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Jozsef Zoltan Magyar

Ambassador of Hungary to Serbia

HUNGARY'S GREEN CHALLENGES

KLM's efforts for sustainable aviation

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WORD OF THE EDITOR

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Dear readers,
Ecological transport is becoming imperative for building a sustainable future in the modern world. As we face the challenges of climate change and pollution, switching to green modes of transportation is a key strategy to reduce emissions and preserve the environment. This issue explores innovations in electric vehicles and the development of infrastructure that supports green transportation.

Jozsef Zoltan Magyar, Ambassador of Hungary to Serbia, spoke to the Energy Portal Magazine about environmental goals and plans for a sustainable future. He highlighted that Hungary has significantly reduced greenhouse gas emissions and is ambitiously moving towards climate neutrality.

We talked about the transformation of traffic in Serbia and plans to expand the network of chargers for electric cars with Miroslav Alempić, Assistant Minister for Road Transport, Roads and Traffic Safety.

Milorad Kilibarda, PhD, Full professor and Dean of the Faculty of Transport and Traffic Engineering at the University of Belgrade, explains how important good planning and construction of logistics centers is and how this can affect the reduction of pollution from traffic.

Changes are taking place in the traditional thermal energy sector, and a new era of electricity production is beginning. The first solar power plant is being built in the Nikola Tesla A thermal power plant complex. We talked about this project with Saša Đorđević, Head of the Energy Efficiency Department of Elektroprivreda Srbije.

On the way to a sustainable future, renewable energy sources, especially solar power plants, play an indispensable role. That's why we present a new project of MT-KOMEX, a reliable partner in transitioning to a greener Serbia.

Each well-built solar power plant is based on a previously carefully prepared project, and the expert team of the CEEFOR company provides such dedication. Read more about that in this issue.

We also recommend stories about talented people and their inventions, which we regularly write about in the section People and Challenges. Our new section – Discover more – also brings a handful of exciting and interesting texts about new technologies, environmental initiatives, and individuals changing the world around us.

Join us, get informed, and find out how, together, we can contribute to a cleaner and healthier environment through environmentally friendly means of transportation.

Nevena Đukić
editor-in-chief

Photograph: courtesy of Nevena Đukić

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Photographs: (first row) Hungarian Embassy; (second row) MT-KOMEX; (third row) KLM; courtesy of Arslan Hajdarević; Tim Moveably

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HUNGARY'S GREEN CHALLENGES

In light of the growing challenges of climate change and the energy crisis, European countries are rethinking their energy policies. Hungary, which prides itself on significant reductions in greenhouse gas emissions and the ambition to achieve climate neutrality by 2050, faces the imperatives of a green transition. Jozsef Zoltan Magyar, the Ambassador of Hungary to Serbia, spoke about environmental goals, plans for a sustainable future, and cooperation with Serbia for Energy Portal Magazine.

Q: How does the energy transition affect Hungary, which ranks 33rd on the EPI list (Environmental Performance Index) among 180 countries?

A: In 2023, Hungary was the 95th largest country in the world in terms of population but in 33rd place based on the EPI index and global export performance. Compared to the base year of 1990, Hungary reduced its greenhouse gas emissions by 43 percent, thus meeting the 40 percent commitment by 2030. In the last five years, it has tripled its export performance in 15 years, and predictable and clean energy is of fundamental interest to its economy. Our country is one of the most open economies in the world, and like Serbia, it is a landlocked, inland continental country. However, the COVID-19 epidemic has affected supply chains, while the escalating war in Ukraine and the Middle East has highlighted the sensitivity of the European Union's competitiveness and energy security. In Europe, we cannot realistically build on the economic and population welfare plans adopted at the end of the last decade. Ensuring low-priced energy sources is essential for our competitiveness and the Hungarian people. Since economic strategies are significantly related to energy and climate goals, the Hungarian government redesigned its 2020 National Energy and Climate Plan at the beginning of this fall,

Photographs: Hungarian Embassy

We will not be able to give up fossil energy sources for a while, even though their proportion and quantity are gradually decreasing. Looking back, we can justifiably say how far-sighted we were when we built a high-pressure interconnector between Serbia and Hungary

JOZSEF ZOLTAN MAGYAR graduated from the Janus Pannonius University in Pécs. His studies were focused on the countries of the Balkans and knowledge of the Serbian language, from which he graduated. He started his professional career in the Ministry of Foreign Affairs of Hungary in 1993 as a desk officer for Serbia, Macedonia and Croatia. In diplomatic functions from 1995, he performed the duties of Consul, Consul General, Deputy Ambassador, later Ambassador to Croatia. In the Ministry of Foreign Affairs, he has been responsible for the countries of the former Yugoslavia for several cycles, in 2012 he became the head of the Department for Central Europe. Before taking office as ambassador to Serbia in 2023, he held the position of deputy state secretary for bilateral relations of the European Union member states for 2.5 years.

which it will shortly submit to the European Commission.

Q: Is the green transition important for Hungary, which holds the presidency of the Council of the European Union?
A: In the capacity of the Hungarian presidency of the Council of the European Union for the second semester of 2024, our first priority is strengthening competitiveness by adopting a new competitiveness pact in the current semester. We consider the green transition necessary, and it should not weaken our economy by increasing the proportion of renewable energy sources. European debates around the energy transition are related to the competitiveness issue. While Hungary is committed to decarbonization goals with a target to become climate-neutral by 2050, we reject the idea of a rapid switch from fossil fuels to electricity. In our understanding, the energy transition is a long process in which "old" and "new" energy sources will play an equally important role soon. We believe that the green transition must be closely aligned with the modernization of industry, which is the key to economic growth and sustainability. However, an answer must also be found in the European Union regarding how we can ensure the achievement of green targets in financing since the signs of strengthening the Union's economy are not yet visible. We have become a leading country between the global West and

the East in vehicle production, introduction of clean energy vehicles, and battery production. Our main goal is to connect Europe and Asia. Instead of re-creating blocks again in the world, let's strengthen the interconnectivity between them, which leads to the predictability of our economy and energy supply. A trade war is taking shape in electric car production, which could lead to tension instead of dialogue. In such a situation, climate policy negotiations can be pushed into the background, which affects the development of our livable environment and the future of humanity, for which we must fight with all our might.

Q: How does your country face the challenges of the energy crisis?

A: Due to the Russian-Ukrainian war and the European sanctions policy, Hungary also faced a sharp rise in energy prices and supply uncertainty. As for other net energy importing countries, the new energy market situation has put the security of supply first for Hungary over sustainability and affordability concerns. The security of energy supply and the increase of energy sovereignty grew into a national security issue, in which regional cooperation, including the Hungarian-Serbian partnership, became even more valuable. We will not be able to give up fossil energy sources for a while, even though their proportion and quantity are gradually decreasing. Looking back, we can justifiably say how far-sighted we were when we built a high-pressure interconnector between Serbia and Hungary. The new pipeline has solved the supply uncertainty in the eastern direction; we can transport 8.5 billion m3 of natural gas from south to north yearly. In 2022, with the signing of agreements connecting the two countries' natural gas and electricity markets, Serbia became Hungary's main gas supply route. This also allowed Serbia to store its safety reserves in natural gas storage facilities in Hungary. The importance of connecting our electricity market is also indicated by the fact that in 2022, electricity became the most essential product in both Hungarian and Serbian exports and imports. We will also strengthen the efficiency of the electricity market by launching the Hungarian-Serbian-Slovenian electricity exchange in Budapest at the end of the year through the Bluesky project, and by 2028, we will build the second Hungarian-Serbian 400 kV transmission line. To overcome the energy crisis, we are also making important domestic investments: blocks 5 and 6 of the Paks nuclear power plant will be completed by the beginning of the next decade, and we have increased the use of the sun, wind, and biomass.

The use of renewable energy sources is closely related to the reduction of harmful emissions

Q: Which sources make the most significant contribution to a cleaner energy mix? What percentage of electricity does Hungary produce from renewable energy sources?

A: Hungary's energy production composition is gradually moving toward clean energy. In crude oil and natural gas, we depend on large amounts of imports, which we can balance with new energy sources in electricity production. In 2023, nuclear energy accounted for 45.6 percent of our energy production, fossil energy for 28.8 percent, and renewable energy

for 25.5 percent. Hungary is a staunch pro-nuclear country with considerable international experience and prestige in the nuclear industry. As such, we are actively expanding our nuclear energy capacities, contrary to some European countries that are dismantling their nuclear power plants. While the electricity production of the Paks nuclear power plant has been stable and most predictable, around 43-46 percent for years, with the two new units, this can be increased to 60-70 percent. Along with all this, the structure of energy production has also changed significantly, since in the last 4-5 years, we have imported 2 billion m3 less natural gas, and the utilization of solar energy has increased significantly.

Q: What is Hungary's plan for renewable sources in the coming years, and how will you increase green energy capacity?

A: The use of renewable energy sources is closely related to the reduction of harmful emissions. According to our revised energy and climate plans, we plan to increase our GHG emission reduction target from 40 percent to 50 percent by 2030 while increasing the final use of renewable energy from 20 percent to 30 percent of gross final energy use. Solar energy will continue to make the most significant contribution to the expansion of renewables. The total installed capacity (currently above 7000 MW) may double the previous expectation to 12 gigawatts by 2030. Building on the favorable domestic conditions, renewables, especially geothermal energy, must gain ground independent of the weather. According to the revised National Energy and Climate Plan, the total investment cost requirement of the measures is about 40 billion euros. However, thanks to the improvements, approximately three-quarters of these expenses can be repaid in significantly reduced operating costs and quota expenses even within the time frame of the energy strategy.

Q: How did you eliminate fossil fuels and switch to clean energy to ensure the country has enough energy?

