plans regarding renewable energy sources in Serbia, with Danijela Isailović, General Manager of the RES Serbia Association.

**The Renewable Energy Sources of Serbia Association was founded two years ago to improve the business environment in our country's RES segment while helping transition from fossil fuels to renewable energy sources and promoting this significant segment in our country. How is our country's transition to renewable energy sources going?**



The first auctions must be successful, both for the investors who will thus protect their reputation and ensure new green megawatts that will be purchased by EPS and for the energy transition process itself

The passing of the Law on the Use of Renewable Energy Sources in 2021 was a significant step forward in the energy transition and the fight against climate change



– If we look at the numbers and percentages, Serbia is in an excellent position regarding the use of renewable energy sources. It is well-known that Serbia almost met the ambitious goal of 27 per cent of green energy in 2020, as Eurostat statistical data showed that we reached a 26.2 per cent share. On the other hand, we have had a standstill in recent years, and the fact is that, as of 2019, not one large RES power plant has been connected to the power grid. The reasons are known – the Law on the Use of Renewable Energy Sources provoked great interest and numerous connection requests but did not bring what was prescribed as a priority – new green megawatts on the grid. After the changes to the Law that took place recently, I expect the first round of auctions to take place and the construction of several large wind farms and solar parks with a capacity of up to 10MW. We can conclude that the energy transition is happening on a campaign level. We had a great investment cycle from 2015 to 2019 when new wind farms of almost 400MW capacity were built and a large number of small solar and biogas plants. Then, a four-year hiatus happened. I expect a new tide of construction and investments in the coming years. If this does not happen, then the energy transition is questionable. Nevertheless, I am an optimist, both in terms of private investments and the state's activities, primarily the Electric Power Industry of Serbia (EPS). The

energy transition can only be successful if EPS is the driving force behind that story. Judging by the Kostolac hydropower plant that is finally being built, the announced investments in solar and the Green Road project, which foresees billions of investments in green energy, I think it will happen. As for the transition of awareness, I think there is no dilemma. Citizens are talking and asking about green energy. They understand its environmental, economic and energy importance, and their interest and support are great. We are continuing on our educational mission.

**In April 2021, the Law on the Use of Renewable Energy Sources was adopted, as were amendments to it only recently. How do you evaluate the new legal framework?**

– The passing of the Law on the Use of Renewable Energy Sources in 2021 was a significant step forward in the energy transition and the fight against climate change. The Law sent out an excellent message about Serbia's direction. Unfortunately, it turned out that the Law was perfect only on paper but unenforceable, which did not produce significant results. More than two years after the adoption of the Law, we have not completed the regulatory framework and its implementation, which was stopped by the key stakeholders in the energy sector – EMS, EPS, and the Energy Agency – who demanded the Law to be changed

**DANIJELA ISAILOVIĆ** is a political scientist with a degree in journalism and communication. She was a journalist in the most popular media outlets for 10 years, reporting on current political and security issues. For two years, she worked as a consultant in the Serbian Ministry of Justice and on important international projects implemented by the OSCE and the Council of Europe. Since 2013, she has been dealing with renewable energy sources while actively participating in developing the Kovačica, Malibunar and Alibunar wind farms and the Plandište 1 wind farm, whose construction is expected. Ms Isailović is a Renewable Energy Sources Group member of the Polish Chamber of Commerce and an associate member of the Association of Energy Lawyers of Serbia. She participated in the formation and now manages the Renewable Energy Sources of Serbia Association.

so that the excessive number of applications for connection (to the power grid) would not collapse the grid itself. Namely, the attractiveness of the Law and the accompanying narrative appealed to numerous foreign investors in Serbia, both serious ones and others, as well as investors from Serbia. All this resulted in a general frenzy regarding the application for connection to the grid, and we found ourselves in a situation whereby EMS AD received approximately 19GW worth of reques-

sts for connection to the power grid. Probably only 10 to 20 per cent of those requests are realistic and achievable, but the operator did express their concern and subsequently asked for the regulation to be changed.

As an Association, we advocate stricter criteria when securing a place in the grid, both in terms of the documentation required when applying

and comments of our members who submitted their proposals and suggestions. By accepting specific comments, the Ministry of Mining and Energy gave us a clear sign of support and expressed the desire for further development of power plants that use renewable energy sources for generating energy. The most significant objection that has been accepted is

European countries, we are facing difficulties and financial challenges.

**The adopted amendments to the Law on the Use of Renewable Energy Sources stipulate that only producers in the incentive system can assume the role of a balance-responsible party. The right to priority access is limited to plants up to 400kW capacity, i.e. to plants up**



and in terms of providing financial guarantees, namely, a guarantee that a certain investor will build a plant that will produce the number of megawatts for which they are requesting a connection.

The new amendments bring fundamental changes in the renewable energy sources sector, as they are expected to implement new projects after the first auctions are held this year and probably the new cycle next year. Now we expect the adoption of by-laws, primarily the Balancing Decree and other legal acts that are currently missing.

**The RES Serbia Association actively participated in a public debate and gave comments on the amendments to the Law on the Use of Renewable Energy Sources. Which of your most important suggestions were accepted and which were not?**

– At a public debate, the Association gave a series of comments on the draft Law following the instructions

that if the Facility Connection Study (which has been drafted and adopted by the transmission system operator as per the Law on Energy) shows the need for additional electricity storage, such projects will have priority when it comes to the connection to the grid, concerning other projects. This objection has been accepted so that projects providing storage will not be delayed in terms of connection.

I must underline that the prices of raw materials, equipment, logistics and transportation for wind and solar farms have increased drastically, just like the costs of construction, financing, and insurance of projects. There are still major problems with the supply chain. This indicates that investors will only be willing to participate in auctions if the Serbian government offers a sufficiently attractive and competitive price. Unfortunately, we missed the period when the cost of investments in renewable energy sources was low, and during that period, we had no construction going on. Like investors in most



## PLANS OF THE RES SERBIA ASSOCIATION

In addition to holding auctions for wind and solar, which the Association members welcome, the Association also expects to see the adoption of a three-year plan for auctions, as well as the Integrated National Climate and Energy Plan, which will define how much electricity from renewable sources Serbia wants and plans to generate until 2030, i.e. until 2050. The celebration of Global Wind Day is also underway. The Association plans to engage in talk about the most important issues to be discussed at the traditional RES SERBIA 2023 conference on September 14. Commitment to the inclusion of women and young people remains one of the priorities for the Association, and the Green Women's Network is also planning new activities.



Photograph: Unsplash/Thomas Reaubourg

to 200kW as of January 1, 2026, under European practices and regulations. Are you happy with those changes?

– We know that taking on balance responsibility is inevitable, and our members have been preparing for this type of responsibility for years. Something like this doesn't come as a surprise for all stakeholders in the subject segment, but a logical sequence in harmonizing our regulation with European practices and regulations. It is a positive thing to retain priority access for smaller capacity power plants, which will motivate investors to continue developing "smaller" projects as well. The installation of primarily solar power plants on buildings, houses and in less accessible locations ensures the increase in energy efficiency that we all strive for. The contribution of each of the individual renewable sources power plants is very clear because each installed megawatt will successfully replace and reduce the production of electricity in thermal power plants, which is our ultimate goal, i.e. the use of energy from clean, renewable sources for a healthier life for all of us.

**What novelties does the Law bring regarding prosumers, and does it create a favorable climate for Serbia having more prosumers?**

– In their first version, amendments to the Law stipulated a limitation of the power that prosumers produce to 150kW for legal entities and 6.9kW for households. These amendments were made at the initiative of the electricity distribution system operator. That limitation was because the distribution system operator faces many requests for connection to the grid (as much as 2GW worth) from potential consumers. Unfortunately, as in the case of transmission in the case of large power plants which generate power of more than 10MW, unfounded requests appeared in the prosumer system, which overloaded Elektro distribucija, the distribution system operator that requested the-

se amendments to be made. Many organizations and companies have protested against this, as they believe that the prosumer concept makes no sense, especially in the industry, taking into account the needs of factories and industrial plants that want to produce electricity for their needs via their roof power installations. This was a small victory, but still only a temporary solution. A permanent solution definitely must be found.

**The first auctions for 400MW of wind energy have been announced. Do you know when they will take place and under what conditions?**

– The auctions should be announced very soon, perhaps even while this issue of the Energy Portal magazine is being printed. The conditions have been known for a long time and have not changed, which means that projects in the late development phase that have a minimum energy permit and a planning basis for connection, as well as those that guarantee the seriousness of the offer with a bank guarantee and meet several other conditions, can participate in the auctions. Our members have long been ready for auctions and obtained building permits for new wind farms. The ultimate question is the maximum auction price and balancing costs. The cost of equipment, transportation, logistics, financing and insurance have soared so drastically that only an attractive auction price can bring investors to auctions. Unfortunately, the time of cheap green megawatts has passed, and for the past four years, we have not connected any large facility to the grid due to the lack of regulation. Failure to do so will cost us a lot in terms of achieving goals and shares in the coming period.

The first auctions must be successful, both for the investors who will thus protect their reputation and ensure new green megawatts that will be purchased by EPS and for the energy transition process itself.

Interviewed by: Milica Radičević



# A MODERN AUTOMATION AND ENERGY PRODUCTION CONCEPT

**E** ATON Electric offers a wide range of products and solutions its partners use to implement renewable energy projects and boost energy efficiency. The company strongly focuses on raising awareness, educating employees, and optimizing internal processes.

Aleksandar Vasić, Cluster Sales Manager at EATON Electric, says that the company has prepared a special mobile application for employees worldwide to learn more about how to adjust their habits to increase energy efficiency or reduce pollution.

“In terms of business and production facilities, we implement a series of measures – from efficient waste management and optimization of energy consumption to the transformation of the vehicle fleet by replacing traditional vehicles with electric drive”, says Aleksandar Vasić, who talked about the application of EATON solutions in Serbia, the advantages of the new electricity production, storage, and consumption concept, as well as solutions for solar power plants.

**What solutions does EATON offer in Serbia, and in which sectors are they applied?**

– We develop and implement solutions for efficient, safe, and sustain-

able energy management with our partners. In addition to being used in electricity production, they are also applicable in electricity distribution to the end user. Our products are also

## BUSINESS DEVELOPMENT

EATON has been operating in Serbia since 2006. The company started its operations when the production of automatic fuses in Sremska Mitrovica was launched. Not long after that, a sales office was opened in Belgrade to market and promote the company’s products and solutions. “Today, EATON employs about 1,000 people in Serbia, in its factory in Sremska Mitrovica, while the Belgrade sales office has grown into a hub where, in addition to the sales department, it has technical support and marketing and finance departments that assist the EATON Company throughout Europe,” Mr Vasić points out.



xSolAir is EATON's answer to the need to provide a mobile substation, compact in size and ready to be connected, for a solar power plant, especially a power plant installed on the ground



used in various industry segments, from machine manufacturers to telecommunication operators. One of the products we manufacture in our Sremska Mitrovica factory – an automatic fuse – is used in households and factories.

**What is the 'Everything as a Grid' concept, and what are its benefits?**

– 'Everything as a Grid' is our vision of the future regarding electricity use. It is a completely new concept of production, storage, and consumption of electricity since we live in a world where electricity is no longer produ-

ced only in large power plants. The idea is that consumers become producers and can produce energy locally, store it, and send it "back" to the power grid if necessary.

'Everything as a Grid' is a set of products and solutions, primarily digital, which help users to maximize the use of self-produced energy and become more energy independent. On the one hand, it reduces the carbon footprint and costs. At the same time, on the other hand, the user can generate a surplus of produced or stored energy and make it available to the power grid, which positively affects the system's stability. The needs and capabilities of each user in the grid are individual, which is why each solution is adapted to their needs.

**xSolAir is a very interesting system for solar power plants. What are its advantages, and how is it different from similar systems?**

– The latest market research shows that by 2050, the use of solar energy will increase as much as 18 times, and to use it properly; we need a solution that is easy to implement and adaptable to different terrains in a short period. Precisely for this reason, but also to facilitate easy delivery and commissioning, xSolAir is EATON's answer to the need to provide a mobile substation, compact in size and ready to be connected, for a solar power plant, especially a power plant that is installed on the ground. This solution

**ALEKSANDAR VASIĆ** is the sales manager for the Adriatic&Greece region, which includes Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, Greece, Cyprus, Malta and Albania. During his sixteen-year-long career at EATON, Aleksandar was in charge of technical support for automation products and expanding the distribution network in Serbia. He also led the project team in Croatia and Serbia. In 2021, he was appointed to the current position. Mr Vasić wants to bring the latest technologies from EATON's portfolio closer to partners and end users, making their everyday life and work safer, easier, and more efficient. He is particularly proud that EATON's team participated in constructing some of the first photovoltaic capacities in Serbia.



is actually a pre-assembled and configured container-type substation. It is important to point out that the xSolAir substation only needs to be placed in the intended location and for cables to be connected. All other parameters are set and ready for operation.