A: In the first half of 2024, a turning point occurred in Hungarian electricity production. Renewable energy sources have already overtaken fossil energy sources and the structure of our energy production is heading towards sustainability. While Hungarian electricity consumption increased by 4 percent in 2024, the proportion of electricity imports decreased from 25.4 percent to 22.8 percent. One of this year's biggest winners is solar energy, which doubled in a year to 47 percent. In September 2024, the installed capacity of domestic solar power plants exceeded 7,000 MW. The share of solar energy in Hungarian electricity production exceeds 18 percent, among the top in the European Union. By 2024, Hungary has fought to second place in Europe after Greece and third place after Chile in the world regarding the proportion of electricity produced with solar energy. In addition to industrial-scale solar parks, roof-mounted household solar power plants are playing an increasingly important role. These systems account for 8.4 percent of production, covering 6.5 percent of total electricity consumption. With various governmental incentives, 283,000 household-sized small power plants were built in Hungary, while most Hungarians live in apartment buildings in the towns. We produce 5 percent clean energy from biomass, 2 percent from wind, and 1 percent from other renewables. In addition to energy production, today's big challenge is how and in what way energy can be stored in addition to production. Within the option of weather-dependent renewable energy sources, the Hungarian government plans to build a pumped-reservoir power plant capable of balancing natural power fluctuations. This naturally operated power plant would be able to store the generated energy for 6 hours and would be able to produce about 6,000 megawatts of electricity.

Q: How much and how do you keep pace with the trend of electromobility,

the development and use of electric cars and vehicles, the level of development, and how do you promote them?
A: The Hungarian government has been providing state support for purchasing new electric cars since 2016; this year, the support level reached 10,000 euros. In July 2024, the 100,000th green registration number was issued in Hungary, which included 60,000 cars with electric engines. The fact that more than 16,000 new electronic cars have been purchased so far in 2024 is an indication of Hungarians' environmental awareness. According to the records of the Professional Representation of European Automobile Manufacturers (ACEA), in the first half of the year, in a tie with Denmark, Hungary was in third place in terms of sales of electric cars in the EU, which today represents an increase of 63 percent. In addition to buying a car, the continuous expansion of charging stations and its network development throughout the country is very important. In 2021, there were 1,880, but by the end of 2023, 2,507 public charging stations were in operation across the country, representing a 33 percent increase in the number of them in two years. In Hungary, motorists use e-vignettes on the highways; there is no gate system, so anyone can quickly charge their car near the highways. Several car factories operate in Hungary. One of the great experiences of the green transition was when the first Mercedes-Benz EQB SUV with a purely electric engine was completed in October 2021, after which the factory in Kecskemét operates 100 percent carbon-free, using only green energy for production. The Audi factory in Győr started production of the electric motor in 2018, of which more than 500,000 units were made by Hungarian workers. Then, in 2023, the Premium Platform Electric (PPE) began to be produced in the Győr factory, which engine, in addition to the Audi, has been installed in Porsches. BMW's factory in Debrecen will start production in 2025, and we are delighted that the company's purely electric Neue Klasse model will roll off the Hungarian production line. In Hungary, tens of thousands of people are connected to car manufacturing. The best incentive for everyone is to believe in a car produced with their own hands and imagine its clean air and green environment.

Q: What more serious climate actions are you taking in Hungary to fight against reducing the consequences of climate change?

We believe that the green transition must be closely aligned with the modernization of industry, which is the key to economic growth and sustainability

A: Adapting to climate change is not an option but a must. This is especially true in the case of Hungary since it is located in the middle of the Carpathian Basin, one of the most vulnerable areas in Europe. According to the available historical data series and the forecasts of regional climate models, the rate of warming experienced in the Carpathian Basin is expected to exceed the global average in the forthcoming decades. As we witnessed just a few weeks ago, rising temperatures and changes in rainfall patterns are leading to droughts, floods, and other extreme weather events. Altered growing seasons and the migration of new pests are affecting agricultural productivity and food security. Hungary has implemented various measures to adapt to changing climatic conditions, including the elaboration of the National Climate Change Strategy (NCCS 1 and 2), which outlines long-term goals for reducing vulnerability to climate impacts. The strategy treats the following sectors as priorities for adaptation actions: human health, water, disaster risk reduction, agriculture, nature protection, forestry, built environment and spatial planning, energy, and tourism. One of the Hungarian EU presidency's key objectives is to increase the European Union's preparedness to tackle envi-

ronmental challenges, such as drought and flood risk, and their economic and social consequences.

Q: What is the basis for Serbia's and Hungary's cooperation in environmental protection? Are there joint projects in the plan?

A: As neighboring countries, Hungary and Serbia cooperate in many fields, including environmental protection. Besides working together on such strategic projects as the Belgrade – Budapest railway development, which will offer the most environmentally friendly and safest means of transportation in the region, we are involved in the construction of water and sewage utility networks. Based on the economic and technical cooperation agreement signed in 2018, Hungarian companies are participating in developing wastewater treatment plans for 10 Serbian municipalities. Under this technical assistance program, Hungarian companies assessed the pollution of Bubanj and Međuvršje lakes and elaborated their rehabilitation plans accordingly. The Western-Balkan Green Development Fund has also recently funded various climate change-related projects in Serbia. Sharing two important rivers, the Danube and Tisza rivers, Hungary and Serbia have had intensive cooperation in transboundary water management. In the frame of EUSDR (EU Strategy for the Danube Region), our experts have frequent consultations serving water quality improvements, flood prevention, and sustainable water management. On the Budapest-based Interreg Danube Region Program's first call for tenders, 3 Serbian and 13 Hungarian-led projects in water management, renewable energy, environmental risk, and the use of artificial intelligence received support worth 37 million euros.

Ensuring low-priced energy sources is essential for our competitiveness and the Hungarian people

I would also mention the modernization of the TENT A power plant as an example of cooperation. The consortium formed by MVM EGI (the Hungarian Energy Provider), Rudis, Južna Bačka, and Millenium Group has achieved a pioneering result and signed a contract for the modernization of the ash treatment system of Serbia's leading lignite-based power plant. The revolutionary Circumix TM slurry technology results from MVM EGI's commitment to innovation and promises to improve ash management and reduce the power plant's environmental impact.

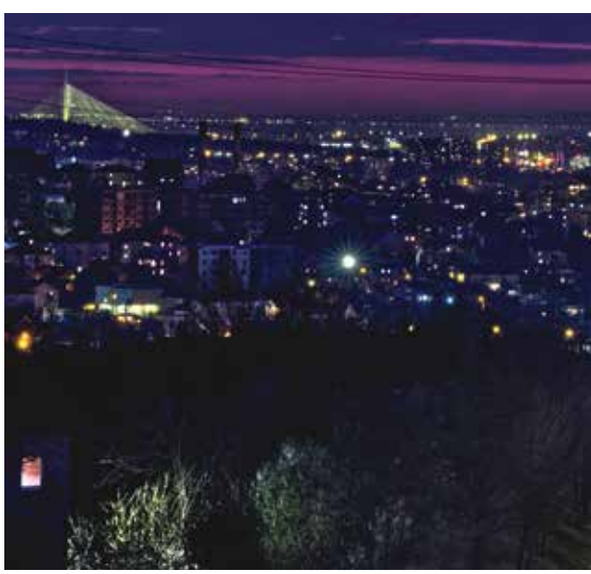
Interview by Milica Radičević

TRANSFORMATION OF TRANSPORTATION IN SERBIA

In recent years, Serbia has taken significant steps towards modernizing its transportation infrastructure, focusing primarily on constructing new roads and enhancing the highway network. These initiatives not only improve connectivity between settlements and regions but also open doors for local economic development and attract investments. Miroslav Alempić, Assistant Minister for Road Transport, Roads, and Traffic Safety, shared insights on new projects and plans for the development of electromobility.

Q: What are the main benefits of constructing new roadways and connecting to the highway network? How does this impact the local economy and regional connectivity?

A: The main benefits of building new roads and connecting to the highway and expressway networks include rerouting transit and freight traffic away from populated areas, reducing exhaust emissions, congestion, and noise, shortening travel time for goods and passengers, and significantly increasing safety for road users. A quality road network also attracts transport and transit flows through



Photographs: (top) Pexels/Boris Hamer; (bottom) Pixabay/Stevan Aksentijević

Serbia, which generates significant revenue. This makes our road network attractive to the economies of other countries for transport and logistics centers across Serbia, enabling freight operations to be centralized, thus bringing substantial revenue and employment growth to our country.

Additionally, constructing a new highway network brings new economic and industrial facilities and centers to Serbia and its local economy, creating new jobs and boosting its development. A well-developed road network provides a broader labor market, allowing employees to live up to 100 kilometers from their workplace without issues reaching their jobs. Fast roads enable people to travel efficiently and quickly to their workplaces.

New roads also enhance the connectivity of villages, towns, cities, and regions, promoting greater mobility for people, goods, and all types of travel.

Q: Can you tell us about the Green Stations project on Serbia's highways?

A: The Green Stations project envisages the construction of supporting facilities at existing rest areas and parking lots to serve highway users. The project envisions constructing 16 green stations along the highway. Each location will include a building with a restaurant, store, and restroom, covering a total area of up to 100 m². Next to the building, there will also be a children's playground.

Each green station will be equipped with fast EV chargers, ranging from five to 16 units of 180 kW each, with two connectors per unit for simultaneous charging. In the first phase of this project, five chargers are planned for installation at each green station. The planned locations include Bikovo, Lovćenac, Čenej, Kovilj, Šepšin, Markovac, Bobovište, Čokot 2, Prevalac, Ljig, Martinci South, Buđanovci and Toplik.