Interviewed by: Mirjana Vujadinović Tomevski





# NEWS FROM THE COUNTRY AND THE WORLD

## WHY IS THE DESULFURIZATION SYSTEM AT TENT IMPORTANT FOR SERBIA?

While environmental problems like pollution and climate change have caused countries around the world to embark on an energy transition, Serbia still largely relies on one energy source – coal. If go deeper into the problem, the coal used in our country is mostly of poor quality, which is why it is more correct to call it lignite. The extent to which this energy source is present in our country is shown by the fact that, in proportion to its size, Serbia ranks high on the list of the largest producers of lignite in the world.

Especially during the winter period, Serbia also ranks high when it comes to air pollution, to which coal contributes significantly, both by thermal power plants using it to generate energy and by households who use traditional furnaces. For example, according to data on the IQAir website, on February 13 of this year, Belgrade ranked fifth in the world in terms of air pollution in major cities, yet at the same time, five cities in Serbia were even more polluted than Belgrade.

Although we cannot currently follow the successes achieved by some more developed countries, when it comes to switching to cleaner energy sources, some steps are being taken after all. Especially in the past year, there a lot of effort was invested into replacing old coal-fired boiler plants with new ones that run on some other energy source throughout our country. Some examples of this are the new gas boiler plant in Guča and the pellet boiler plant in Osečina. In addition to the implemented projects, we should also mention those that are planned. This year, the Republic of Serbia's government had a meeting at which they adopted a decree regarding the shutdown of boiler plants with a capacity of fewer than 50 megawatts, which, among other things, rely on coal and can be connected to a district heating system or a gas pipeline. Niš was one of the Serbian cities that was classified as the most polluted on February 13 and the good news is that the plan is to shut down its biggest polluter – the boiler room in the University building.



No matter how good these examples are, they are only 'examples', showing how dependent Serbia is on coal and how much work lies ahead when it comes to switching to cleaner energy sources. Thermal power plants remain the most significant source of pollution in our country. The Nikola Tesla thermal power plant (TENT) burns between 28 and 30 million tonnes of coal annually. The TENT has five organizational units, among which are the largest TENT A in Obrenovac, which consists of six blocks with a total power of 1,765.6 megawatts, and TENT B in Ušće, which has two blocks of 650 megawatts each, and they produce more than 50 per cent of electricity in Serbia.

The most significant and largest project implemented in the Electric Power Industry of Serbia (EPS) was launched in 2019, during which a desulfurization system will be built at TENT A. The project, which should reduce sulfur dioxide (SO<sub>2</sub>) emissions 10 times, is expected to end this year. Just one year later, the groundbreaking ceremony for the construction of the desulphurization system at TENT B took place and the construction of this system should be completed in 2024. Thanks to this plant, all SO<sub>2</sub> emissions should be reduced by 20 times, more precisely from the current 80,000 to 4,500 tonnes.

In Serbia, the SO<sub>2</sub> emission level is several times higher than the permitted level, however, as reported by the EPS, with the commissioning of the flue gas desulphurization plant, the quantity of SO<sub>2</sub> in the flue gases will be within the limits of European standards.

Katarina Vuinac

## TWO SIDES OF EUROPE: COAL OR RES – POLLUTED AND UNPOLLUTED EUROPE

The Balkan Peninsula is an area that has significant deposits of coal, especially lignite, known as brown coal. Serbia has the most extensive coal deposits in the Balkans and ranks high for lignite deposits globally – right after Germany, Australia, the United States, Russia, and some other countries. The majority of Serbian coal mines are located in the Kolubara and Kostolac basins. Kosovo is also very rich in lignite and it ranks highly in terms of its quantities, but also its use. The key coal mines in Bosnia and Herzegovina are located in Tuzla, Banovići, Breza, Kakanj, Zenica, Bugojno and Gacko. North Macedonia has lignite reserves concentrated mainly around the towns of Bitola and Oslove.

The below data from the last 12 months show how active coal was in the production of electricity in regional countries.

In Serbia, 39.85 per cent of electricity was obtained from coal in the last 12 months, considering that our thermal power plants mainly use lignite, but also a significant share of 39.27 per cent comes from hydro-energy in the same period.

Croatia, just like Serbia, generates large quantities of electricity from hydro-energy – 45.06 per cent – which is not

surprising. After that, wind energy ranks high at 13.64 per cent and gas at 12.55 per cent, which also produces the largest share of emissions, while coal was close to zero.

In Bosnia, hydro-energy and coal have the highest share in electricity production with 44.8 per cent and 42.32 per cent respectively. North Macedonia also predominantly uses coal (38.22 per cent). Slovenia, for example, uses 29 per cent of nuclear energy, as much as hydro energy, while 5 per cent is coal. In a number of other European countries, coal is not used at all, or very little, like in Croatia. In countries which do use it, there is a plan to shut down coal-fired plants or switch them to use other forms of energy by 2030. Poland is one of the countries most dependent on coal, despite being an EU member.

Earlier reports from European agencies warned that the Balkans is a problem spot in terms of air and water quality, which strongly affects the surrounding countries. Pollution from coal-fired power plants in the Western Balkans also has a cross-border impact, despite the air being cleaner in Western Europe. According to WHO data from last year, Bosnia and Herzegovina had the fifth-highest death rate as a result of air pollution, due to excessive use of poor-quality coal.

Eastern Europe, especially the Balkan countries, is struggling with an air pollution crisis that is in stark contrast to the air quality in Western Europe. Looking back at the said information, the pollution data paints a poor picture but coincides with the coal data. Reliance on coal mining and the proliferation of lignite-fired power plants has resulted in alarming levels of air pollution. A striking indicator is that of the 50 most polluted cities in Europe, in 2022, nineteen are located in Bosnia and Herzegovina, and 12 in Serbia. Herceg Novi in Montenegro and Tuzla in Bosnia and Herzegovina are among the most polluted towns.

While Western Europe generally meets the World Health Organization's pollution guidelines, the entire population of Eastern Europe lives in conditions that are unfavourable to their health. Eastern Europeans lose an average of 10.7 months of life to pollution, compared to just 3.8 months in the West, according to research by the University of Chicago's Energy Policy Institute.

This region is peculiar because it resembles a labyrinth from which it is difficult to get out – there is a lot of lignite, the mines are brimming with it, and it is a cheap and easily usable source of energy, but it also promotes serious pollution and is dangerous for the population's health.

Western Europe, in contrast, has seen notable improvements in air quality over the past two decades. Portugal, for instance, implemented all WHO clean air guidelines. This division within Europe not only underscores the urgent need for Eastern Europe to end its excessive use of coal but also the necessity of collective, strategic action.

Milica Vučković



## FIVE TIPS FOR LIVING MORE SUSTAINABLY

Humanity's unsustainable consumption and production patterns are placing unprecedented pressure on the planet. From the ubiquity of single-use plastic products and fast fashion to food and transportation choices, lifestyle choices impact human wellbeing, environmental health and the economy.

Food loss and waste account for up to 10 per cent of global greenhouse gas emissions. Meanwhile, humanity produces around 430 million tonnes of plastic a year, two-thirds of which are short-lived products that soon become waste, according to the Turning off the Tap report from the United Nations Environment Programme (UNEP). By 2040, plastic production could be responsible for 19 per cent of global greenhouse gas emissions.

To address these issues, individuals must make sustainable lifestyle changes in their day-to-day lives, say experts.



### FOOD – CHOOSE LOCAL, PLANT-BASED OPTIONS

Opting for plant-based diets when possible is the most effective way to reduce the wide-ranging impacts of food consumption. Agricultural expansion is driving almost 90 per cent of global deforestation, while some 25 per cent of the global land surface is used for grazing livestock. This threatens biodiversity and ecosystem services, which provide shelter to local communities, medicine, recreational and spiritual benefits, and economic opportunities. Swapping to a more vegetable-friendly diet can improve one's health, lower greenhouse gas emissions and reduce biodiversity loss.

### TRAVEL – AVOID SHORT CAR TRIPS

Approximately 95 per cent of the world's transport is still fossil-fuel-powered and the transport sector directly accounts for 23 per cent of global energy-related carbon dioxide emissions. Using public or shared transport, or even better, walking and cycling, can help reduce emissions – and air pollution. It can also encourage a shift in the way planners design cities.

### HOUSING – MAKE SIMPLE CHANGES AT HOME AND WORK

Buildings account for 21 per cent of total greenhouse gas emissions, primarily due to electricity, heating and cooling. Simple actions in households and offices can reduce energy needs. This includes using natural light, changing clothes instead of relying on heating or cooling, and shifting to more sustainable furnishings and energy-efficient appliances.

### SHOPPING – THINK BEFORE BUYING

Humanity produces 2.24 billion tonnes of municipal solid waste annually, of which only 55 per cent is managed in controlled facilities, according to the World Bank. In this era of overconsumption, experts say consumers must change shopping patterns to consider what they need, prioritize products that last longer, and opt for sharing and repairing goods – while still ensuring people can meet their basic needs. These practices can reduce the use of high-footprint materials like plastics, paper and textiles, reducing waste and associated emissions.

### LEISURE – REDISCOVER LOCAL ATTRACTIONS

How people spend their leisure time – including on tourism and recreational activities – significantly impacts the environment. Individuals can make impactful actions to shift to more sustainable leisure activities by staying local and supporting nearby businesses. The tourism sector accounts for around eight per cent of all emissions. When travelling a long distance, experts suggest extending stays, eating local and avoiding disposables in favour of reusable products, including utensils.

Katarina Vuinac



# SIGNIFICANCE AND APPLICATION OF ESG PRINCIPLES IN THE REAL ESTATE SECTOR



Mia Zečević  
general director of the Novaston company

**T**he Novaston company plans and aligns Environmental, Social and Governance (ESG) activities with its general goals. They recently published a Guide to real estate development: an example of office space, which they worked on together with the law firm Gecić Law.

Mia Zečević, general director of the Novaston company, says that within the guide, an entire chapter is dedicated to ESG principles, their importance, and their application in the commercial real estate sector.

– The guide can be downloaded free of charge from our website, as well as from the website of the law office; it is available in both languages (Serbian

and English). With this, we wanted to, as a socially responsible company, contribute to a better understanding of the ESG concept and principles and facilitate the entire process for investors when they decide to invest in business premises – Zečević points out.

On how she sees the role and development of ESG in this company as a wider business environment in the years to come, Mia Zečević says that ESG principles are no longer a matter of trend and choice. Still, their implementation in all business spheres is a key factor and a necessity for all companies. Soon it will be necessary for everyone who wants to do business with other companies in the EU market.

– All banks, especially European ones, see the implementation of these principles as imperative, which is also shown by the incentives they receive from the EU. This year, most banks will perform a screening – what is green in their portfolios, which projects meet ESG standards, which meet the requirements for obtaining an energy passport, which meets the standards for LEED and BREEAM certificates and for which categories. Those companies whose projects are not aligned with ESG standards will have a different risk assessment, and it will be more difficult for them to borrow, get a development loan or a development investment – explained Zečević.

As for the Novaston platform, they started working on a strategy to introduce ESG principles into business. This company primarily provides services, so they are already very much up to date with everything. Following the situation, they advise clients and investors on applying ESG principles, primarily in constructing or applying them within existing buildings.

On the one hand, Novaston's role as a renowned company is to educate clients and employees, initiate initiatives, and point out the importance of applying all these principles in business to be sustainable and scalable.

Novaston



Marina Mijić  
Head of the Energy Efficiency and  
Environmental Unit at ProCredit Bank

## WHY SHOULD WE ALL USE SOLAR ENERGY

**W**e are all witnesses that the climate is changing faster and that global warming threatens the very survival of the planet and all its inhabitants. Research confirms that humans are to blame for all of this. If we cause the problem, we are the only ones who can offer a solution.

How to translate our words into action? Is it possible for us as individuals to do something really significant about it?

The answer is “yes”; it is possible. One of the key ways is to be determined to start using renewable energy sources.

**Sun-generated energy**  
Solar energy is one of the biggest and inexhaustible sources of green energy. People have been using it for more than 2,000 years. The ancient Greeks and Romans used concave mirrors to direct the sun’s rays onto a target and set fire to enemy ships. Today, instead of mirrors, we have photovoltaic



## SEVEN REASONS TO USE SOLAR ENERGY

If you are skeptical or insufficiently informed about the benefits of using solar energy, here are seven reasons to motivate you and decide to invest in solar panels.

- 1.** By using solar energy, you become energy independent. Do not forget that fossil fuels are a limited resource; furthermore, the price of these energy sources is constantly increasing.
- 2.** By using solar energy, you manage your consumption independently, whereas you would only occasionally use energy from other sources in case of higher consumption.
- 3.** With solar panels on your roof, no losses occur during energy transport, so the savings are greater.
- 4.** Solar energy is clean energy that does not pollute the environment. By installing solar panels on the roof of your house, you are doing a great thing for nature in the long run.
- 5.** The solar energy supply is stable, and there can be no restrictions or shortages.
- 6.** As more of us decide to have our solar panels, we are taking care not only of our environment but also of our community. By developing new technologies and branches of the economy, we all enjoy the benefits and improve society.
- 7.** We can use solar energy for various purposes, including heating.

solar panels and systems that absorb sunlight and generate electricity, which we then use to supply households, power cars, production plants and even entire cities.