New roads also enhance the connectivity of villages, towns, cities, and regions, promoting greater mobility for people, goods, and all types of travel

MIROSLAV ALEMPIĆ worked at the CIP Transportation Institute from 1995 to 2003, focusing on projects in the transportation sector, specifically in the research, improvement, modernization, reconstruction, and organization of railway transport and in designing transportation infrastructure to support intermodal transport development. From 2003 to 2023, he was employed by the Directorate for Building Land and Construction of Belgrade. He has been a member of the Engineering Chamber since 2004 and holds design and construction licenses. Since 2006, he has actively participated in Ministry of Construction and Transportation working groups, contributing to the development of intermodal transport and the construction of the Intermodal Terminal in Batajnica. From 2011 to 2013, as a professional consultant at the Corridors of Serbia Company, he was a member of the Expert Working Group for developing the National Traffic Safety Strategy and Action Plan. He has extensive experience managing contracts for the construction of significant projects under FIDIC regulations and EIB and EBRD procedures, as well as preparing project technical documentation and project implementation. Over the past 20 years, he has been involved in constructing over 200 transportation and utility infrastructure facilities, performing the roles of supervisory authority, engineer (according to FIDIC), and construction and supervision manager.

Photograph: (Alempić) courtesy of Miroslav Alempić

Considering this project's complexity, which requires designing and constructing the necessary infrastructure, each location needs a 1 MW substation, connections to the power grid and water supply, and fiber optics, which require significantly more time to complete than locations with existing installations.

According to the project schedule, six green stations with 30 fast chargers are planned to be completed and operational by December 1, 2024. The remaining 10 are expected to be completed by the end of April 2025.

Q: Besides the Green Stations project, what additional steps are you planning to take to develop electromobility in Serbia?

A: In parallel with the implementation of this project, PE Roads of Serbia is expanding its network of EV chargers along the highway network. Alongside the eight existing chargers, they have installed 10 new fast chargers this year, which are currently connected to the *Elektroprivreda Srbije* power grid. Plans are in place for *Roads of Serbia* to install 16 more chargers on the highways by spring 2025 at the latest. In addition to highway installations, chargers are being placed throughout Serbia in public buildings and spaces, particularly in new developments, following amendments to the Planning and Construction Act.

The start of electric car production in Serbia, combined with incentives for purchasing and using them, will significantly accelerate the expansion of the charging network. The Ministry of Construction, Transport, and Infrastructure is drafting a new law on alternative fuel infrastructure, primarily focusing on EV charging infrastructure. This law will define the goals for establishing infrastructure and the optimal number of charging and refueling stations for alternative fuels (EV chargers, hydrogen, and liquid methane). It will also set minimum requirements for constructing this infrastructure, determine standard technical specifications, and outline requirements for user information, payment, and record-keeping, aiming to develop an organized infrastructure to increase electromobility in Serbia.

Q: As the number of registered electric vehicles grows yearly, is the Ministry considering any support or subsidies for electric vehicle drivers?

A: According to official data, by the end of August 2024, 3,629 fully electric and 28,523 hybrid vehicles were registered in Serbia. The total number of registered vehicles is about three million, of which 2,452,064 are passenger cars.

The government is already subsidizing the purchase of electric cars, which is an excellent incentive to increase the presence of these vehicles on the road. This subsidy program is managed by the Ministry of Environmental Protection. The following steps by the Ministry of Construction, Transport, and Infrastructure involve creating additional benefits for EV drivers, such as lower tolls, free or discounted parking, and exemptions for driving in city areas where vehicles with internal combustion engines are banned. They are also working on amending the Law on Road Traffic Safety to introduce new green license plates with a special designation for electric vehicles.

Q: How would you assess the progress in Serbia's transportation electrification, and what are the key obstacles?

A: We must acknowledge that we are still in the early stages of transportation electrification in Serbia, with a very small number of electric vehicles compared to the total fleet. However, steps taken over the past year have set the stage for accelerating electrification in Serbia. At

the initiative of Minister Goran Vesić, amendments were made to the Planning and Construction Act, with a specific focus on electromobility, introducing requirements for a certain number of EV chargers in residential and commercial buildings and at highway rest stops.

EV chargers are being rapidly installed, with expectations that around 300 will be available along highways by the end of next year and 3,000 to 5,000 in total within two to three years.

Serbia opened its first electric car factory this year; the first vehicles are expected in November. This will provide significant momentum for advancing transportation electrification.

Electric commercial vehicles are increasingly used in cities, and the number of electric buses is growing. The main challenge for

Photograph: Unsplash/Anton Luk

accelerating electrification is ensuring sufficient power from the *Elektroprivreda* power grid, which will require increasing demand for electricity, alternative fuels, and a more substantial shift towards renewable energy production.

The current issue of high EV prices will gradually subside as, alongside purchase subsidies, these vehicle prices are steadily dropping, leading to more affordable options in the near future.

Q: What is the Ministry doing to improve traffic safety, and what specific measures do you plan to implement in the future?

A: Our primary tasks include establishing regulations and improving traffic safety standards. Recently, the implementation of the Vehicle Testing Regulation began, allowing for the testing of non-homologated vehicles and adapting them for homologation to meet European market standards. In July this year, a new regulation was adopted concerning the conditions and procedures for obtaining driver competence certificates and qualification cards. We are also in the final stages of drafting another regulation that sets conditions for professional drivers' training centers. Additionally, we are finalizing a traffic signage regulation that will improve road signs and significantly enhance road safety.

A draft of a new Law on Public Roads has been prepared to strengthen maintenance standards to improve road infrastructure and traffic safety. We strive to ensure that all road sections under construction or reconstruction comply with EU standards.

The amendments to the Law on Working Hours of Road Transportation Vehicle Crew and Tachographs are also in their final stages. These changes will address existing application issues and further align Serbian regulations with EU standards. Strong cooperation with key stakeholders in traffic safety, such as the Ministry of Interior, the Road Traffic Safety Agency, and national road operators, supported by the academic and scientific communities, is vital for achieving these goals.

The project envisions constructing 16 green stations along the highway

Photograph: Pexels/Nikola Stanojković

Q: What does the Ministry of Construction, Transport, and Infrastructure expect in the upcoming period?

A: The Ministry is actively working on further development, especially road and rail infrastructure. Miles of highways, expressways, and railway lines are under construction. Our transportation network is becoming increasingly modern, necessitating a new approach to infrastructure development in the following period.

A particular emphasis is placed on modernizing transportation infrastructure, developing and implementing Intelligent Transportation Systems (ITS), and pursuing the Smart Roads project. Given the significant expansion of the road network and the increase in road structures, vehicles, and traffic participants, it is necessary to implement new systems for traffic, road, and infrastructure management. As a result, roads will be equipped with advanced infrastructure and technology to enable interactive communication between drivers, vehicles, and the road network. Drivers will receive real-time information about road conditions, weather, traffic conditions, warnings about potential hazards, and recommendations for optimal routes.

The first smart highway, the Pojate–Preljina (Morava Corridor), is under construction, with completion expected by the end of 2025 or early 2026.

The Ministry will enhance the toll collection system by introducing a new system without toll booths. Using portals, cameras, and GPS signals, this system will calculate and charge tolls based on the vehicle's mileage. The existing toll collection system will remain on highways in the first phase. In contrast, the new system will be implemented on motorways (for all vehicles) and IB-category state roads (for freight vehicles over 7.5 tons).

Projects are planned to increase commercial amenities along highways, as well as initiatives to utilize the roadway and surrounding land for electricity generation through the installation of solar panels. Additionally, there are plans to turn noise barriers in suitable locations into energy producers by integrating solar cells.

Interview by Milica Radičević

ALTERNATIVE FUELS – THE EU'S PATH TO CLIMATE NEUTRALITY

Transport is an indispensable part of modern life. It connects us to the world—allowing us to carry out daily tasks, travel on holiday, and keep store shelves stocked with goods. Life without cars, trucks, ships, or planes would be unimaginable.

However, as crucial as their role is, means of transport can seriously harm another equally important aspect of our lives—our health, the environment, and even the future of our planet.

In the European Union, transport emissions have risen by over a quarter since 1990. Without serious intervention, the transport sector alone could account for nearly half of all greenhouse gas emissions by 2030, according to the latest analysis from the organization Transport & Environment (T&E).

As outlined in the EU's strategy, the path to achieving net-zero emissions by 2050 requires urgent action. Since 2007, when transport

In the European Union, transport emissions have risen by over a quarter since 1990

Photograph: Unsplash/Daniel Abadia

emissions peaked, the sector has been reducing emissions at a rate three times slower than the rest of the economy.

It's also essential to consider that the transport sector in Europe is continuously growing. According to data from the European Environment Agency (EEA), between 2000 and 2019, demand for transport increased significantly: passenger traffic by 20 percent, air traffic by as much as 86 percent, road transport by 18 percent, and freight transport by 22 percent.

The biggest polluters remain cars with internal combustion engines, which account for more than 40 percent of total emissions in the transport sector. A zero-emission target has been set for cars and trucks by 2035, meaning that by then, all new cars and vans sold in the EU should be electric. On the other hand, rail transport is considered the most environmentally friendly way to travel, apart from cycling. This fact is strengthened by the ongoing electrification of railway lines. According to Eurostat, the number of electrified railway lines has increased by about 30 percent since 1990.

The biggest polluters remain cars with internal combustion engines, which account for more than 40 percent of total emissions in the transport sector

Photograph: Pixabay/Stefan Schweihofer

Infrastructure for Alternative Fuels

On 12 October 2023, the European Union implemented Regulation (EU) 2023/1804 on introducing infrastructure for alternative fuels, with its application beginning on 13 April 2024. This regulation replaces the previously applicable Directive 2014/94/EU. Under the new regulation, various targets for member states will be introduced gradually until 2035. This initiative is part of the Fit for 55 package, aimed at reducing the EU's net greenhouse gas emissions by at least 55 percent by 2030 compared to 1990 levels, with the overarching goal of achieving climate neutrality by 2050.

The Regulation sets mandatory national targets for EU member states regarding the introduction of publicly accessible infrastructure for alternative fuels, particularly electricity and hydrogen. This infrastructure applies to passenger vehicles, docked ships, and stationary aircraft, emphasizing trans-European networks. The regulation divides targets according to transport type and fuel type, with specific goals set for each category to ensure adequate charging and energy supply infrastructure and promote sustainable transport development.