How can we become users of solar energy? First of all, we need to become aware of all the benefits of its use.

### Bank as an advisor and financial supporter

Having understood why solar energy is the energy of the future, the next step is the investment. We learned from Marina Mijić, Head of the Energy Efficiency and Environmental Unit at ProCredit Bank, that using solar panels and solar systems is no longer science fiction for us.

“Someone might wonder why people from our bank took it to explain why and how to invest in renewable

energy sources, specifically solar. The answer is simple – ProCredit Bank has been actively engaged in green investments for more than a decade. The green loan portfolio already makes up almost 20 per cent of the total portfolio of ProCredit Group.

Our team consists of available environmental protection experts who know every step of the solar investment process. They can explain to you why it is good to invest in solar systems, what exactly you and your household get from it and what the benefits are for nature. They can also explain the financial construction in detail and give you the proper justification for the investment but also recommend adequate manufacturers and subcontractors with the best performance. Because we are committed to environmental protection as an institution, we have developed

an appropriate organizational framework to support it. Our special department deals with environmental protection and renewable energy sources. Although massive investments in renewable energy sources have been made recently, we have been doing it for a decade, and we can say that our banking advisors have good expertise in this area of financing. Implementing solar technologies in households will immediately show its good sides, while the justification for the investment will be more than obvious in the long run. The maturity of the return on the investment has decreased significantly, almost halved, so you should take advantage of the current market opportunities and invest in something that helps us and everyone around us,” says Ms Mijić.

ProCredit Bank



# INVESTING IN RENEWABLE ENERGY POWER PLANTS

In this article, I will focus only on those electricity sources that use renewable energy, which I know relatively well. These are small hydroelectric power plants, wind farms, solar power plants and power plants that use biomass that they burn directly or generate gas from biomass, mainly used by piston engines with internal combustion.

The basic feature of the first three types of power plants is the great variability of available power. The available power at these power plants is stochastic and can only be partially predicted. It means that the power system to which these power plants are connected must at all times have a working reserve that is at least equal to the power currently generated by small hydropower plants, wind farms and solar power plants. In other words, the installed power in the base part of the power system cannot be reduced at the expense of the installed power in power plants that



The state should help and encourage (with loans and other incentives) the electricity industry to build medium voltage transmission lines and the required transformer stations in places favorable for the construction of solar power plants

The price of electricity in thermal power plants depends a lot on the fuel price (coal, oil and gas). The increase in the prices of these fuels favors power plants that use renewable energy because their fuel is practically free



use renewable energy sources. Power plants that use renewable energy sources can save energy that would otherwise have to be supplied by the base part of the power system. It reduces the consumption of coal, gas and fuel oil in thermal power plants, as well as the release of unwanted gases into the atmosphere.

Given that funds must be invested in constructing power plants that use renewable energy, the number of MWs installed in the power system has been increasing. It leads to a higher fixed part in calculating the electricity price. The variable part in the calculation is zero for these power plants because the energy of water, wind and sun is free. However, the price of electricity in a power system with renewable energy power plants must be higher than in the same power system without renewable energy power plants because the number of installed MWs in such a power system is higher. The price of electricity in thermal power plants depends a lot on the fuel price (coal, oil, and gas). The increase in the prices of these fuels goes in favour of power plants that use renewable energy because their fuel is practically free.

Power plants that use biomass as fuel have less variability in available power. In this respect, these power plants are better than the previous three types. However, biomass must be collected from large areas of arable or other land and delivered to the

power plant, incurring transportation, storage, and biogas production costs.

### Small hydropower plants

Until ten years ago, talking about small hydropower plants was very popular. However, cost-effective locations for small hydropower plants in Serbia limit their total installed capacity to around 850 MW.

You have to be very careful with small hydroelectric plants. In most cases, they can be built not to disturb the environmental system in their surroundings, but they can also do much more harm than good. The state should not allow the chase for profit to prevail. Switzerland is a good example where a lot of small hydropower plants have been built, and none of them damage the ecosystem in their surroundings.

**MILENKO ĐURIĆ, PhD, professor of Electrical Engineering Science, graduated from the Faculty of Electrical Engineering in Belgrade in 1973, received his master's degree from the same faculty in 1977, and his doctorate in 1985. He worked in all positions at the Faculty of Electrical Engineering in Belgrade – from trainee assistant to full professor. Professor Đurić has taught the following courses – Elements of Power Systems, Power Plants, Switchgear, Relay Protection, Digital Relay Protection, Stability of Power Systems and Regulation of Voltage and Frequency in Power Systems. He wrote the corresponding books for all the courses. For many years, Professor Đurić taught at electrical engineering faculties in Priština, Niš, Banja Luka and East Sarajevo. He has published over a hundred scientific and professional papers in journals; about 50 are in foreign journals with an impact factor.**



In my opinion, the right to build small hydropower plants should be given to the local governments so that the people who live immediately around the relevant watercourse (stream or small river) have the right to have the last word on whether a small hydropower plant will be built at all.

Due to the small available capacity of small hydropower plants in Serbia, the state neither gains nor loses

anything if these small hydropower plants are not built. Let's just think of our ancestors who, not so long ago, built mills (watermills) mostly with one mill wheel. It did not occur to them to build a mill with ten mill wheels, although it was technically possible with the construction of larger dams, flooding of the land and damage done to the natural environment. Obviously, greed had no place there.

In our conditions, in my opinion, we should wait at least five years to see the impact of the already-built wind farms (in Banat and the Danube region) on the surrounding living world. On the other hand, the construction of wind farms must be coordinated with the existing power system, which must provide a rotational reserve. I advocate that wind power plants of higher power can only be built simultaneously with increasing the



I advocate that wind power plants of higher power can only be built simultaneously with increasing the capacity of the base part of the power system

## Wind farms

Wind farms have the greatest variability in available power. That is why the energy they generate is of the worst quality. The impact of these power plants on the natural environment is highly dependent on their location. Discussions about the extent to which wind farms damage the natural environment are not yet finished. Wind farms located in shallow coastal waters of seas and oceans do not significantly impact their environment because there are no people or animals in those locations that would be disturbed by them.

power of the base part of the power system.

## Solar power plants

In terms of operational autonomy, solar power plants are divided into autonomous (off-grid) and power plants that operate connected to the electricity distribution or transmission grid (on-grid). Solar cells of the off-grid type require the installation of storage batteries. Even though battery technology has advanced a lot, the price of batteries is still quite high, and their lifespan is relatively

short. Off-grid solar power plants are an acceptable and practically the only solution in cases where there is no electricity distribution grid near an object, and constructing an electricity distribution grid for the observed object would cost a lot. Off-grid solar power plants cannot send the surplus of energy they produce to the distribution grid when the powered facility consumes little electricity. Due to these limitations, not many off-grid solar power plants will be built for a long time.

On-grid solar power plants operate in parallel with the electricity distribution grid. They can be used only for the facility's needs, send the complete produced energy to the distribution grid, and work in a mixed mode, i.e. they can fulfil the facility's own energy needs and send surplus electricity to the power distribution grid.

Architects and civil engineers should be urged to build roofs on new buildings (especially hangars, warehouses, production halls, etc.) in such a way that they can withstand the additional load that will be caused by solar panels and inverters that are mounted on them. Roofs should be safe and easily accessible for people, devoid of large slopes and obstacles. Introducing this as a standard, even an obligation, would make sense.

Solar power plants of higher power (over 1 megawatt) can only be built on the ground due to the large area the panels occupy. Low-quality land, unsuitable for agricultural production, should be used for this purpose. At present, one of the important criteria for investors when choosing a location to construct a solar power plant on land is the existence of power infrastructure (transformer stations and transmission lines) near the location. The state should help and encourage (with loans and other incentives) the electricity industry to build medium voltage transmission lines and the required transformer stations in places favorable for the construction of solar power plants. This approach would generate great benefits to the state, would prevent the devastation

of agricultural land, and, at the same time, would encourage investors to invest in the construction of solar power plants.

Depending on the installed power, solar power plants can be connected to low (0.4 kV) or medium (10, 20, 35 kV) voltage. Solar power plants whose power is equal to or less than the power of the transformer station can be mounted on buildings with their transformer stations without any problems.

## Power plants powered by biomass energy

In our country, Vojvodina has the largest quantities of biomass. The most economical way of using biomass is to produce biogas in digesters. In

The most economical way of using biomass is to produce biogas in digesters. It is where sorghum performed best



addition to using the residue after harvesting cereals and picking maize, it is also profitable to grow certain plant crops to produce gas in digesters. It is where sorghum performed best. Vojvodina is covered by a fairly dense network of roads, both public and dirt, that connect arable plots. The existing agricultural machinery can be successfully used to collect and transport biomass to the digester. Gas piston engines with power from 0.5 to 2.5 MW are used as drive engines in such power plants. The state should support everyone who wants to invest in such facilities in all possible ways (subsidies, credit policy, etc.).



# THE MT-KOMEX COMPANY EXPANDED BUSINESS IN BIH

**M**any years of experience in constructing solar power plants have positioned MT-KOMEX as a safe and reliable partner. Engineers and installers employed by the company regularly attend specially prepared trainings and have so far built and delivered equipment for numerous solar power plants on the ground and on roofs, with a total installed capacity of 60 MW. As pioneers in solar power plant construction projects in Serbia, they are always there to help with expert advice and find the best solution for each client.

The leaders of the company realized that with their knowledge and experience in this field, they could help the development of projects in the area of renewable energy sources in Bosnia and Herzegovina, which is why in April of this year, the decision

The problem in BiH is numerous unharmonized legal regulations and regulations

was made to open the company MT-KOMEX BH.

This area's market is developing very quickly and has great potential, as needs in terms of energy and investments in renewable energy sources. BiH certainly requires its energy capacities in the production of clean electricity to stop using coal for energy production. As they are in the pre-accession arrangement for membership in the European Union, they must work to reduce carbon dioxide



This area's market is developing very quickly and has great potential, as needs in terms of energy and investments in renewable energy sources

emissions, and they can achieve this by phasing out the use of fossil fuels. The logical sequence of events is the transition to clean energy.

– Solar and wind energy are our chance to switch to green energy, and I see a lot of room for progress there. The problem in BiH is numerous legal regulations and regulations. It significantly complicates the entire procedure of obtaining all the permits required to construct a solar power plant, which significantly complicates the way for all potential investors – explains Radoslav Marić, director of MT-KOMEX BH.

The Law does not regulate the prosumer category in the Federation of Bosnia and Herzegovina, and this deters people from investing in small solar power plants. At the same time, the situation is somewhat better in the Republic of Srpska. Still, Marić believes that the laws and measures that have been adopted are not sufficiently encouraging for ordinary citizens.

He hopes that the legal regulations will be changed and that the authorities will follow the examples of the Republic of Serbia and the Republic of Croatia, which recognized the importance of the prosumer concept by adopting the Law on the Use of Renewable Energy Sources. The fact that the number of small solar power plants doubled last year shows that this segment of the Law is also well-regulated.



Radoslav Marić  
director of MT-KOMEX BH

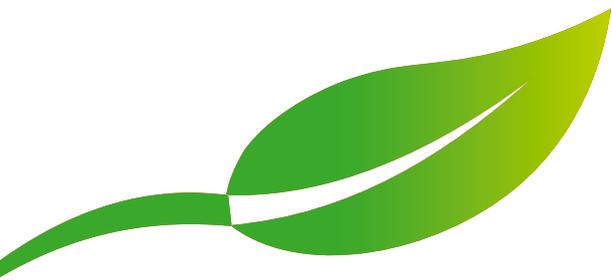
## Complicated procedure

Different legal procedures in the Federation of Bosnia and Herzegovina, at the level of Republika Srpska and in Brčko District, cause headaches for potential investors in solar power plants. Marić says that the company saw that it could help in this segment, and that's where they recognized their chance.

– We offer, so to speak, a complete package of services. It practically means that the company's expert team does everything, from idea to implementation. So we issue all the necessary permits, work on the project's development, and obtain all the necessary approvals. We actually do the entire project, the whole administrative part, and then realize it according to the turnkey system. It is one of the rare and unique offers in Bosnia and Herzegovina – Marić explains.

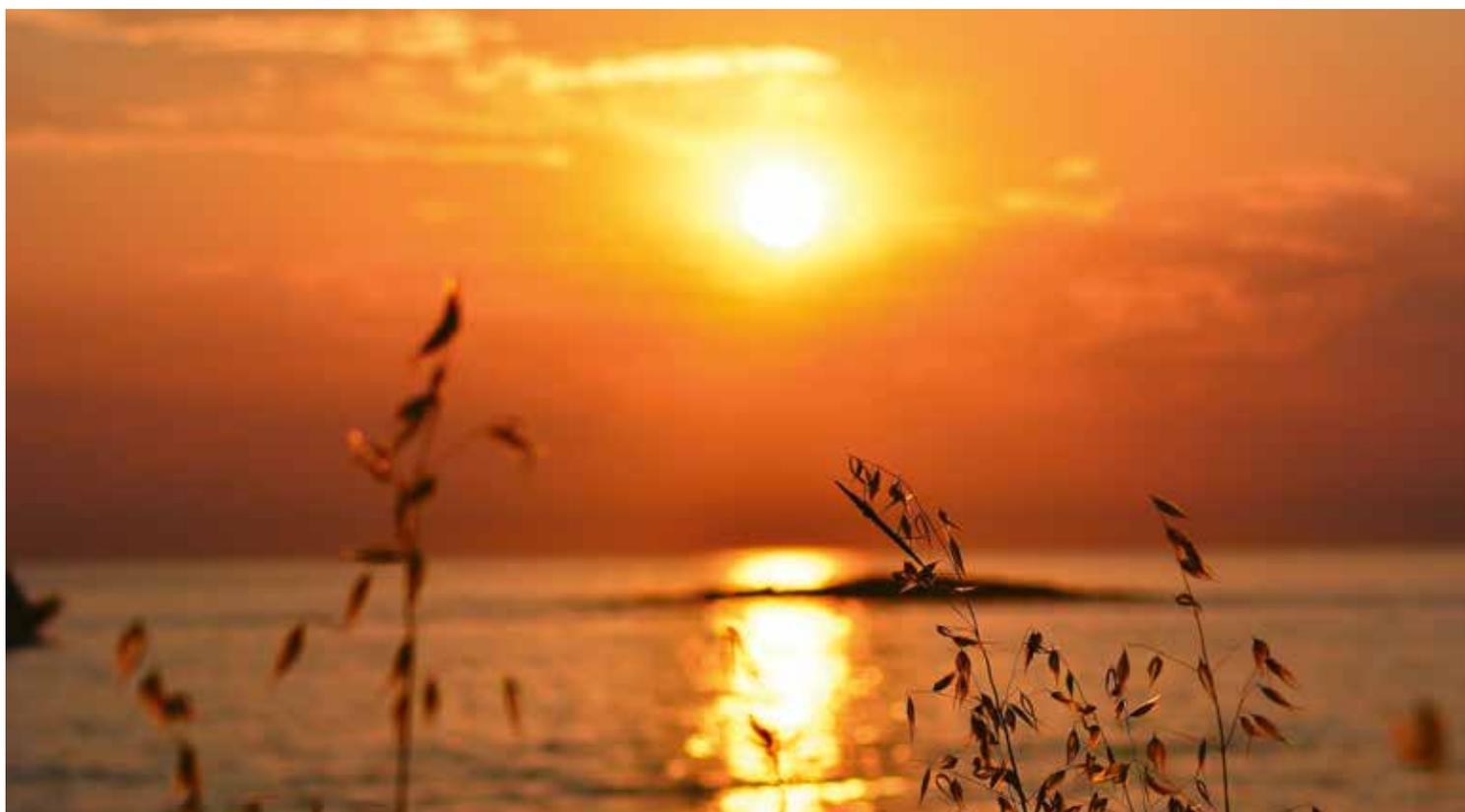
Numerous investors are ready to invest in solar power plants in this country; projects are being prepared for solar power plants, both on the ground and on the roof. The engineers and installers of the company MT-KOMEX BH are ready for all the challenges that business brings to them in Bosnia and Herzegovina and to help every client construct a solar power plant.

Prepared by: Milica Radičević



# RENEWABLE ENERGY SOURCES ARE THE WAY OUT OF THE ENERGY CRISIS

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**T**he energy crisis showed us how vulnerable we are and how fragile our energy safety is. The war in Ukraine, which caused an unprecedented increase in electricity prices, exposed all the flaws in the electricity pricing system. It forced the entire continent to develop new plans to quickly energy independence so that a similar crisis would never happen to us again. We spoke with Maja Pokrovac, director of RES Croatia (OIE Hrvatska), about what Croatia is doing to overcome the current situation and how

much attention the country pays to renewable energy sources.

## **What is Croatia doing to find a way out of the energy crisis?**

– In this crisis, Croatia fared better than many countries thanks to developed renewable energy projects, mostly hydroelectric power plants. However, due to the increase in electricity prices, the government of the Republic of Croatia, like other EU countries, implemented special measures such as capping the electricity and heat prices. Furthermore, it adopted

Solar has the strongest potential because it does not depend on location, and each location has insolation far greater than any country in northwest Europe

Energy approval has become the first important step in project development, in contrast to the former system where energy approval came after the project was almost developed



#### energy sources projects implemented?

– Both acts brought big and significant changes to the RES sector in Croatia. Energy approval has become the first important step in project development, in contrast to the former system where energy approval consequently came after the project was almost developed. According to the new Electricity Market Act, this is a key tool of the Ministry of Economy and Sustainable Development in developing and managing the energy sector.

The government introduced significant changes regarding the duration of the project development. Before, a project could last over 10 years, but now it is limited by law to a maximum of five. The time given to fulfil the prerequisites for connection to the power grid has been significantly shortened, and it has now been reduced to three months compared to last year because the requirements have been met for the Croatian transmission system operator to hand over part of its operations to external authorized and certified companies. Opportunities for innovative business formats have also been created. And for the first time, the law introduced electromobility as an important part of the country's energy transition. After the law's passing, key by-laws and other regulations were missing, so the development of renewable energy projects could not be implemented at the expected pace.

measures for developing renewable energy sources, including the abolition of VAT on solar panels.

At the same time, this crisis has once again confirmed that only energy produced within the state's borders can ensure protection from external influences.

**With the passing of the Electricity Market Act and the Renewable Energy Sources Act, deadlines for completing relevant administrative processes have been shortened. How does that look in practice, and how fast are renewable**

**MAJA POKROVAC, MSc, has been the Renewable Energy Sources Croatia (OIEH) director since its foundation in 2016. She is a Master of Science in Public Policy and completed an MBA in Energy Sector Economics. Ms Pokrovac has managed the development and communication programme at the international level working for the International Committee of the Red Cross for Croatia in Geneva, the region and Abkhazia, on ICBL projects in Washington, DC and on the Syni project in Lausanne. For twelve years, she was the director of branch associations in the Croatian Employers' Association, where she was responsible for the economic sector of transport, financial and energy markets, boosting the investment segment and economic environment. She launched the first Coordination for RES in 2013 in the HUP Energy Department. After two years of working as an advisor to the Minister of Entrepreneurship and Crafts, she took over the organization and management of OIEH. Ms Pokrovac has been proactively contributing to the issue of female economic empowerment. She is also the vice president of the Croatian Society of Lobbyists.**

There were no known rules on the criteria for conducting a public tender for issuing energy permits, which investors often complained about.

Thanks to transitional provisions of the new law, it was possible



to complete all serious RES projects. Thus, 87 energy approvals with a total power of 2,132MW were issued. Their implementation should begin soon, which means that in the next five years, we will have 2,000MW of energy produced by new RES facilities.

**What is our region's position in the RES segment compared to the rest of Europe?**

– In terms of the region, it is often associated with great potential. Solar has the strongest potential because it does not depend on location, and each location has insolation far greater than any country in northwest Europe. Indeed, this potential is huge and

can put the entire region on the map of those countries which achieved energy independence with the help of renewable energy sources and can also export electricity. Each country in the region is better than the other in some respects, but we all need administrative obstacles to be eliminated to accelerate the development of RES projects.

We have recently published an Action Plan for the Uptake of Offshore Renewable Energy Sources in Croatia, which clearly shows that we have the potential to develop as many as 25GW of offshore wind farms. Our experts have calculated that with the development of 2,500MW of wind

Due to the increase in electricity prices, the government of the Republic of Croatia, like other EU countries, implemented special measures such as capping the electricity and heat prices

and 2,500MW of solar power plants, we could cover all electricity imports. However, the potential for the development of solar energy is significantly higher than that. SolarPower Europe believes Croatia can develop up to 7GW of solar projects by 2030. Croatia has abundant geothermal deposits, and the potential for developing around 1,000MW of geothermal projects has been estimated. We currently have only 10MW installed. Biogas and biomass plants are also essential to us.

**RES Croatia became part of the large European RE-Source platform dedicated to the development of PPA contracts in the European Union. At the same time, Croatia was also included in the PPA statistics for the first time. What changes do PPA contracts bring in Croatia?**

– Croatian companies sign PPA contracts and receive inquiries for concluding new contracts almost daily. Power purchase agreements (PPAs) are extremely important to the entire energy system and benefit everyone. Companies that are large electricity consumers sign long-term contracts with renewable energy producers on the purchase of electricity at pre-

agreed prices. It enables producers of energy from renewable sources to safely sell produced electricity and customers to supply green energy at an agreed price safely. This way, companies can more easily plan their annual expenses without contemplating whether a crisis would hit them.

**Is the distribution grid ready to connect all new capacities from renewable energy sources?**

– As we heard at the recently held Days of the Sun conference organized by RES Croatia in Bol on the island of Brač, the issue of the distribution grid is a problem that affects the entire European Union. Investments in the power grid are the number one topic in Europe. The European Commission must focus on the development of power grids, as must all Member States. Croatia faces the same problem. The power distribution grid in Croatia can receive about 2,500MW of power, as much as it receives from the transmission grid. The transmission grid in Croatia needs reinforcement to be able to take new megawatts. Without constructing a new double transmission line connecting Dalmatia and Northern Croatia, it will not be possible to implement new large-scale

RES projects in Dalmatia, where the demand is the highest. The Croatian transmission system operator (HOPS) will invest HRK 1.6 billion until 2026 to revitalize, construct, digitize, and modernize the Croatian transmission power grid to facilitate the reception of new megawatts. On the other hand, in the continental part of the country (Slavonia, Banovina, Istria), we have more than 2,500MW of free capacity in the grid, which is a great potential for the development of RES and especially for the development of agrosolar power plants. In any case, to develop and receive additional energy produced from renewable energy sources, RES Croatia experts believe that Croatia should also develop energy storage systems to be able to accept more than what is currently possible, that is, 5,000MW worth of new RES projects by 2030.

**What will your association do in the next period?**

– An exciting time is ahead of us. We are proud to say that, thanks to our members and their participation in RES working groups, we revealed important issues and obstacles for the development of RES in Croatia. RES Croatia will draft a review of bottlenecks and recommendations for simplifying and shortening administrative processes, following the example of the European RES Simplify project for Croatia. We will look at all the legislative frameworks of all government ministries that are considered important for RES projects and all inconsistencies in laws and by-laws. We will make proposals on how to simplify and make everything more efficient to reduce the project implementation time to less than 12 months after an opinion on the impact on the environment and nature is obtained. The drafting of a study on the potential of using solar energy in the agriculture and freshwater aquaculture sector in the Republic of Croatia is also underway.

Interviewed by: Milica Radičević





Achieving climate neutrality and reducing the use of fossil fuels requires an accelerated transition to the use of renewable energy sources

## GREEN ENERGY AND STABLE SUPPLY WITH ABB SUPPORT

In the process of mitigating climate change and fighting for the preservation of natural resources, we are turning to renewable energy sources, improving energy efficiency and optimal consumption.

The use of new technologies and innovative solutions reduces the impact on the environment and emissions of harmful gases while, at the same time, modern society functions smoothly and safely. Achieving climate neutrality and reducing the use of fossil fuels requires an accelerated transition to the use of renewable energy sources. In contrast, the use of the most advanced solutions achieves the optimization of already existing capacities.

The need for a stable supply of electricity is constantly growing, especially when the demand is intensified, and this is possible only with the application of new technologies. By improving performance in hydropower plants, their life cycle is improved; and by installing ABB Ability™ Symphony® Plus SCADA solutions, efficiency is maximized

ABB provides its customers with the most efficient technologies, products and services and introduces innovations for even greater efficiency



through automation, integration, and optimization of the entire plant, which becomes more reliable. The Repsol company from Spain saw the quality of this system, and it was installed in five of their hydroelectric plants. SCADA provides a standard control methodology with workflow automation and optimization of daily operations with a high degree of security. More than 7,500 Symphony Plus systems have been installed worldwide, of which more than 5,000 support energy applications.

## ABB advanced wind solutions

Almost every day, some new, innovative solution in renewable energy sources is presented. They simply become necessary for large systems that use wind and solar energy to work smoothly, providing a stable distribution of the generated electricity.