Electric Vehicle Charging Infrastructure

For electric vehicles and vans, member states must ensure the installation of publicly accessible charging stations proportional to the number of registered vehicles. The total output power for each registered electric vehicle should be at least 1.3 kW, while for hybrid vehicles, it should be at least 0.80 kW. Additionally, publicly accessible charging stations along the Trans-European Transport Network (TEN-T) must be

provided. By the end of 2025, each charging point with an output of at least 400 kW, including at least one point of 150 kW, should be located at least every 60 kilometers on the core TEN-T network in each travel direction. By 2035, each station along the network should have a minimum output of 600 kW and include at least two charging points of 150 kW. To meet these standards, output power at stations will gradually increase from 2025 to 2035.

Heavy Electric Vehicle Charging Infrastructure

Member states are required to provide sufficient charging points for heavy electric vehicles. By the end of 2025, these charging points must cover a minimum of 15 percent of the TEN-T network's length and offer at least 1,400 kW of output power, including at least one point with a capacity of 350 kW. As demand increases, by 2030, output power should be elevated to a minimum of 1,500 kW on the comprehensive TEN-T network every 100 kilometers and 3,600 kW every 60 kilometers on the core network.

The Regulation sets mandatory national targets for EU member states regarding the introduction of publicly accessible infrastructure for alternative fuels, particularly for electricity and hydrogen

Safe and Secure Parking Areas

By the end of 2027, every safe and secure parking area must be equipped with at least two publicly accessible charging stations, each providing an individual output of at least 100 kW. This number will increase to four charging stations by the end of 2030.

Photographs: (bottom left) Pixabay/Tama66; (middle right) Pixabay/Falco; (middle right bellow) Unsplash/Sophie Jonas

Furthermore, by the end of 2025, each urban hub or key point in the traffic network should have publicly accessible charging stations for heavy electric vehicles with a total power output of at least 900 kW, rising to 1,800 kW by 2030.

Hydrogen Fueling Infrastructure

Hydrogen infrastructure for road vehicles requires member states to ensure publicly accessible hydrogen refueling stations along the core TEN-T network by the end of 2030, with a maximum spacing of 200 kilometers. Each station must have a capacity of at least one ton of hydrogen per day.

Liquefied Natural Gas (LNG) for Road Transport

Regarding LNG for road transport, by the end of 2024, member states must ensure the availability of enough publicly accessible LNG refueling stations along the core TEN-T network if there is demand unless the costs of establishing such stations outweigh the potential benefits, including environmental impact.

Shore Power Supply for Maritime Ports

Targets are also set for power supply equipment at seaports. By the end of 2029, sufficient shore power must be available for docked ships at ports within the core and comprehensive TEN-T networks. This applies to at least 90 percent of all container and passenger vessels over 5,000 gross tons.

Power Supply for Stationary Aircraft

For stationary aircraft, by the end of 2024, all airports within the core and comprehensive TEN-T networks must supply power to aircraft at all contact parking positions. By the end of 2029, this supply should also be available at all non-contact parking positions.

Railway Infrastructure

For rail infrastructure, member states should evaluate the development of alternative fuel technologies and propulsion systems, including hydrogen power or battery systems, for railway lines that cannot be fully electrified for technical or economic reasons.

Electric Car Charging Stations in the EU

The European Automobile Manufacturers' Association (ACEA) published a report in April 2024 on publicly available electric car chargers in the EU. In 2023, over 150,000 new chargers were installed, bringing the total to over 630,000. To meet the European Commission's goal of 3.5 million chargers by 2030, approximately 410,000 chargers must be installed each year—nearly three times last year's number. Currently, around 60 percent of all chargers are located in Germany, France, and the Netherlands. Two key challenges remain: only 13.5 percent of current chargers offer fast charging, and ACEA estimates the number of chargers will need to increase eightfold by 2030 to keep up with the growth in electric and hybrid vehicle sales, exceeding the European Commission's target.

Serbia

According to the Ministry of Trade, in May 2024, Serbia had over 1,500 petrol stations and around 150 public electric vehicle chargers. Of the 2.8 million registered vehicles, only about 3,000 are electric, making up around one percent. The Serbian Association of Vehicle and Parts Importers warns that this number of chargers is insufficient given the growth in electric vehicle numbers and the transit of foreign vehicle owners. The increase in electric vehicles in Serbia is further supported by subsidies offered by the Ministry of Environmental Protection. Since February, legal entities, entrepreneurs, and individuals have been able to apply for grants under this program, which runs until October 2024. The subsidy ranges from 250 euros to 5,000 euros, depending on the type of vehicle.

Prepared by Katarina Vuinac

Photograph: Pixabay/NoName_13

SAFETY OF ELECTRIC VEHICLES – CHALLENGES AND OPPORTUNITIES

Electromobility is already present and is an integral part of the path towards climate neutrality. Although trust in this technology is not yet fully established, this is a natural process of adaptation and familiarization with innovations. Every innovation brings numerous opportunities and potential challenges. Gaining knowledge is crucial to make the most of it and minimize risks. Milan Milojević, Head of the Vehicle Department at the Road Traffic Safety Agency, explains how the public, future users, and professionals working with these vehicles are gradually becoming familiar with the new technology and what the Agency is doing to provide necessary training and preparation.

Q: Can you tell us more about the Electric Vehicle Safety project presented by the Road Traffic Safety Agency?

A: With the growing popularity of environmental protection in the Republic of Serbia, great efforts are being made to reduce exhaust emissions, especially those that increase the greenhouse effect and directly contribute to global warming. With the continuous development of society and the economy, more and more people are turning to alternative and renewable energy sources. In the transportation sector, a large number of vehicles use alternative fuels such as LPG, CNG, and others. With the development of the automotive industry, electric and hybrid vehicles are being introduced, offering a promising

Photograph: Unsplash /Hush Naidoo Jade

compromise between the necessary reduction of exhaust emissions and fuel consumption. However, electric vehicles represent a completely different technology than internal combustion engines. This means there are new challenges for traffic safety, primarily related to the characteristics of high-power electrical equipment.

The Electric Vehicle Safety project aims to, through various educational forms such as expert gatherings or appropriate literature, introduce electric and hybrid vehicles to all parties involved in handling these vehicles as part of their job. These include primarily emergency services like firefighters, emergency medical services, and the police.

Electric vehicles represent a completely different technology from internal combustion engines

Q: The Road Traffic Safety Agency is also preparing guidelines for the safer use of electric and hybrid vehicles. Can you tell us more about these guidelines?

A: Four guidelines for the safe use of electric and hybrid vehicles have been created as part of the project. The first guideline is intended for emergency services to help them handle these vehicles after traffic accidents. The second guideline pertains to preparing electric and hybrid vehicles for technical inspection and is meant for their owners. The third guideline provides instructions for service technicians and tire repairers when working on these vehicles. The fourth guideline covers technical inspection procedures for electric and hybrid vehicles in categories M1, N1, and L.

In addition to creating the guidelines, the Road Traffic Safety Agency organized an expert gathering focused on electric vehicles for 120 technical inspection controllers. The second expert gathering on the same topic is underway, bringing together another 400 controllers.

Q: Do technicians undergo special training to work on electric vehicles? What equipment is available for this purpose?

A: The number of electric vehicles is increasing yearly, and these vehicles have not yet been singled out as a category in the Rulebook on Technical Inspections. Therefore, no legal regulation requires controllers to attend and complete training related to these vehicles. Given the significant increase in the use of electric cars, the Road Traffic Safety Agency believes it is necessary and valuable to provide answers to many questions related to this area.

As already mentioned, electric vehicles represent a completely different technology from internal combustion engines, and new challenges related to the characteristics of high-power electrical equipment significantly complicate the job for controllers.

In addition to the usual personal protective equipment prescribed by the Rulebook on Technical Inspections and other legal acts related to occupational safety and health, electrical protective gloves, high-resistance insulating footwear, and eye protection are recommended for work on high-voltage systems. Of course, this additional equipment should be used following instructions to ensure its effectiveness.

Q: What traffic safety promotion projects do you anticipate in the near future?

A: This area is extremely important and interesting; there is always room for innovation and improvement. Through new projects and campaigns about electric and hybrid vehicles, we will try to further introduce this area to all services, companies, and citizens of the Republic of Serbia. We are also continuing our activities, in cooperation with all institutions at the state and local levels, to raise awareness and educate the population, exceptionally professional categories of traffic participants, to save lives. We aim to fulfill the general goal of the National Road Traffic Safety Strategy of the Republic of Serbia for the period from 2023 to 2030, which is to reduce the number of fatalities and severe injuries by 50 percent by 2030, compared to 2019, as well as the Vision Zero of no child fatalities in traffic by 2030.

Interview by Katarina Vuinac

Photograph: Unsplash /Markus Spiske

ECOLOGICAL VISION – GOOD HEALTH OF PEOPLE AND NATURE

The city of Bijeljina focuses on its citizens' needs and is working on various projects to improve the quality of life in Semberija in the long term. As part of the strategic concept of Green BijeljINa, the city strives for sustainable ecological development, with particular attention given to non-motorized forms of movement, which positively contributes to human health and environmental protection.

We talked about the city's activities, plans, and challenges with Ljubiša Petrović, the Mayor of Bijeljina.

Q: What would you highlight as the most important achievements in Bijeljina related to ecology, energy independence, or sustainable development?

A: In the past nearly four years, the city of Bijeljina has actively worked on improving the situation in various areas related to ecology, energy independence, and sustainable development. Significant efforts have been made to green public spaces through campaigns such as April – Month of Cleanliness and Green BijeljINa, during which, along with intensive planting across the city, actions were taken to clean roadways and other public areas, including the removal of illegal dumpsites.

Based on the Decree on the Establishment and Functioning of the

The primary goal of the Sustainable Urban Mobility Plan is to build a system that will provide citizens with a promising future in terms of mobility and accessibility

Photograph: City of Bijeljina

Co-financing Mechanism – Model for Co-financing Measures to Improve Energy Efficiency in the Housing Sector, a public call for financial support for the implementation of energy efficiency improvement measures in the housing sector was launched for the first time in 2023 in Bijeljina. This call was aimed at individual households and homeowner associations to replace their existing systems with environmentally friendly ones, such as water-to-water and water-to-air heat pumps, with the support of the City Administration.