Overhauling plants operating for years can significantly improve their reliability and extend their service life. In addition, carbon dioxide emissions are inevitably saved. Using the ACS800 inverter, 24 wind turbines

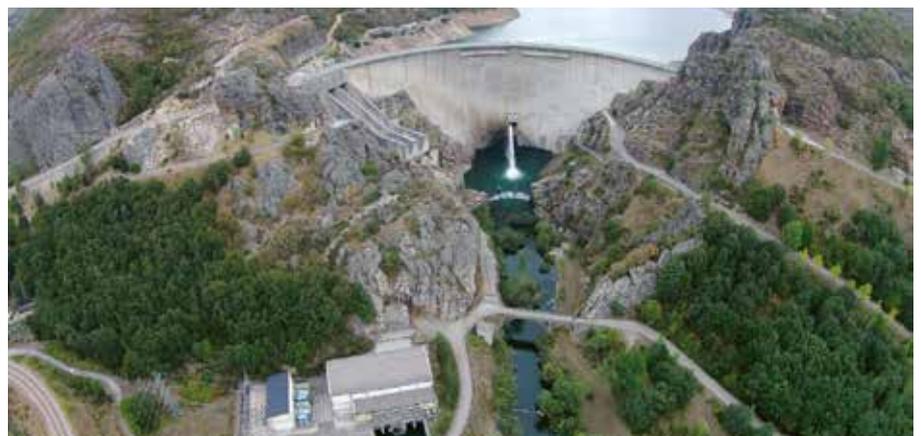
at the Aulepa and Aseri wind farms in Estonia operate reliably. Thanks to the new technologies installed in these wind farms, ABB's maintenance team is ready to help improve the performance of the wind turbines at any time throughout the wind farm's lifetime.

ABB provides its customers with the most efficient technologies, products and services and introduces innovations for even greater efficiency. It is certain that increasing the capacity of renewable energy sources. However, crucial for climate change mitigation and energy independence cannot happen overnight. Therefore, we must do everything we can now to preserve the environment and reduce costs, as well as to ensure enough energy.

Prepared by: Milica Radičević



Overhauling plants that have been operating for years can significantly improve their reliability and extend their service life





# PORTUGAL A COUNTRY OF GREEN IDEAS – A TRAIL THAT EVERYONE SHOULD FOLLOW

I started my visit to Portugal in Lisbon, one of the world's oldest and most beautiful cities in the world. Thanks to the Pulse of Europe project – Media Trips to the EU, I had a unique opportunity to get to know this country in a completely different way.

During my visit to Lisbon, I learned from the officials that Portugal can teach us how to go through the energy transition in a good way. The energy crisis that strongly shook Europe shows how necessary a safe

and reliable electricity supply is. And while many are still trying to find the best and easiest way to achieve a stable supply of green energy, Portugal is largely meeting the energy transition goals.

They get about 60 per cent of their energy from renewable energy sources and predict that this will go up to as much as 80 per cent in two years. Portugal stopped using coal for electricity production more than a year ago when they shut down the last thermal power plant.

Portugal gets about 60 per cent of their energy from renewable energy sources, and they predict that in two years, this will go up to as much as 80 per cent

They are among the first countries in the world to start building wind farms and are leaders in the use of biomass and solar energy.

Ana Fontoura Gouveia, State Secretary for Energy and Climate at the Ministry of Energy, explains that Portugal started the energy transition more than twenty years ago.

As she pointed out, their big challenge is accelerating the use of renewable energy sources. The most important thing for the country is the secure energy supply and ensuring that the industry has green, reliable, and price-competitive energy. Cooperation with citizens and policymakers is very important in this process so that everyone solves everything together to reduce bureaucracy and eliminate all other problems they face.

Ana Fontoura Gouveia also points out that it is necessary to expedite the

construction of solar power plants and offshore wind farms and that Portugal attracts investors and industries with competitive energy prices.

“Solar power plants are common here, but we also focus on wind farms. Regarding technology related to offshore wind farms, it develops continuously, which we monitor closely. We plan to use it more and more in the future as the price of this technology gradually decreases,” says the State Secretary for Energy and Climate at the Ministry of Energy.

Antonio Coutinho, director of innovation at the power company Energia Portugal, explains that innovations are key to the energy transition, and he particularly underlines floating wind farms.

“Energy transition is ‘something we must do’ because we must stop using fossil fuels and completely

turn to renewable energy sources. It is an ongoing process in Portugal; everyone must get involved to put coal out of use. Electrification is the next step, followed by boosting energy efficiency, use of hydrogen, synthetic fuels and others,” he adds.

## Renewable energy cooperative

Copernicus is the first renewable energy cooperative in Portugal, which gathers 3,000 cooperative members who, by association, ensure a safe electricity supply.

“This is a new way of producing electricity in communities organized by citizens and different institutions. Their buildings are covered in solar panels. Within a range of two kilometres, they can combine production and generate enough energy for their



They are among the first countries in the world to start building wind farms and are leaders in the use of biomass and solar energy



needs. They can also sell it to people who live nearby and have problems with supply for social reasons,” said Rui Valente, director of Copernicus.

He adds they currently have 1,600 customers who enjoy a guaranteed price and says that they are focused on solar energy but plan to use wind energy as well. One thing is certain: they will definitely use and sell energy from renewable sources only.

## Energy rehabilitation of buildings

We can learn from Portugal also regarding energy rehabilitation of old buildings, of which there are many in Lisbon and other parts of the country, as you can imagine. The energy rehabilitation of the buildings began in 2006, and almost a third have been renovated. They seem particularly proud of Lisbon’s Town Hall, which has been completely renovated. Thanks to the renovation, which cost 863,000 euros, the electricity consumption in this building was reduced by 50 per cent, and CO2 emission reduction stood at 85 tonnes per year.

In this building, 4,000 light bulbs were replaced, solar panels were

installed on the roof, and the biggest challenge was replacing the windows, which had to be wooden to preserve the architectural and historical value of the building.

An energy certificate is a document that certifies that a building saves energy and is issued by the Energy Agency. Apartments that are energy-certified are in big demand in Portugal.

## Beer from wastewater

We know that we can use wastewater by recycling. Did you know wastewater can be filtered to such a degree that it can be used in making drinks? Two factories in Portugal treat sewage water to such a degree that the resulting water can be used for beer production.

At the Alcantara plant in the suburbs of Lisbon, the process begins with separating sludge, which is used as biomass to generate electricity. Further processing of wastewater results in multi-purpose water. It is used in industry, for agricultural irrigation and street washing, while one part is returned to the river and the other is used for beer production.

The beer they make in this factory is not for sale, but in this way, they want to show the citizens that wastewater recycling is useful.

## A smart city for a good life – Cascais

About thirty kilometres from Lisbon lies Cascais. For many, this is just one of the holiday resorts in this country, while for others, it is one of the smart cities due to innovative solutions and new technologies, but also, most importantly, because of the quality of life that the town’s residents have.

This town has more than 300 sunny days a year, sufficient to tell us about the quality of life the residents have. The local government considers them to be very socially responsible.

Miguel Pinto Luz, the deputy mayor of Cascais, proudly points out that “tourism is not the main goal”. Rather, the main goal is “to make the city the best place for life”.

He adds that that is achieved thanks to good schools, healthcare that works almost perfectly, strong security, and new technologies. The city authorities can boast that public



An energy certificate is a document that certifies that a building saves energy and is issued by the Energy Agency. Apartments that are energy-certified are in big demand in Portugal



transport is free and anyone can rent a bicycle or scooter free of charge.

“Healthcare is free, as is the delivery of medicines, if necessary. The model of ‘helping everyone’ has been our public policy for the last two decades,” says Miguel Pinto Luz, who proudly adds that they have the best colleges in the country.

Technology is essential for everything to work perfectly in this town, and everything functions perfectly thanks to the command centre.

All data is stored in the centre’s database, which manages the entire city, from public lighting, traffic, communal services, and crises.

This smart city is extremely committed to meeting all the set green goals. They proudly point out the excellent circular economy system applied in waste management. They burn the collected waste and get hydrogen from it, which they then use as fuel for city buses, while activated carbon is used as fertilizer for agricultural land. Fruits and vegetables grown on this agricultural land are consumed in school kitchens and canteens, thus closing the circle of the circular economy.

The city has over a million tourists annually, which brings a considerable income. Thanks to a smart way of managing the city, resources are used adequately and well.

Serbia can learn a lot from Portugal and apply it on our road to the energy transition.

Prepared by: Nevena Đukić





# NEW TRENDS AND INNOVATIVE TECHNOLOGIES IN ONE PLACE

**T**he Siemens company is a symbol of innovation and technical expertise, in which numerous opportunities for learning and improvement are constantly opening up. In addition to being known for cutting-edge technological solutions, this company has many female engineers who are technology experts, which is a real refresh since the usual engineering team is mostly made up of men. At Siemens, they do not differentiate between women and men engineers or other profiles, but work and knowledge come first. Among the female engineers is Sunčica Cvetković, director of the smart network department of Siemens Serbia.

**Statistics show that men when it comes to the engineering profession, make up the largest percentage. How much does Siemens, in your experience, empower women engineers?**

– Siemens is a company with many opportunities for learning and improvement, and if you have that personal urge to learn, then the possibilities are endless. Although my team consists mainly of men when it comes to gender equality, I work in a company where there is no distinction between women and men engineers or other profiles; they only value work and knowledge. In the younger generations, the trend is that there are in engineering work more men changing, which makes me happy.



Colleagues in my team are experts in their work, professional and dedicated. I see my role as supporting the further development of everyone in the group and motivating us to continue achieving success. Siemens always tries to be one step ahead in the market and, somehow, sets an example for other technology companies.

**How much will digitization improve everyone's life?**

– Digitization definitely makes life easier. We are all users of various electronic services that save us time. The possibility of working from home as part of the digitalization process brings a new concept of life organization in general and buys both men and wo-

Siemens is one of the few technology leaders that merges the physical and virtual worlds, offering a synergy of hardware and software solutions that provide users with faster and more flexible operational processes

Although my team consists mainly of men when it comes to gender equality, I work in a company where there is no distinction between women and men engineers or other profiles; they only value work and knowledge



Sunčica Cvetković

director of the smart network department of Siemens Serbia

men some time in their daily activities. When it comes to smart grids that we deal with, they refer primarily to the power system. These are solutions for high-quality and reliable electricity supply – digitization in the energy sector. Siemens is a leader in innovation in this area. Our mission is to bring the latest technologies that are applied worldwide closer to our users, and together we create solutions for the needs of the local market.

**In the wake of the global energy crisis, the need to stop climate needs comes to the fore. To what extent is it possible to find technological solutions for these problems?**

– We live in fast and unpredictable times, where we depend a lot on world circumstances, and advanced technologies are the answer to some of those changes. Innovation and digitization are truly key to completely redefining economies and economies around the world. A green, circular economy is not feasible without innovative solutions that will connect our real, physical world and the one we create in the digital domain. Siemens is one of the few technology leaders that combine those two worlds, offering a synergy of hardware and software solutions that provide users with faster and more flexible operational processes and smart solutions that offer

better productivity or infrastructure with efficient energy use.

**What are the changes in your portfolio regarding digitization and sustainable solutions?– Our company strives for innovations and technologies that change the world, so we are also a reliable partner in this area for the transition to digital solutions. If you want to remain competitive in the market and respond to all user requirements, digitization is an opportunity to strengthen your position.**

– Perhaps a real example is Digital Twin, software for virtual equipment testing, where you can create your solution in a virtual world, check performance, and optimize and test the most complex system. A big step forward in energy is reflected in SI-PROTEC Digital Twin, the software for virtual relay protection testing, which allows the possibility to complete a large part of the work from the office or from home, thus significantly reducing the time spent in the field. This software provides great opportunities for analyzing events on the network, the simulation of various scenarios and thus, the improvement and optimization of the operation of power facilities.

Prepared by: Mirjana Vujadinović Tomevski





## A CRAFT THAT PRESERVES TRADITION AND SAVES OLD UMBRELLAS FROM OBLIVION

Umbrellas about a hundred years old were brought to the shop for repair, which they managed to do flawlessly. Currently, they have several umbrellas in the shop that are over 80 years old



**S**ongs were written about Balkanska Street, and now this street is writing a love story that is nurtured and passed on to new generations. In the heart of Belgrade, there is a craft shop called “Kišobrani” (“Umbrellas”), where rare and precious knowledge is passed down to now the third generation. While carefully observing her mother’s work since childhood, Tatjana Živković today proudly holds the title of master of umbrellas. She was the one that has helped this story to survive, passing the knowledge she inherited to her children. We spoke with Tatjana about the value that artisanal work had in the past and how it has found its place in consumer society today.

While growing up, Tatjana was always surrounded by this craft, perceiving it as something natural, but without giving it much thought that it would be something that she would do in her future. After school, she would take her friends to her mother’s tiny shop, where a dozen of them would gather and continue socializing, laughing and being joyful. She learned the trade by watching her mother, listening to her conversations with customers or when she thought aloud about how she could solve a problem.

The biggest obstacle to crafts today is the established habit of consumer society that replacing an existing product with a new one is easier than trying to repair and maintain it. However, a segment of society still prefers quality and sentimental values. As Tatjana says, most of her customers are emotionally attached to their umbrellas, so they are less interested in the price.