A similar call for 2024 is currently underway, with 300,000 convertible marks (approximately 153,000 euros) allocated for this purpose.

In addition, the city of Bijeljina signed a Memorandum of Understanding with a company to conduct testing and research on geothermal energy sources in the Semberija region. This company will independently carry out the research phase, examine existing boreholes, and produce a study on the use of geothermal resources in the city of Bijeljina.

The gas system installation is also in progress. The local community has fulfilled all its administrative and financial obligations, and the Srbijagas Company is responsible for further strategic steps.

Q: What does the Sustainable Urban Mobility Plan entail?

A: This plan is designed and developed as a strategic direction for the city of Bijeljina towards modern urban mobility concepts for the 2020–2025 period. It is the first integrated plan of its kind and one of the few in Bosnia and Herzegovina. It outlines three goals: a safe, inclusive, and functional city tailored to every individual, a place of healthy and comfortable living, and smart solutions and innovations aimed at sustainable development.

The primary goal of the Sustainable Urban Mobility Plan is to build a system that will provide citizens with a promising future in terms of mobility and accessibility. Bijeljina aims to establish itself as a dynamic and thriving environment, promoting environmental protection and contributing to a healthier and safer environment for all residents and traffic participants. The emphasis is on non-motorized forms of movement, pedestrians, cyclists, individuals with limited mobility, and the city's residents in general. The focus is, therefore, on people and their needs.

The Sustainable Urban Mobility Plan aims to ensure mobility for all citizens, particularly in non-motorized transportation and movement—such as cycling and walking—while establishing an efficient, low-emission public transport system. It also aims to introduce innovative measures to reduce the use of private cars for urban travel, which will lower greenhouse gas emissions, noise, and congestion.

LJUBIŠA PETROVIĆ graduated from the University of Belgrade's Faculty of Medicine and is pursuing postgraduate doctoral studies at the University of Novi Sad. He is engaged in scientific research and is the author and co-author of several scientific papers in internal medicine, neurology, radiology, and psychiatry. He has begun his specialization in radiology. Mr Petrović has worked at the Emergency Medical Service at the Health Center in Bijeljina and also served as a doctor for the football club Zvijezda 09. From 2016 to 2020, he was a councilor in the Bijeljina City Assembly. In late 2020, he was elected mayor of Bijeljina. In the most recent local elections, he won another term in office.

Q: What has been achieved with the Local Ecological Plan for the period from 2018 to 2028?

A: The Gromiželj protected habitat was cleaned of municipal waste during the April – Month of Cleanliness campaign. An initiative has been sent to the line ministry to transfer management rights over this prote-

Photographs: City of Bijeljina; (Petrović) courtesy of Ljubiša Petrović

cted habitat to the city of Bijeljina. A sanitary protection program for the Grmić drinking water source in Bijeljina has been in place from 2016 to 2024, with plans for a new sanitary protection program underway.

Between 500 and 1,000 saplings are planted each year. Since the beginning of 2024, several children's playgrounds with landscaped green areas have been built, and there are plans to construct a new city park, Knez Ivo od Semberije. The size of areas where waste is collected and transported has increased, and the city now has 100 percent coverage in organized municipal waste collection.

According to the Republic's Regulation on Measuring Stations and Sites, a unified system for monitoring air quality has been established. Traffic remains a dominant air pollutant. A significant measure implemented by the City Administration is prioritizing public transport over private cars, specifically by introducing organized public transport. Consequently, a Public Transport Study has been completed, and preparations for technical documentation and approvals for new pedestrian and cycling paths are underway.

The goal of the Sustainable Urban Mobility Plan is to ensure mobility for all citizens, particularly in the area of non-motorized transportation and movement

From 2018 to 2024, approximately 20 kilometers of new water supply networks have been built, about one kilometer of the existing water supply network has been reconstructed, and around 30 kilometers of new sewage networks have been constructed.

Q: How is the transition to renewable energy sources progressing in Bijeljina, and how many such plants are being built?

A: Plans are being developed to make the existing city heating plant more environmentally friendly by replacing the fuel source and the entire system. Project and technical documentation for this purpose are being prepared. A study on the usability and potential of geothermal sources is in progress, with plans to build a new heating plant for Bijeljina and associated hot water and steam pipelines.

Q: How much are you investing in improving the energy efficiency of residential and public buildings?

A: In the previous period, energy audits were conducted for 28 public buildings to enable a systematic approach to improving energy efficiency. Also, since 2023, the city of

Photograph: City of Bijeljina

Bijeljina has introduced subsidies for switching to heating systems using heat pumps for private households and collective residential buildings. After a public call was launched, 16 heat pumps were installed in individual residential buildings and two in collective residential buildings in 2023. A similar public call was launched in 2024, which defines incentives for replacing heating systems in individual residential homes.

Q: What are the plans for air quality protection, and what are the key pollutants?

A: In 2021, the City Administration launched a long-term campaign to green the city and urban areas under the slogan "Let's Make Bijeljina Green Together" as part of the strategic concept of Green BijeljINa, aimed at creating the conditions for sustainable ecological development. This strategic concept was designed to continuously raise awareness about the importance of environmental protection, promote partnerships and collaboration in creating a healthier and ecologically cleaner community, and implement concrete activities to reduce air pollution and improve the quality of life for citizens.

Between 500 and 1,000 saplings are planted each year. Since the beginning of 2024, several children's playgrounds with landscaped green areas have been built, and there are plans to construct a new city park Knez Ivo od Semberije

In the three years of implementing activities under the Green BijeljINa strategic concept, over 3,000 saplings have been planted in both urban and rural areas of Semberija. Several recreational and rest areas have been established, preparations for constructing another large park have begun, a study for establishing public transport has been completed, and a network of bicycle paths is planned. Aside from traffic, the main pollutants include private and collective residential buildings and the city heating plant, which uses fossil fuels in its heating system.

Q: What is the city's stance on mining in Majevica?

A: The city has rejected all requests for approval of detailed geological explorations in the Bijeljina area, and we have been very consistent in this as a local government. The City of Bijeljina will continue to engage the entire community in ongoing efforts to highlight the harmful effects of lithium mining, ensuring that this and future generations can thrive in our region. Numerous studies have clearly demonstrated that many diseases in humans, animals, and plants are the result of lithium and other types of mining. We are here to engage in informed discussions and work together to fight for a healthy environment and life in this area. That's why we must preserve our Majevica, as protecting it also safeguards Semberija and Bijeljina.

Interview by Jasna Dragojević

Photograph: City of Bijeljina

GREEN PROJECTS – TENT A GETS A SOLAR POWER PLANT

The Nikola Tesla Thermal Power Plants (TENT) are a critically important pillar of Serbia's energy system and a major stakeholder in Southeastern Europe. With a total capacity of 3,429.5 megawatts, TENT produces more than half of Serbia's electricity, ensuring supply stability and security.

A branch of Elektroprivreda Srbije known as TENT includes four thermal power plants and a railway transport division. One of these is TENT A in Obrenovac, which has six units and a capacity of 1,765.5 megawatts. Beyond its essential role in electricity supply, TENT is now positioning itself as a participant in environmental initiatives, a unique stance for a thermal power plant.

Clean Energy

Change is underway in the traditional thermal energy sector as a new era of electricity production begins. The Nikola Tesla A plant complex will initiate green energy production by building the first photovoltaic plant within a branch of Elektroprivreda Srbije.

Solar panels will be installed on five of the most suitable external structures at TENT A and TENT Railway Transport—on the storage facility for hazardous and non-hazardous waste, the Remote Traffic Control Center, and the storage area for machinery and spare parts.

The first kilowatt-hours of clean energy from this 948-kilowatt solar

Photographs: Ljubivoje Maričić

The solar power plant, which will begin producing clean electricity this year, is the first in a planned series that will eventually be built at other branches of Elektroprivreda Srbije

SAŠA ĐORĐEVIĆ was born in Lazarevac in 1974. He began his professional career in 1996 at the Nikola Tesla Thermal Power Plants, now part of Elektroprivreda Srbije. He has a vocational master's degree in electrical engineering and computing. At TENT, he is the Head of the Energy Efficiency Department within the investment sector and also serves as the Energy Manager for the TENT branch.

plant are expected by early December, and annual production is anticipated to exceed 1 GWh. All generated energy will support the plant's internal consumption, contributing to significant energy savings and reducing the complex's environmental footprint.

The plant will host over 1,400 solar panels manufactured by Swiss Solar, each with an individual power output of 670 Wp. The project is being managed by a consortium led by MT-KOMEX, with Čačak-based Elektrovat and subcontractor DB Kop Josipović. IMP Automatika is handling the implementation of the supervisory control system.

"When this project is completed, it will provide several benefits. The primary benefit is improving the energy performance of the entire complex. We will generate green kilowatts to meet our internal needs, which will reduce emissions and positively impact the overall carbon footprint of TENT's energy production. This solar plant will generate green energy in a sector traditionally impacted by fossil fuel use. Our public image is changing significantly, and we continue working on this every day. Besides this project, numerous other projects are underway, both here in the thermal power plants and across Elektroprivreda Srbije, aimed at improving energy performance and reducing environmental impact," explained Saša Đorđević, Head of Energy Efficiency.

This solar plant, which will begin producing clean electricity this year, is the first in a planned series to be built at other branches of Elektroprivreda Srbije in the future. Constructing a renewable energy facility on the roof of a thermal power complex signals a clear shift toward the energy transition Serbia is undergoing.

Environmental Transformation

TENT A's flue gas desulfurization plant, inaugurated this year, is one of the most significant environmental projects in European thermal power plants. It was achieved through the collaboration of Serbian and Japanese experts.

This plant significantly reduces annual sulfur dioxide emissions, bringing them in line with European standards. The project employs wet flue gas desulfurization technology using lime as the primary material. A key feature of this technology is that it produces gypsum as a by-product. Instead of being released into the atmosphere, sulfur dioxide is converted into gypsum through an absorber process, advancing TENT A towards a circular economy. Annual gypsum production is expected to reach approximately 250,000 tons.

Construction of a similar plant is also underway at the TENT B location. The same technology will be implemented for both units, extending emission reduction and recycling strategies to other parts of the thermal power complex.

Prepared by Milica Vučković

Photograph: courtesy of Saša Đorđević

THE RISE OF ELECTROMOBILITY IN THE KINGDOM OF FJORDS

The energy powerhouse of the North, the Green Kingdom, the Kingdom of Fjords—these picturesque phrases only partially describe Norway, a country distinguished by its unique blend of majestic nature, abundant resources, and remarkable achievements in energy and sustainability. Norway, the world's leading advocate of electromobility and a pioneer in the transition to electric vehicles, has developed into a mature market that is ready to continue its fight for the top spot in the number of electric cars per capita.

This claim can be backed by numerous statistics, including a recent milestone: for the first time in history, the number of electric cars on Norwegian roads has surpassed the number of petrol cars. Out of 2.8 million registered passenger vehicles, 754,303 were electric, compared to 753,905 running on petrol, according to data from the Road Traffic Information Council (OFV) published on September 16, 2024. Over the past 20 years, more than a million petrol cars have disappeared from Norway's vehicle fleet, largely replaced by electric vehicles, and a similar trend is expected for diesel cars. However, their numbers make the transition slightly longer. Nevertheless, since 2017, more than 280,000 diesel cars have been phased out.

Additional figures confirm the popularity of electric vehicles in the country. In August 2024, 94 percent of all newly registered passenger cars were electric—a 13 percent increase compared to the same period last year. By September, the share of electric vehicles among new registrations exceeded 96 percent.

These changes didn't happen overnight. As early as 2016, Norway reached a significant milestone, with five electric vehicles for every 100 commercial vehicles on the roads—a scenario unimaginable in most other countries at the time. This achievement highlights how rapidly Norway embraced electric cars compared to the rest of the world. Progress didn't stop there—data for 2020 showed that the country set a new record by

Photograph: Unsplash/Emil Karlsen

becoming the first to have more new electric vehicle registrations than those with internal combustion engines annually.

Incentives for Electric Vehicle Purchases in Norway

Norway's incentives for electric vehicle adoption have evolved through a series of policies over time. From 1990 to 2022, electric vehicles were exempt from purchase and import taxes. However, in 2023, a new tax based on the vehicle's weight was introduced. Between 2001 and 2022, the 25 percent value-added tax (VAT) was also eliminated for electric cars. Still, starting in 2023, VAT is applied only to the portion of the price exceeding 500,000 NOK (approximately 45,000 EUR), with prices below that threshold remaining tax-free.

In addition, electric vehicle drivers have enjoyed various benefits, such as free tolls and ferry rides until 2017. From 2018, they have benefited from reduced tolls and ferry fees, with discounts of up to 50 percent. Public parking was free for electric vehicles between 1999 and 2017, and since 2005, they have been allowed to use bus lanes. However, since 2016, this privilege has been chiefly limited to electric vehicles carrying passengers.

Corporate users of electric vehicles have also enjoyed tax benefits when purchasing company cars.

Norway's incentives for electric vehicle adoption have evolved through a series of policies over time

From 2000 to 2008, a 25 percent tax reduction was offered, which increased to 50 percent between 2009 and 2017. After that, the benefits were gradually reduced to 20 percent by 2022, according to the Norwegian Electric Vehicle Association.

Charging Infrastructure

A right-to-charge policy, introduced several years ago, ensures that residents of apartment buildings have access to charging infrastructure in shared parking areas, similar to homeowners who can install private chargers. These measures aim to remove as many barriers as possible to make electric vehicles more practical.

The number of public fast chargers has significantly increased in recent years. While in 2014, around 270 electric cars could be charged simultaneously at fast chargers, today that number has grown to over 8,700. Additionally, the number of slow chargers available is considerably higher.

A charging center located on the E-39 highway in southern Norway was recently awarded first place in an international competition. This center offers 16 high-power charging stations, delivering up to 200 kW, and includes options for electric trucks. This success further validates that long-term incentives, financial support, public education, and an overall atmosphere of innovation have helped Norway become a leader in this field.

Norway has set ambitious goals, including that all new cars sold by 2025 will have zero emissions (either electric or hydrogen-powered). Judging by the number of newly registered vehicles in recent months, this goal seems achievable without major obstacles.

Overall, the evolution and steps that began in the 1990s have transformed Norway's infrastructure and vehicle fleet. Its regulations, subsidies, and measures serve as examples for other countries aiming to achieve similar goals in sustainable transport and transition efforts, demonstrating the time required for societies to adapt and implement new technologies effectively.

Prepared by Milica Vučković

Photographs: (middle) Unsplash/Jack White; (bottom left) Unsplash/Sasha Matic

CHARGING INFRASTRUCTURE AS THE FOUNDATION OF E-MOBILITY

Changes in the world, especially in science and technology, are occurring rapidly. Such transformations have not bypassed the automotive industry. A revolutionary shift in transportation can be summed up in one word—e-mobility. However, this is not a phenomenon without historical roots. The ideas behind electric vehicles, specifically a series of inventions from batteries to electric motors, date back to the 19th century when true pioneers created the simplest models of cars and carriages powered by electric motors. After decades, these early visions have become everyday topics in modern discourse on sustainable transport.

In Serbia, e-mobility began developing intensively during this century. The first electric vehicles in the country appeared relatively recently. Still, thanks to rapid technological advancements and growing demand, they have become increasingly common, particularly since the start of this decade. The development of charging infrastructure, government support, and the availability of electric models from an increasing number of car manufacturers have driven this trend.

Currently, the company operates 27 AC and 83 DC connectors. The number of registered users exceeds 3,500 and grows daily

Photographs: Charge&GO

Charge&GO is a pioneering company in Serbia in the field of e-mobility. Its development began in 2017 with the installation of its first chargers, followed by work on an app and platform. The company launched the first regional platform and mobile app with a network of chargers, enabling quick and simple charging of electric vehicles, which is essential for popularizing e-mobility. Currently, the company operates 27 AC and 83 DC connectors. The number of registered users exceeds 3,500 and grows daily.

Most installed chargers are located in and around Belgrade, but the network is rapidly expanding to meet user needs. Chargers have been activated recently at three new locations—Nova Crnja, Kikinda, and the OMV station at Ada Ciganlija—carefully chosen based on user demand. These new locations indicate that infrastructure development is not solely focused on Belgrade, signaling an increasing demand for chargers across various parts of Serbia. Due to its geographical position, particularly during the summer, Serbia often serves as a transit country, highlighting the need for local infrastructure, as evidenced by the growing number of foreign drivers each year.

How to Access the Chargers

Installing chargers through Charge&GO begins with contacting their expert engineering team. The company caters to both individuals and businesses. Choosing a suitable charger depends on the type of vehicle, available power capacities at certain locations, such as gas stations and shopping centers, the installation site, and other factors. Charge&GO operates on a turnkey principle, taking responsibility for all installation phases, from planning to project completion.

Chargers have been activated recently at three new locations—Nova Crnja, Kikinda, and the OMV station at Ada Ciganlija—carefully chosen based on user demand

Number of Vehicles in Serbia

According to data from the Ministry of Internal Affairs, by the end of August, over 3,500 purely electric vehicles were registered in Serbia, while the number of hybrid vehicles is significantly higher, reaching 28,400 cars.

Charge&GO acts as a system integrator for renowned manufacturers like ABB, Schneider Electric, Siemens, and Kostad, ensuring the quality and reliability of the installed chargers. Besides installation, the company offers annual maintenance services to extend the lifespan of chargers and ensure safe charging for users. Maintenance contracts have been signed with numerous companies with which Charge&GO has partnered.

As repeatedly demonstrated, adopting electric vehicles and building adequate infrastructure are inextricably linked. The widespread use of electric vehicles is only possible with a robust accompanying network of chargers. The success of e-mobility in Serbia, as elsewhere, depends on the balanced development of both segments. This year's European Automobile Manufacturers' Association (ACEA) report highlights the imbalance issue. Between 2017 and 2023, electric car sales in the EU grew three times faster than the rate of charger installations, prompting estimates that the EU will need to install chargers eight times faster annually by 2030 to meet its goals. Such data underscores the argument that sustaining electric vehicle growth becomes challenging without a proportional increase in the charging network. Therefore, companies like Charge&GO are vital pillars of e-mobility adoption.

Prepared by Milica Vučković

RES SERBIA 2024 – PATH TO A GREEN TRANSITION

The RES Serbia 2024 conference, held in September in Vrdnik, brought together key representatives from national and international institutions, investors, equipment manufacturers, and financial institutions supporting renewable energy projects. Over two days, eight panels addressed critical topics of the energy transition, including integrating renewable energy sources (RES) into the power system, developing wind and solar plants, and challenges faced by participants in market auctions.

At the conference's opening, Dubravka Đedović Handanović, Minister of Mining and Energy, stated that by 2026, Serbia is expected to have over 1,500 green megawatts—33 times more than in 2012.

"In August, we had about 390 renewable energy plants online, with a total capacity of 753 MW, and an additional 750 MW of new capacity is under construction. Following the European model, we successfully completed the first market premium auctions, the largest conducted simultaneously in our region. Investors have recognized regulatory improvements, resulting in over 715 MW of new RES capacity and over one billion euros in new investments in the economy and energy sector. We are preparing for the second round of auctions, which will be announced within the next two months, with final analyses currently underway," said Đedović Handanović.