“People no longer value things emotionally, but financially, and we should ask ourselves why how we became this way. An umbrella you inherited from your parents or even grandparents will serve you much longer than any umbrella you can buy in stores or online today. It always makes me happy when young people

bring an umbrella they found in the attic, the basement, or some other place where we usually leave old things,” says Tatjana.

The shop tries to restore such umbrellas to their former glory and satisfy the customer. In return, they enjoy the feeling you get when you restore a forgotten thing with your hands and bring it to its purpose again. Umbrellas about a hundred years old were brought to the shop for repair, which they managed to do flawlessly. Currently, they have several umbrellas in the shop that are over 80 years old.

The biggest problem today is finding the parts her mother used to source from all over Europe. Tatjana can repair any umbrella brought to her if the parts are available. The services the shop offers include replacing the umbrella fabric, restoring its pattern, repairing wires, whether they are broken or need rust removal, replacing broken holders, replacing lost ferrules (small tips at the ends of the umbrella fabric) and more.

Deciding to repair an old umbrella, instead of putting it in the rubbish container and buying a new one, will not only save you money because you will not replace it with a lower quality one that will break pretty quickly, but you also care about the environment.

Thanks to her love for the craft, memories of her mother and the great support of her children, Tatjana decided to continue doing this business. However, she says she cannot

### BY REPAIRING UMBRELLAS, WE REDUCE POLLUTION

The shop tries to use every part of the umbrella and give it a new purpose. Even old fabric not for use can be used as straps for tying, mending other torn fabric and sometimes for clothes. It is also important to mention that customers often give umbrellas for free to the shop so they can be used to repair other umbrellas.

### WHERE CAN YOU TAKE YOUR OLD UMBRELLA?

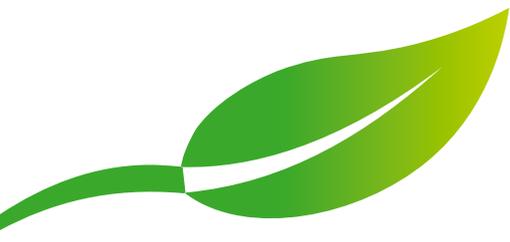
If you have an old umbrella in your home that you no longer need or that needs repairing, you can come every weekday from 10 a.m. to 5 p.m. and on Saturdays from 10 a.m. to 2 p.m. to 20 Balkanska Street and leave it in safe hands to be repaired or re-used.



make a living from this job today. Her mother used to be able to pay utilities for the whole month with three fabric changes, while today, Tatjana would need to change at least 25 umbrella fabrics to pay the bills.

“Whether we will be in business for another five, ten or more years depends on our patience, the overall situation in society, and others being understanding of our profession. I sincerely hope that there will be a greater change in people’s consciousness and that they will begin to value more the quality, the surroundings in which they live and how their actions affect others and the environment. Still, also how much it affects their quality of life,” Tatjana says.

Prepared by: Katarina Vuinac



# EFFICIENCY OF PANELS MADE BY GERMAN PRODUCER LUXOR SOLAR

## TOP BRAND

Solar panels made by the German manufacturer Luxor Solar, with their quality, occupy the very top of the photovoltaic module industry.

**L**uxor Solar has been a manufacturer of photovoltaic modules since 2007, with headquarters in Stuttgart, Germany. Their development and design center is also located there, in which they invest two to three million euros per year to provide clients and their users with the best technology for solar power plants of any size, regardless of whether they are residential or large solar parks.

“In the last four years, from the technology of polycrystalline cells, they came to the P TYPE (PERC) technology, which is used successfully to this day. In the Premium segment of our portfolio, we also have modules with N TYPE and HJT technology,” said Nino Sijerić, business development manager at Luxor Solar, with

whom we discussed the efficiency and advantages of this company’s solar panels, as well as why presence on the local market is important when choosing the panel brand.

## What are the advantages of your company’s solar panels?

– Luxor modules are manufactured with state-of-the-art machinery and contain the most modern and efficient cell technology. HJT is currently the most efficient cell technology on the commercial market, providing the best results and module efficiency of more than 23 per cent. As a German company, we provide our users with warranty conditions valid in Germany, so our client or Luxor module user has greater legal certainty. If the irregularity of the module in production turns out, it is easier for users to get their legal effect. Our guarantees in the Premium segment of our modules are 30 years on the product and 30 years on the production. Depending on the technology, this means guaranteeing, for example, for HJT modules, 93 per cent of the nominal power of the module after 30 years, which you will not find in any of our competitors, regardless of whether they are from Europe or Asia.

## What does the solar panels’ efficiency depend on?

– Cells are the heart of every module or panel; in this sense, the type of cells you use in the production of the



Cells are the heart of any module or panel, and in this sense, the type of cells you use in the production of the module also defines the efficiency of the module



Nino Sijerić

business development manager at Luxor Solar

module also defines the module's efficiency. We offer our users P TYPE modules (PERC) or P type, which has turned out to be the most economical variant so far. Still, we are currently in transition, and a new generation of cells is competing, the so-called N TYPE cells (or N type), which offer greater efficiency, better temperature behavior and less degradation during the warranty period. However, HJT is currently the most efficient cell technology on the commercial market, providing the best results and module efficiency of over 23 per cent.

**Why is the presence of producers on the local market important when choosing a brand of solar modules?**

– Our clients or users see the solar

power plant as an investment for the future. Every investment, including a solar power plant, requires certain security. Of course, clients and users look at references and power plants in operation, ask questions, and get information to find the best solution and the highest quality photovoltaic modules. Luxor modules have been installed in Serbia and the region since 2011 – we have been present for more than 12 years. So, financial institutions in the local area and region already have experience with Luxor modules, and it is easier for them to approve loans in some cases for projects with Luxor modules. Logically, a client or user will prefer to opt for a more locally present brand. For two years in a row, we are the TOP BRAND PV in the

module category in Serbia and 10 other countries in the region <https://www.luxor.solar/en/news-details/11-joint-forces-for-solar-global-sales-2023.html>

Cheaper modules will be found, but the big question is whether they will be better than the Luxor module in terms of efficiency, warranty, electricity production, and according to references in the Balkans for a solar power plant that produces electricity for a guaranteed life of 25 years. Whoever opts for safety and quality opts for Luxor panels.

Interviewed by: Mirjana Vujaidnović Tomevski





# COOPERATION BETWEEN CEEFOR ENGINEERS AND GERMAN EXPERTS IN THE FIELD OF RES

**T**he engineers of the Ceefor company, in cooperation with the company GOPA – International Energy Consultants (Intec), participated in the organization of a study trip to Germany as part of the project Promotion of renewable energy sources and energy efficiency in Serbia, which is implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in partnership with the Ministry of Mining and Energy of the Government of the Republic of Serbia, and as part of the program of German development cooperation in Serbia.

The project aims to encourage the use of renewable energy sources (RES) in Serbia, representing its



great potential to produce electricity and heat and contribute to the green energy transition. The attention is primarily focused on prosumers, that is, solar power plants in households, residential communities, and public and private buildings for supplying their consumption, which deliver surpluses back to the grid. Through cooperation with relevant institutions and organizations, the implementation of the project is carried out by raising awareness of the advantages of solar energy, then by improving the legal and technical

teachers and professors, as well as the civil sector and the media.

The participants of the study visit were representatives of the Ministry of Mining and Energy, the Energy Agency of the Republic of Serbia, Elektrodistribucija, Elektroprivreda Srbije, energy cooperative Elektropionir, as well as energy managers from five local governments and respected representatives of secondary technical schools and universities.

Ceefor company engineers had the opportunity to participate in lectures and exchange experiences with

for connecting to the network and obtaining the status of prosumer in Serbia, as well as about the possibility of simplifying the procedure based on a comparison with the practice in the countries of the European Union.

On the second day, our engineers had the opportunity to listen to lectures by German experts in the field of RES, who spoke about the special conditions for renewable energy sources, and then the compliance and certification process. They also discussed innovations in the field of checking the process of connecting to the network, automating the processing of requests, and future network management and monitoring.

The third day was reserved for a visit to the production facilities of the SMA company, where the entire portfolio was presented to them, from the first inverter to today's solutions that contain all the elements for the construction of modern solar power plants, i.e. both off-grid and on-grid solutions. Also, they had the opportunity to attend and see what assembling all the elements of inverters from 3 kW to 160 kW looks like.

A visit to the solar park Dreieich – Buchschlag, built on the former largest landfill in Europe, not far from Frankfurt, was also organized as part of the project. This power plant was built in 2012, in a month and a half. Also, during the visit to the ABO company, the regulations were shown, as well as the entire process of building wind farms, which can last from five to eight years, depending on the issue of environmental protection and the threat to biodiversity. The presentation showed solar power plants in Europe that have storage systems, as well as the storage systems that are used for regulating the power system. Within the ABO company, a parking lot with chargers for electric cars was set up, where the battery system used to power the chargers was also located, which the participants had the opportunity to see during the tour.

Prepared by: Katarina Vuinac




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**SMA Solar Technology** is a leading global expert company for photovoltaic systems technology, setting the standards for the decentralized, digital, and renewable energy supply of tomorrow. By offering innovative solutions for every type of photovoltaic application, households and companies worldwide can be more independent in meeting their energy needs.

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framework for the use of RES, as well as strengthening the capacities of relevant target groups, which include representatives of institutions in the field of energy policy, experts from the power industry system, energy managers, the education system,

colleagues from Serbia and Germany as co-organizers of the study trip. Ceefor engineers have many years of experience in renewable energy sources and energy efficiency, and this was an opportunity to widen their horizons further.

On the first day, through a presentation, they presented the possibility of acquiring the status of prosumers and their position in Serbia, talking about the regulatory framework and procedures, types of contracts and account clarifications, then about return on investment and profitability for different types of prosumers. They also talked about prosumers in the countries of the European Union and the applicability of examples of good practice in Serbia. The first day was concluded with a discussion about the procedures



## COSMETICS WITH A SPLASH OF NATURE

**T**he cosmetics industry imposes new beauty standards on the consumer society in order to then compete with their competitors in fulfilling these new and imposed demands of the same society. In this vicious circle, the true value of beauty imbued with health has been dropped somewhere, just like its prerequisite – a healthy

nature. In the catalogue of aesthetic brands, one cosmetic brand with a generous splash of health and nature stands out with its bright green frame – Royal Balm. With knowledge, love and the support of her lifelong companion, Katarina Milosavljević harvests the fruits of the Rtanj Mountain, processes them and brings them to our homes.





The decision to embark on production was inspired by the desire to find the right natural cosmetics for herself and her family. Ten years ago, the market offer was inadequate, to say the least, and the products called “natural“ had very poor composition.

### ORGANIC CERTIFICATES CONFIRMATION OF CONSISTENCY

All the plants and extracts they use, as well as the production method, have organic certificates, the acquisition of which requires knowledge, effort, and time to prove the product’s consistency and success.

Encouraged by this, Katarina started searching for oils that would improve the quality of cosmetic products.

From early childhood, she learned from her grandmother about medicinal plants, which eventually became her love and hobby. This opportunity to absorb knowledge from a young age proved to be very important to her because, as she says, it is not easy for a city dweller to become a farmer as well, as these skills are acquired throughout life, and children learn them from birth.

However, it took her a lot of patience and effort to upgrade and perfect the basic knowledge – learning everything about the care of each plant her family grows. An additional challenge was to find top-quality, clean ingredients.

cold-pressed oil. Then comes straining and filtering the oils after maceration, and only then are they ready for use and product preparation.

The Royal Balm brand offers five types of moisturizers divided according to skin type and three types of serums and tonics. Furthermore, they produce five types of hydrolats, four essential oils, two special oils and seven salves. Due to the content of essential oils, Royal Balm cosmetics also have aromatherapeutic properties. Thanks to a diverse combination of ingredients, each product has a special herbal scent, so using perfumes in the composition is unnecessary.

Speaking about the well-being only nature provides, which is also the source of our good health, industrial

### BOTH NATURE AND PEOPLE

“Organic production was the only choice for us. Medicinal plants must not be treated with herbicides and pesticides, as they are used for human health. This production method is very important because it is closely related to preserving nature and its sustainability.”



The Royal Balm brand offers five types of moisturizers divided according to skin type and three types of serums and tonics. Furthermore, they produce five types of hydrolats, four essential oils, two special oils and seven salves

When she started this search, she realized that the best solution was to find land where they could plant plants themselves and get the best quality raw materials from them.

Today, their plantation spans two hectares of land, where they grow immortelle, lavender, yarrow, sage, St. John’s Wort, calendula, and comfrey. At the same time, they are thinking about growing a new type of plant species that will greatly contribute to their skincare line. The production also involves cold-pressed organic oil, which they do not produce but procure from verified producers.

Explaining the production process, Katarina says that it takes time and a lot of effort. Part of the plants are distilled, and the other part is crushed, followed by extraction in

cosmetics are very harmful – non-degradable packaging and ingredients polluting soil and water. Royal Balm cosmetics are packaged in glass packaging that is suitable for recycling.

As a bad example, I would like to mention conventional body scrubs that contain microplastics that are extremely harmful to human health and the environment. These microplastics do not break down and can be indigested by animals whose lives can be jeopardized. No consideration is given to what will happen tomorrow and what kind of world we will leave to our generations,” says Katarina.

Royal Balm products are currently available in the online store <https://royalbalm.rs/>, while the plan is to sell them in small organic shops too.

Prepared by: Katarina Vuinac



“The understanding of sustainability must be placed at the very centre of business, which consequently develops the sustainable mindset of employees. It is precisely the guarantee for long-term competitiveness and profitability.”

Robert Ćuzela Piljac  
business development manager for  
Adria and the Balkan region at Horváth  
Consulting

# SUSTAINABILITY IS DRIVEN BY CONSUMERS

**HORVÁTH CONSULTING: “Transformation of the entire value chain is the path to sustainability”**

“**E**uropean companies view sustainability from the perspective of guaranteed long-term income growth, and they believe that a sustainable product can bring them an additional income of as much as 23 per cent (on average) since consumers are increasingly opting for such brands and products. Regardless of the fact the focus on this topic can lead to cost reduction and significant savings, in

non-EU countries, the general awareness of ESG is lower compared to the EU Member States”, Robert Ćuzela-Piljac, Business Development Manager for Adria and the Balkan region at Horváth Consulting, says at the beginning of the interview for Energy Portal magazine.

These are just some of the conclusions of a study conducted by the international consulting company Horváth, which specializes in ESG

consulting. 35 European companies from Switzerland, Germany and Austria took part in the study. These companies combined employ over a thousand people, generating revenues of over three billion euros. The study also confirmed that sustainability is one of the biggest challenges, especially in setting, defining and measuring ESG goals. Speaking about the situation in our region and Serbia regarding developing and

## CONSUMERS CRUCIAL TO STEP TOWARDS SUSTAINABILITY

“The implementation of sustainable business is mostly encouraged by consumers increasingly looking for sustainable products and services. Companies should be ready for this change and do them while respecting the principles of transparency,” Robert Ćuzela-Piljac said at the recent conference “Risks of the New Era: Sustainability and Resilience”, where he spoke to representatives of the business and financial sector about how best to devise an ESG strategy.

Member States. Nevertheless, companies that export goods or services to this market attach great importance to it, and many of them have already implemented various initiatives in this segment. One of these is appointing persons who deal exclusively with this topic. Their focus is on the planning and implementation of ESG standards in the companies for which they work,” he points out.

Mr Ćuzela-Piljac adds that companies should keep in mind that all parties see huge potential for growth and profitability through improved sustainability.

“According to our studies, 50 per cent of all participants see the potential for generating more revenue

reducing costs by up to 7 per cent is particularly significant,” he says.

He goes on to say that, according to Horváth Consulting’s insights, companies who have implemented ESG in their business are mostly focused on two activities – reporting per EU guidelines and investments in renewable energy sources. It is also logical because, in this way, one can see a quick and direct impact on reducing the carbon footprint.

“Almost 70 per cent of the participants in the Horváth study have set themselves the goal of becoming carbon neutral by 2030. However, what is very important is that a successful green transformation can only be implemented holistically, with the integration of all sectors and clearly defined goals and plans,” he adds.

Horváth Consulting advises clients on basic steps before starting to implement the ESG strategy, including identifying the most appropriate response to ESG requirements,

## HORVÁTH – SUSTAINABILITY FROM THE GET-GO”

Horváth Consulting underlines that the supply chain, production, and products are the most important levers for increasing sustainability.

“Real and realistic changes are more desirable and important than greenwashing,” Mr Ćuzela-Piljac says.

introducing ESG standards, Mr Ćuzela-Piljac explains that, unlike EU countries, Serbia still does not have many binding requirements regarding this topic.

“Even though the implementation of ESG principles contributes to differentiation from the competition, cost reduction and creates new market opportunities, the general awareness of this topic in Serbia is lower compared to the European Union

in existing markets, which could be achieved through competitive advantage and/or prices, 11 per cent (on average). On the other hand, 60 per cent of participants expect a sustainable product portfolio to lead to the opening of new markets or segments. It can also potentially increase revenue by up to 23 per cent on average. The fact that 40 per cent of the participants estimate and expect that sustainability can contribute to

defining an adequate strategy, goals, and measures and fitting this concept into all organizational processes.

“The understanding of sustainability must be placed at the very centre of business, which consequently develops the sustainable mindset of employees. It is precisely the guarantee for long-term competitiveness and profitability,” concludes Mr Ćuzela-Piljac.

Horváth Consulting



# MIXKON CONNECTS INDUSTRY, THE ENVIRONMENT AND PEOPLE

**W**aste from most factories creates landfills, contaminates soil and groundwater, and frequently and significantly affects large bodies of water. Factories like chemical factories, steel mills, crude oil refineries, and aluminium smelters are often positioned near a water source due to production needs, such as having electricity generation plants nearby. Still, very few consider where the wastewater will end up during this process. Metals, chemicals, oils and various other substances are usually released into rivers, lakes or seas through wastewater, as this is the easiest way for factories to get rid of surpluses, which, in turn, has horrible consequences for aquatic ecosystems. It is not the only form of industrial pollution from which many living beings and nature suffer because, in addition to wastewater, over two billion tonnes of solid waste is produced on Earth annually, which ends up in landfills or is burned. At the same time, only 16 per cent are recycled.

The MIXKON company processes waste material from the foundry, which is then used to produce refractory materials

One industrial activity that inevitably generates large amounts of waste is casting. Foundry is a technological process in which metal objects are shaped by pouring molten metal into certain moulds to obtain the required casting. Mining, automotive, mechanical, construction, electrical industries and cement plants are just some of the manufacturers that depend to a large extent on this activity because they use different



MIXKON has developed a range of products for various industrial purposes, from refractory concrete VB MIXKON, thermal-insulating refractory concrete IZO MIXKON and refractory concrete for shotcrete TOR MIXKON to acid-resistant powder KOB MIXKON, coated sand OP MIXKON and insulation boards GARNEX PANELS FOR INTERMEDIATE BOARDS FOR CONTINUOUS CASTING.

The company also engages in socially responsible work because it employs people with disabilities to whom MIXKON gives the opportunity to find employment and work on a useful project that should be the future of our industry



**Mileta Bogdanović**  
technology engineer who specializes in non-metals and construction materials, co-owner MIXKON



castings, i.e. moulded objects made of metal, which they then use in manufacturing their products. As foundry is necessary for production, just like a healthy living environment is also necessary, someone has thought of how to apply technological and technical knowledge and encompass all of the above thanks to a single idea.



Mileta Bogdanović from the town of Arandelovac is a technology engineer who specializes in non-metals and construction materials. Back in 2018, when, as a co-owner, he founded MIXKON d.o.o., a company that carries out professional rehabilitation and employs persons with disabilities, he put his knowledge to good use. That effort and innovation paid off, as shown by the award won at the Green Ideas Forum last year, a kind of validation for entrepreneurs whose ideas are based on sustainable development.



The company processes waste material from the foundry, which is then used to produce refractory materials used at extremely high temperatures. As Mr Bogdanović explains, the waste is removed from the Mikro Liva landfill, and then the chemical composition and characteristics of the raw materials used are examined. The resulting products are made of aluminosilicate waste, and their strength lies in the ability to withstand enormously high temperatures – from 1,550 to 1,760°C. Thermal aggregates with high operating temperatures are one of the ways of applying such materials, but

they are also used to make channels for transporting metals in the liquid phase. The company also produces thermal insulation plates from refractory materials that produce continuous cast iron. These products can be re-used in foundries and in thermal power plants, ironworks and other industries that work at such high temperatures. Thanks to the innovative capabilities and knowledge of Mr Bogdanović and his collaborators, the maximum consumption of waste material is achieved. At the same time, new, top-quality products are produced, primarily for foundries. These processes can eliminate about 200 tonnes of waste material produced by just one foundry annually.

It is not the only far-reaching vision that MIXKON has. The company also engages in socially responsible work because it employs people with disabilities to whom MIXKON gives the opportunity to find employment and work on a useful project that should be the future of our industry. Out of the total number of employees, 84 per cent of employees are disabled, and all employees receive adequate training approved by the line ministry during employment.

Prepared by: Milica Vučković



# DEVELOPING ELECTROMOBILITY AS VOLVO'S PRIORITY

**M**odern society is completely reliant on transport modes that cover long distances in a short time. Considering that traffic represents one of the most important sources of environmental pollution, it is not surprising that around 60 per cent of all polluting substances in the air come from exhaust gases. Electrification of traffic can significantly reduce emissions of harmful gases, which will greatly affect the quality of the air we breathe. The Swedish manufacturer of motor vehicles, Volvo, pays special attention to the reduction of harmful gas emissions, as well as saving and conserving energy and reducing the impact on the environment and climate change. We spoke with Dragana Krstić, General Manager of Volvo Trucks Group for the Adriatic South region, about the novelties this company has in store and their operations in Serbia.

## **How long has Volvo been operating in Serbia? What can you tell us about your work in the company?**

– In the spring of 1998, the Volvo Truck Corporation opened a branch in our country. The company grew year-on-year and expanded its offer and range of services, but the intimate, friendly relationship and care for each customer remained unchanged. With such an approach, we quickly became market leaders. Volvo also invested in the showroom and service



network – it opened its own modern business, sales and service centre in Novi Banovci, while showrooms and service centres in Novi Sad, Čačak and Niš were adapted to specific needs.

I have been with Volvo since the launch of its business in Serbia. Over the years, I worked in various positions and had the opportunity to get to know in detail all segments of the company's operations. I was appointed General Manager on January 1, 2017, and before that, I worked in the position of regional Financial Director in Volvo Trucks companies in Serbia, North Macedonia, Bosnia and Herzegovina, Croatia and Slovenia. In my career, I encounter many challenges, but with the help of my colleagues, we overcame all obstacles easily.

## **Volvo Trucks has presented its hydrogen-powered electric trucks. What novelties do you have in store for us and when can we expect these vehicles to hit the road?**

– Hydrogen-powered fuel cell trucks, which emit only water vapour, will be an important part of Volvo Trucks' zero-emission product portfolio. These zero-emission trucks use hydrogen to generate the truck's own electricity and can be used for long trips, thus making them suitable for longer hauling tasks. These trucks are tested on public roads and to make it even more challenging, the tests were conducted above the Arctic Circle in northern Sweden in extremely cold conditions. So far, all the tests have been going well.

Volvo Trucks aims for 50 per cent of global new truck sales to be electric trucks by 2030 and 100 per cent to be zero-emission by 2040



**Dragana Krstić**  
 general manager of Volvo Trucks Group for the Adriatic South region



areas without charging infrastructure. All required checks are followed by tests done with carriers and we expect these trucks to be available for road use in the second half of this decade.

**What does Volvo Trucks offer to its customers in terms of emission-free transport?**

– For hauliers who want to provide emission-free transport, Volvo Trucks currently offers six different electric-battery models, as well as trucks that run on renewable fuels, such as biogas. We must act now to stop global warming. Regardless of the transport tasks or the places in the world where our customers do

After the first quarter of 2023, we have sold almost 5,000 electric trucks in 40 countries. During the first quarter of 2023, a total of 600 16-tonne electric trucks were registered in Europe, more than four times compared to the same period in 2022. We also saw an increase in the number of new truck orders in the first quarter of 2023.

**What is your plan for resolving the electric truck charging infrastructure problem?**

– Last year, Volvo added three of its most popular 44-tonne heavy-duty trucks to its electric range – Volvo FH, Volvo FM and Volvo FMX. With these new additions, Volvo Trucks now has six electric truck models in series production. A well-covered network of chargers is necessary for electric trucks to participate in traffic without interruption. Thousands of public heavy-duty truck chargers will be needed to increase the number of electric trucks. Together with Daimler and Traton, the Volvo Group will build at least 1,700 high-performance green energy public charging stations across Europe. The Group is also investing in an electric chargers corridor in North America.



Hydrogen fuel cell electric trucks will be particularly suitable for longer distances and when battery-only use is not an option – for instance, in rural

business, waiting is not an option. In a few years, our clients will be able to completely eliminate CO<sub>2</sub> emissions from their trucks.

Interviewed by: Milica Radičević



## AN INCREASING NUMBER OF SOLAR POWER PLANTS IN THE REGION

**T**he second consecutive Days of the Sun international conference, held in May this year in Bol on the island of Brač, attracted a lot of attention from experts and state institutions from Croatia and countries in the region. During the two conference days that Renewable Energy Sources of Croatia (RES Croatia) organized, about 400 participants had the opportunity to hear from about 60

lecturers and panellists about all the novelties related to renewable energy sources, especially solar energy.

At the opening, the director of RES Croatia, Maja Pokrovac, highlighted the recommendations of the European Commission for Croatia, which are mainly related to reducing dependence on fossil fuels.