The Minister recalled that the government had adopted the Integrated National Energy and Climate Plan through 2030, with a vision through 2050. This plan sets a strategic goal to obtain 45 percent of electricity from RES by the end of the decade, meaning nearly every other megawatt will be green.

On the first day of the conference, a financing and electricity purchase agreement was signed for the Čibuk 2 wind farm. It was also announced that the Pupin wind farm has been connected to the transmission system and that construction on Montenegro's first wind farm, Gvozd, will begin in October, with the Pljevlja–Lastva transmission line expected to be completed by June next year.

Participants in the panel "Challenges of Integrating RES into

Photograph: OIIE

the Power System—Serbia and the Region" emphasized that regional cooperation and investments in transmission systems are essential to avoid an energy collapse. Dušan Živković, CEO of Elektroprivreda Srbije (EPS), announced that by the end of 2026, 80 percent of hydroelectric plants will be refurbished, significantly boosting the power system. Investors have provided EMS with bank guarantees for constructing 28 plants with a capacity of 4 GW.

New Auctions

During the panel discussion on auctions in Serbia, Rade Mrdak, Special Advisor to the Minister of Mining and Energy, announced a second round of auctions to award market premiums for RES.

He says prices will be significantly lower than in previous auctions but still attractive enough to draw investors. He also announced the introduction of a new criterion whereby, in addition to the bid price, consideration will be given to the portion of capacity designated by the investor for end-customer supply. This capacity can be offered to the guaranteed supplier, EPS, or to an end customer through a Power Purchase Agreement (PPA), a corporate power purchase agreement.

During the panel discussion on "Perspectives on Wind Power Plant Construction and Financing," it was noted that Europe added 6.4 GW of new wind capacity in the first half of this year. Serbia is highly attractive to wind farm investors due to a combination of factors, including a relatively predictable environment.

Solar Energy

The panel discussion "Challenges and Prospects for the Development and Construction of Solar Power Plants" was in high demand. Participants learned that 130 MW of solar power plants are connected to Serbia's distribution system. This solar capacity is expected to improve in the spring of next year, with an additional 150 MW anticipated to come online.

Miloš Kostić, proprietor of MT-KOMEX and a pioneer in solar project development in Serbia, shared his early experiences from 2009 when regulatory obstacles and limited state support dampened initial enthusiasm for solar energy. The initial phase was even marked by dissatisfaction as solar capacity was capped at just 5 MW. At the same time, other types of renewable energy, such as hydro and biogas, were prioritized, leading to slow growth in solar installations. However, he realized that although this decision initially seemed like a major setback, the experiences gained during the early days of the solar industry showed that continuing along a different policy path would have been detrimental—not only to the state budget but also to the sector itself. Reflecting on these lessons, Miloš expressed a degree of satisfaction, acknowledging that these early decisions allowed the sector to develop in line with realistic capacities and market needs gradually.

In the traditional closing panel of the RES Serbia 2024 conference, "Electricity Market 4.0," upcoming legislative changes were discussed, mainly updates to energy laws and bylaws. These changes are expected to significantly liberalize the market and enable benefits from large ongoing projects aimed at aligning with European Commission directives.

The discussion also highlighted the importance of adapting market and regulatory frameworks to effectively support these transitions, with expectations that legislative and policy reforms, especially regarding energy standards and market integration, will provide a more flexible and open market environment.

The Renewable Energy Sources Association of Serbia organized the RES Serbia 2024 conference, which state institutions and public enterprises supported.

Prepared by Milica Vučković

RELIABLE SOLUTION – SOLAR ENERGY

An increasing number of companies recognize the benefits of investing in sustainable energy. This trend is driven by the pursuit of decarbonization and climate neutrality goals and as a response to the global energy crisis. This moment revealed the instability of traditional energy sources and the necessity to move towards energy transition. Companies are increasingly considering integrating solar energy in their efforts to secure reliable energy sources for their operations. However, making such decisions requires trust in the efficient execution of projects. When a project is entrusted to a team of experts, investors need assurance that all phases are carefully planned, allowing them to focus on achieving their business objectives.

SAKURA ENERGY has decided to integrate sustainable energy into its

MT-KOMEX has constructed over 200 solar power plants, with over 140 MW of installed capacity across over 300,000 solar panels. The company offers clients complete turnkey solutions encompassing all project phases, from design and construction to commissioning and final system testing.

Photographs: MT-KOMEX

Regarding the solar power plant Sakura Park 1, the expected annual CO2 savings amount to 82,317.25 kilograms, highlighting this project's environmental benefits. These benefits include achieving climate goals, reducing air pollution

operations. This decision marks a significant step toward reducing the company's environmental footprint and improving energy efficiency. To realize their ambitious idea, they found a reliable partner in MT-KOMEX, a company with extensive experience constructing solar power plants. MT-KOMEX offers comprehensive support at all project stages, from initial analysis and design to implementation and maintenance. The company's expert team oversees every aspect of the project, ensuring compliance with the latest standards and regulations in the field of renewable energy.

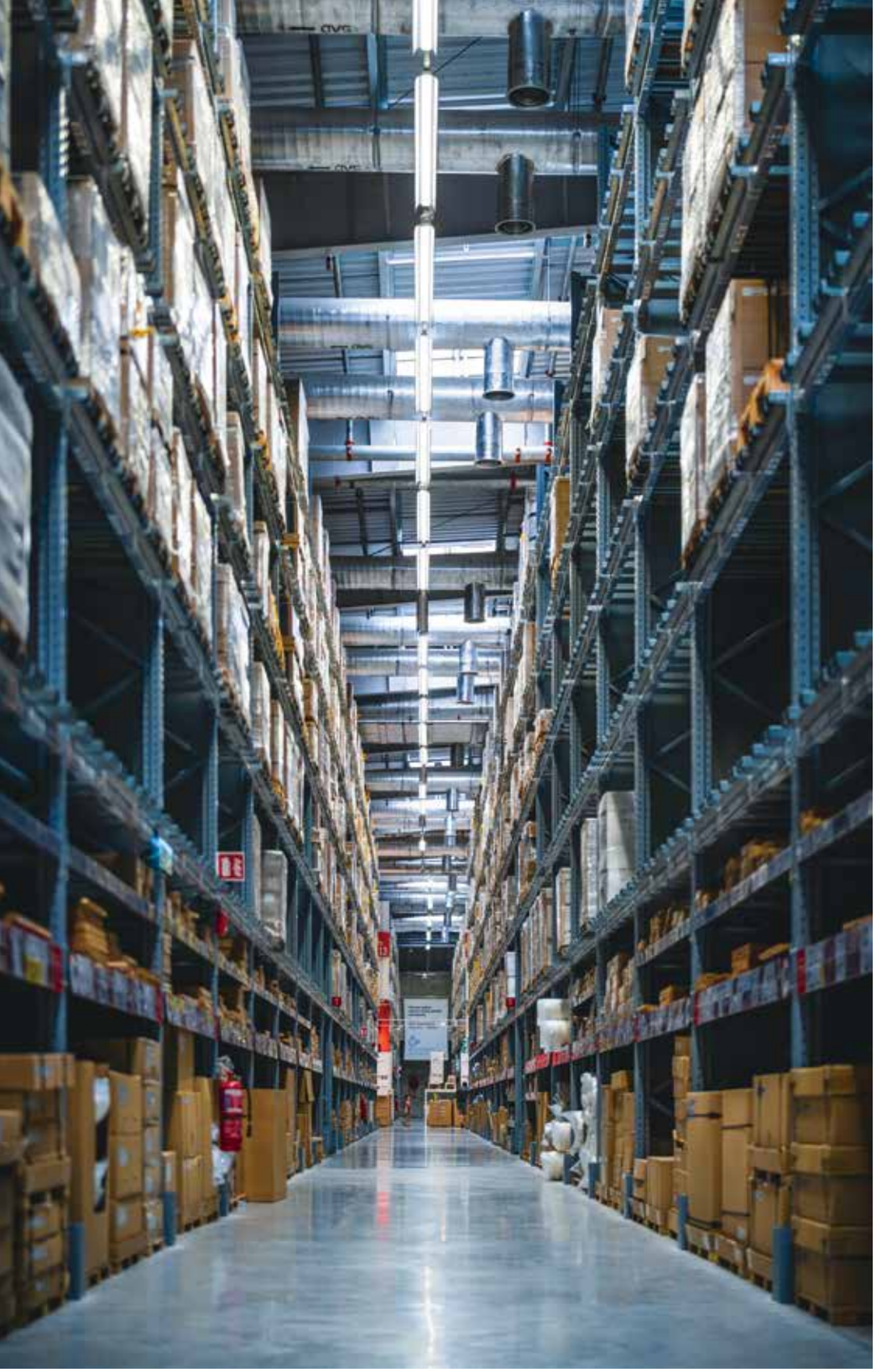
The solar power plant Sakura Park 1, located on the rooftop of a building in New Belgrade, will include 304 bifacial photovoltaic panels manufactured by Luxor Solar, chosen for their high quality and efficiency. Bifacial solar panels are designed to generate more electricity by capturing sunlight reflected off the surface on which they are installed.

The panels will be installed in landscape orientation on flat rooftop surfaces. They will be arranged in two rows facing east-west, with a tilt angle of 9°. The horizontal spacing between the panels is 22 millimeters, while the vertical spacing is approximately 140 millimeters. Each panel measures 2,279 x 1,134 x 30 millimeters and weighs 32.7 kilograms.

The total capacity of the photovoltaic generators is 173.28 kWp DC. Four alternating current inverters, each with an output power of 40 kW and manufactured by Huawei, are planned for connection to the grid. The total output power of all inverters is 160 kW, and they are connected via AC cables to a single AC distribution panel within the building. The electricity generated by this solar power plant will be used to power the building's internal systems, with partial excess energy fed into the distribution grid. The estimated annual electricity production from the solar power plant is 175,221.00 kWh, demonstrating the efficiency and capacity of the project.