“Croatia imports about 53 per cent of energy annually, although it has great potential in renewable sources,

especially wind, solar, and geothermal sources. Half of the energy production comes from hydropower plants, and the share of wind farms in total energy sources has increased to 14 per cent. Still, the potential of solar energy has not yet been sufficiently utilized. According to the European Commission’s recommendations, Croatia should reduce its dependence on fossil fuels by faster development of renewable sources, especially by



investing in wind, solar and geothermal energy. Croatia needs to complete the insufficient legislative framework, which would simplify administrative procedures for issuing permits and installing equipment such as solar panels in residential buildings,” said Maja Pokrovac.

## Solar panels save electricity

Walburga Hemetsberger, director of SolarPower Europe, said that now is the right time for new solar goals and ambitions and that investments in solar energy are slowly taking over investments in oil.

“For every dollar invested in fossil energy today, \$1.4 is invested in green energy, which was unthinkable until recently. The energy crisis has taken its toll, so we all must expedite the transition so that Croatians and other European citizens can benefit from cheap energy. Research has shown that in the past year, people with solar panels installed on their roofs saved 3,800 euros on their electricity bills, in contrast to those without. The price of energy in the EU is too high,



but the European Commission plans to eliminate fossil fuels. We want to leave this world to our children as it should be and not have them face droughts and floods,” she said.

Professor Sandra Voća, PhD, vice-dean for teaching and study programmes at the University of Zagreb’s Faculty of Agriculture, said that the Faculty participates in numerous scientific research projects and that the use of renewable energy sources in agriculture has recently attracted a lot of attention.

According to Karlo Ressler, an MEP, solar energy is one of today’s most important topics. He reminded us that Europe wants to become climate neutral and that solar energy is key.

Ivo Milatić, the representative of the Republic of Croatia’s Prime Minister, pointed out that in terms of renewable energy sources, Croatia today is different than before.

“A few years ago, we had a chaotic situation with renewable energy sources. That chaos was solved through two laws – the Electricity Market Act and the Renewable Energy Sources and High-efficiency Cogeneration Act. In a short time, we have achieved significant success, and from early 2021 to date, we have issued 2,454 MW worth of energy approvals, of which 1,300 MW are solar. By the end of 2024, we must

install 1,500 MW of new renewable energy sources, and we will achieve that,” Milatić said.

In her presentation “The road to 2050 is paved with solar energy”, Walburga Hemetsberger said that Europe installed about 41 GW of solar energy last year, tantamount to building 14 nuclear power plants. Although reaching 1 GW worth of solar installations is difficult, as many as 10 European countries have exceeded that limit. SolarPower Europe predicts that Croatia will cross the 1 GW mark by 2026.

## Simplified procedures

During the panel discussion on the role of public policies for stronger development of solar projects, Tonči Glavinić, advisor to the Minister of Spatial Planning, Construction and State Assets, confirmed that the new proposal

of the Spatial Planning Act introduces a much simpler procedure for issuing permits for solar power plants, which could certainly stimulate their stronger growth. “This law brings numerous changes. One of them is that the Republic of Croatia, with the new provisions of the law, can obtain the status of member countries with a secure factor of energy independence. Many investors face difficulties in interpreting spatial plans, and planned digitization is a way to harmonize spatial plans,” he said.

The panellists also talked about combining agriculture and solar energy, how to use the traffic infrastructure for the production of solar energy, as well as the potential and use of solar energy.

Our region has an enviable solar potential, but unfortunately, it is quite underutilized. Thanks to numerous projects in this area, experts hope

According to the European Commission’s recommendations, Croatia should reduce its dependence on fossil fuels by faster development of renewable sources, especially by investing in wind, solar and geothermal energy





that by 2030, as much as 45 per cent of energy will come from renewable sources.

“Production Instead of Consumption” was the topic of a panel which attracted a lot of attention from all conference participants. The panellists agreed that there is a strong interest in installing solar panels in Croatia and that the number of power plants connected to the power grid is constantly growing. Many citizens want to install solar power plants on the roofs of their houses because, in this way, they can become energy independent and save energy which, in turn, reduces their electricity bills.

Miloš Kostić, Director of the MT-KOMEX Company, which is a leader in the construction of solar power plants in Serbia, spoke about how the company built its first Solaris Energy power plant in our country in 2013. He also spoke about procedures the company had to go through back then, adding that the big challenge was financing the entire project.

“After we built the first power plant 10 years ago, we focused on

projects in this segment. This year, in April, we commissioned the currently largest power plant in Serbia, DeLasol, for which a PPA contract was signed,” Mr Kostić pointed out and added that in 2017, MT-KOMEX started developing electromobility.

As he explained, in Serbia, the initial steps have been made with the installation of electric car chargers and by launching the Charge&GO digital platform and application, which helps drivers of electric cars to locate chargers quickly and simply. They are currently working on developing the network in Serbia, but the plan is to install chargers in the region too.

The regional situation in the solar segment was the main topic of the panel discussion in which Danijela Isailović, manager of the Renewable Energy Serbia Association (OIE Srbija), took part. She spoke about a strong interest in constructing solar power plants in our country and the entire region. Ms Isailović reminded me that the amendments to the Law on the Use of Renewable Energy Sources had been adopted and that

Experts hope that thanks to numerous projects in this area, by 2030, as much as 45 per cent of energy will come from renewable sources

the first round of auctions is coming soon.

The European Commission, the Government of the Republic of Croatia, SolarPower Europe, the Ministry of Regional Development and EU Funding, the Ministry of Spatial Planning, Construction and State Assets, the Ministry of Agriculture, the European Bank for Reconstruction and Development and the European Investment Bank were sponsors of the conference dedicated to the development of solar energy projects.

Prepared by: Milica Radičević



# A STORY INSPIRED BY THE LOVE AND CARE OF CHILDREN

**T**he Alkaloid pharmaceutical company recently celebrated the 45<sup>th</sup> anniversary of one of its most recognizable brands – Becutan, a collection of skincare products for babies and children.

The story of Becutan is firmly rooted in love and care for children. In 1978, the Becutan brand became an indispensable part of childhood in this region and a synonym for quality. Thanks to constant investments and innovations carried out in Alkaloid's state-of-the-art laboratories, Becutan has been and remains consistent in providing top-quality

products. That's why Becutan is used by our youngest and remains a skincare friend to all generations for decades to come.

Becutan and Alkaloid are not only symbols of tradition but also bearers of change, sustainable technologies and nature conservation through energy saving – both in the pharmaceutical industry and sustainable development.

Alkaloid Skopje is a company that has been operational for over eight decades in the production of medication, cosmetic and chemical products and the processing of botanical raw materials. It is present in all markets



of the former Yugoslavia and Switzerland, Bulgaria, Turkey, Romania, Ukraine, the Russian Federation, and the USA.

The constant growth of production implies constant investment in production processes and the education of existing and new personnel. There are many areas in which Alkaloid can boast to be a socially responsible company – from helping orphanages and helping sports to be involved in the dual education system.

The company also recorded significant results in saving energy and caring for a healthier environment in which we live. It has set long-term goals, the most important of which is to help the community where we live and do business. Other long-term goals are divided into several segments – identifying the source and establishing a carbon footprint measurement process, devising measures to reduce CO<sub>2</sub> emissions, increasing renewable

energy production by 12 per cent in the next 25 years, increasing recyclable waste by 10 per cent by 2025, analyzing sustainable PC packaging for CCB and PC Pharmaceuticals, identifying sources and establishing a water footprint measurement process for all of the company’s sites by the end of 2023.

The first results are already visible in daily production, especially in the main production plant in Skopje. So far, CO<sub>2</sub> emissions have been reduced by 1,285 tonnes, new bicycle parking spaces have been built, encouraging employees to use bicycles more in their daily commute, and 5,000 m<sup>3</sup> of water has been saved, i.e. 1.5 per cent used in total production.

A digital platform for professional communication has also been launched, which saves on the energy consumption of other materials, such as paper. These are all parts of the company’s ESG strategy.

into drivers of sustainable business with economic and social benefits for the environment and people around the world. It is extremely important for us to participate and act in the implementation of these goals through our daily operations and activities”, Alkaloid says.

Živko Mukaetov, the company’s CEO and Chairman of the Board of Directors has recently presented this strategy and highlighted the main postulates of business for this and future generations. Caring for the environment, with a special emphasis on energy efficiency and the

Becutan and Alkaloid are not only symbols of tradition but also bearers of change, sustainable technologies and nature conservation through energy saving – both in the pharmaceutical industry and sustainable development



“Our ESG strategy reflects how we deal with, and approach issues social responsibility and environmental protection issues and adds a new value to our company. When developing Alkaloid’s ESG strategy and ESG goals, we took sustainable development goals into account. We have identified priority goals, where we have the opportunity to make positive changes and where our activities can contribute to building a better future. The UN Sustainable Development Goals represent a global vision for creating a sustainable future in which we all have a stake. The UN Global Compact turned these goals

use of alternative energy sources, is the first on the list of the company’s obligations, which includes a dozen more points. Among them is caring for its employees and the community in which the company operates, as well as raising awareness among employees about the need to preserve nature and the role of each of us in that process.

All this is best represented by taking care of the youngest and daily investments in product quality. That’s why Becutan, with all its innovations, is one of the brands that are the bearers of change.

Alkaloid Skopje



# ORIGINAL AND ECO-FRIENDLY SCENTS OF CITIES



**Y**oung, skilled and creative entrepreneur Karla from Zagreb started envisioning her idea two years ago - making scented candles that will exude the specific flora and cultural heritage of Croatian cities. These are not ordinary scented candles, as every detail is clearly thought out and they tell a special story with their fragrant notes and aesthetics. When Karla and her mother Dinka Kuleš devised a plan how to bring their vision of making candles that smell like the indigenous plants from Croatian cities to life, they realized that this fusion of scents, flowers and history actually creates a real souvenir of culture.

The work on making the candles is clearly divided - Dinka is in charge of production and Karla is in charge of logistics, finance, media and social networks. Although the Croatian coastline is widely known and associated with the wonderful local scents, it was less popular towns, so to speak, like Varaždin that this imaginative female duo also focused on. The Croatian brand miCrodia was launched late last year because a certain period was spent on researching the production technique, as well as the spectrum of fragrances specific to a certain place.





Eco-ceramic or, as it is popularly called, jasmonite, from which candle containers are made is an environmentally friendly non-toxic material created by mixing gypsum and water-based acrylic resin and contains no chemical agents

A candle named Ragusa, their best-selling product, smells like the oranges grown in the city of Dubrovnik. This candle's scent is based on beautiful gardens in the old part of the city, which is home to one of the first wild orange trees, standing in the Franciscan Monastery in the Old Town. It is an incredible 2,000 years old and has often been the topic of many poems. Since Zagreb is the city where Karla and her mother live, it is also one of their favourites. If you ever frequented the main train station in Zagreb in the spring, you must have noticed pink magnolias. Moreover, in addition to Zagreb and Dubrovnik, you can now smell the scents of Osijek, Varaždin, Rovinj, Pula, Rijeka, Otočac, Zadar and Split, and each candle label features the main historical symbol of the city, be it the Zagreb Cathedral or the Arena in Pula.

"Light music, the scents of Croatia and the sound of sizzling wax is all a person needs. Every day is a working day, sometimes we work for 12 hours if we have received a large order, but when you love what you are doing, Mondays are not bad at all", Karla says.

### Eco-design and natural materials as green solutions

There is another message hidden behind the materials used in the realization of this extremely interesting idea. That is eco-ceramic or, as it is popularly called, jasmonite, from which candle containers are made. This is an environmentally friendly non-toxic material created by mixing gypsum and water-based acrylic resin and contains no chemical agents. This material has become quite popular with many world designers and artists when creating decorative items. Three years ago, when eco-ceramics was first presented in London, it was declared „the material of the year“ because of its incredible chameleon-like adaptability, i.e. its ability to replicate different textures and shapes, Karla explains to us. In this case, jasmonite is mixed with water to create a container that holds the scented candle.

The versatile material that Karla uses can become the future for many manufacturers. Apart from eco-ceramics, these candles have another



special feature which is the cotton wick and soy wax which is used exclusively in the production. Cotton wicks are environmentally friendly and due to their structure, they can carry a flame for hours. The candles are made from 100 per cent natural soy wax which, in turn, contains natural-based fragrance oils and which the girls melt by hand. The structure of this wax is what sets it apart from others. Paraffin wax is made from processed petroleum products, while aromatherapy candles are made from paraffin – a petroleum byproduct – and they release carcinogenic soot when burned. Soot can cause respiratory problems and worsen the health of those people who already have asthma, lung or heart problems.

The beauty of miCrodia's products lies in the scents that come exclusively from flowers or plants and not from popular scents like cappuccino, perfume, candy and the like. The aim of scented candles produced under the miCrodia brand is to create a background scent note that reminds of nature and pleases the senses.

Prepared by: Milica Vučković

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