The adoption of solar energy plays a significant role in combating climate change by reducing carbon dioxide emissions, one of the main greenhouse gases contributing to global warming. Regarding the solar power plant Sakura Park 1, the expected annual CO_2 savings amount to 82,317.25 kilograms, highlighting this project's environmental benefits. These benefits include achieving climate goals, reducing air pollution, and improving quality of life.

Prepared by Katarina Vuinac



SUSTAINABLE LOGISTICS REAL ESTATE

Logistics centers and warehouse systems usually have flat roofs, which are ideal for installing solar panels to maximize the use of solar energy

Transportation is often the primary focus when discussing sustainable logistics solutions, as it is a major energy consumer and environmental polluter. However, other logistical systems, such as logistics and distribution centers, terminals, warehousing, and handling systems, also significantly improve energy and ecological efficiency and the sustainability of logistics solutions within the supply chain. This aspect is often underrepresented, which motivated this discussion to highlight the various aspects of sustainability in logistics real estate in more detail. In fact, sustainability in logistics real estate is examined from two main angles: sustainable locations and facilities.

Sustainable Logistics Locations

Location selection is one of the most challenging tasks in logistics. Traditionally, location criteria for logistics properties prioritize good connections with transportation infrastructure, various transport modes, and logistics networks at the macro level and solid connectivity with end users and service locati-

Photograph: Pixabay/Tham Yuan Yuan

ons at the micro level. This logistics-oriented approach to location selection significantly contributes to energy and environmental sustainability.

Based on these criteria, logistics centers and warehouses would ideally be located close to end-use and consumption points, as this would minimize delivery times, distribution costs, energy consumption, and emissions from transport.

However, achieving this is challenging in practice. Buyers and consumers are often in urban areas where space for logistics properties is limited and expensive. Additionally, traffic congestion and local transport and operating hours regulations can restrict logistics operations in these areas. As a result, logistics systems and facilities are often moved to the outskirts of large cities. A key question then becomes where to locate them and how far from end users and delivery sites, as this directly impacts transport volume and environmental effects. Delivery of goods largely relies on road transport, which emits significant amounts of CO_2 and other pollutants. If logistics and distribution centers are far from urban areas, this increases vehicle starts, empty return trips, travel distances, energy consumption, and pollution. Positioning logistics systems closer to urban areas and near highways, railways, airports, and other transport hubs and terminals is preferable. This allows for intermodal transport systems that use more energy- and eco-efficient transportation methods. Indicators that highlight the importance of this approach include energy use and emissions per ton-kilometer (tkm): road transport consumes about 2,890 KJ/tkm and emits approximately 139.8 gCO_2/tkm; rail transport uses about 667 KJ/tkm and emits 15.6 gCO_2/tkm, while river transport averages 423 KJ/tkm and emits around 50.62 gCO_2/tkm.

Besides transport distance, the land used for logistics locations is also essential for sustainability, as it could otherwise be used for agriculture, water management, forestry, or other ecosystems. Preserving the natural environment and contributing to biodiversity is crucial here. Land use and building construction impact the environment negatively by reducing rainwater absorption, disrupting the natural circulation of air and water, destroying green areas, and altering the landscape and visual environment. The area also loses its ability to absorb carbon and

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Green properties use equipment and building materials that save energy and have lower emissions of harmful substances

Photographs: Pixabay/Marcin; (Kilibarda) courtesy of Milorad Kilibarda

other pollutants, creating lasting consequences. Logistics real estate is increasingly occupying more land. In Europe, it is estimated that around 23 percent of commercial real estate is devoted to logistics. There are over a million square meters of logistics and industrial space in the Belgrade region, mainly on former fertile land along the Belgrade–Šid and Belgrade–Novi Sad highways. This trend of land occupation continues. Facilities are generally up to 10 or 15 meters high. Still, by constructing high rack warehouses up to 40 meters tall, land use would be much more efficient, resulting in less environmental impact. Such facilities are also more energy-efficient.

Sustainability also improves when existing sites or previously used industrial or commercial properties that are now abandoned, underutilized, or contaminated are repurposed instead of converting agricultural land into building land. This saves space, helps clear polluted land, and removes environmental hazards. Often, these sites have existing transportation, utility, and technical infrastructure that can be reused rather than building new structures from scratch.

Sustainable Logistics Facilities

Green buildings utilize energy-saving equipment and materials with lower emissions. Regarding logistics properties like warehouses, operational emissions during construction are minimal, but avoiding using CO_2 in construction materials and processes should be a focus. For long-term use, operational energy savings are valuable even if they generate emissions during the building phase (such as from additional insulation).

During construction, emissions come from building materials and processes. For example, walls made from aluminum panels have an embedded energy of about 1,000 MJ/m² and a lifespan of under 40 years. Wooden structures with aluminum cladding have similar longevity but require only 400 MJ/m². Comparing aluminum walls to concrete reveals the importance of longevity. Concrete walls have about 800 MJ/m² of embedded energy, roughly 20 percent less than aluminum, but their lifespan is almost twice as long. Energy savings would be significant if a structure were used for over 40 years, as aluminum panels would need total replacement. Local sourcing is essential, especially with wood. Imported wood typically has an embedded energy of 7,540 kWh/m³ (far higher than 800 kWh/m³ for concrete), while locally sourced wood has only 110 kWh/m³.

Heating and cooling are significant costs in warehouse operations (around 20 percent of total expenses), affecting energy and environmental sustainability. High-performance HVAC systems, eco-friendly refrigerants, and appropriately sized systems can improve efficiency and minimize energy use. Thermal barriers and warehouse insulation materials can also reduce energy loss, emissions, and consumption.

Replacing lighting with LED bulbs in a warehouse reduces the building's overall energy consumption and heat generation

Photographs: (middle) Pixabay/Sarla Wu; (bottom) Pixabay/EFAFLEX_Schnelllauftore

Additional methods include cool-reflective roofs and strategically planted trees to provide shade.

Lighting is often one of the largest energy consumers in a warehouse so that simple changes can yield significant savings. Replacing traditional lighting with LED bulbs reduces overall energy use and heat production. LEDs also last much longer, reducing the frequency and costs of replacements. Automatic lighting systems that adjust based on occupancy or natural light can further decrease warehouse energy consumption.

Another way to reduce energy consumption in a warehouse is to install sensors wherever feasible. This includes motion-activated lights and sub-meters on machines, devices, and other equipment. With sensors in place, energy use can be easily tracked and reduced, saving money in the process.

The materials used for constructing or finishing warehouse facilities also directly impact sustainability. For example, non-toxic paints, wood products, adhesives, and carpets improve overall air quality within the warehouse. Enhancing the insulation of the building further reduces energy consumption.

Logistics centers and warehouse systems usually have flat roofs, which are ideal for installing solar panels to maximize the use of solar energy. Solar panels can significantly lower the energy costs of these facilities, contributing to long-term savings. For instance, with a solar plant installed for a 25-year period (the typical performance guarantee), the production cost per kWh would be around 2.6 euros. Solar panels play a crucial role in achieving energy independence, as generating their own electricity helps reduce reliance on utility companies and unstable energy sources. Logistics systems and companies can rely on solar panels to meet their energy needs, providing stability and autonomy.

Photographs: (top) Unsplash/Ivan Bandura; (bottom) Pixabay/Erich Westendarp

KLM'S EFFORTS FOR SUSTAINABLE AVIATION

Climate change and global warming present challenges that require swift and decisive action. As we confront them, it is important to recognize the various sources of pollution. Civil aviation, for example, contributes to overall carbon dioxide pollution by two to three percent. Without serious changes, this share could rise to as much as 22 percent by 2050.

There must be a way to reconcile humanity's natural desire to travel with reducing aviation's impact on climate change.

Since the main cause of pollution in the aviation industry is the use of fossil fuels, the key solution lies in reducing their use and transitioning to sustainable alternative fuels. In fact, this is exactly what the world's oldest airline still operating under its original name, KLM Royal Dutch Airlines, is doing.

KLM has been a leader in the aviation industry for many years when it comes to sustainability. Instead of developing a separate strategy for sustainable operations, the company places sustainability at the core of its business strategy. This approach allows it to integrate environmental practices into all aspects of its operations, thereby actively contributing to reducing its environmental impact.

The airline's goal is to reduce its relative carbon dioxide emissions by 30 percent by 2030

Photographs: KLM

is to use 10 percent SAF on its flights by 2030, and through purchases and various partnerships with SAF producers, the company has already secured the necessary amount of fuel to be halfway toward achieving this ambition.

How can you, as a passenger, participate in the fight for more sustainable aviation

It's simple – the next time you pack your suitcase, consider whether you really need all the items you're taking. Also, when booking a flight, you have the option to voluntarily purchase an additional amount of sustainable fuel. Your contribution is calculated based on several factors that affect the carbon dioxide emissions of your flight, such as aircraft type, distance, and load factor. Today, KLM uses one percent sustainable aviation fuel on all flights departing from Amsterdam. It's a start, but with your help as a passenger, it can do even more. Every small step contributes to the larger goal of preserving our planet.

KLM

How KLM is trying to reduce its carbon footprint and climate impact

- FLEET RENEWAL, as the newest generation of aircraft consumes less fuel and, therefore, emits fewer harmful gases. The airline's goal is to reduce its relative carbon dioxide emissions by 30 percent by 2030, and fleet renewal will enable it to achieve 12 percent of that target. This is why KLM is introducing new Airbus A320/321Neo aircraft for medium-haul routes, as these planes reduce emissions per passenger kilometer by 20 percent compared to the aircraft they are replacing. Additionally, KLM is introducing Airbus A350F aircraft to its cargo fleet, which will reduce carbon dioxide emissions from cargo flights by 40 percent on an absolute basis.
- OPERATIONAL MEASURES, such as route optimization, weight reduction, and fuel efficiency improvements, can contribute two percent towards achieving the projected goal for 2030.
- PURCHASING AND USING SUSTAINABLE AVIATION FUEL (SAF). The most important factor for reducing aviation's climate impact is better fuel: sustainable aviation fuel or SAF, as its use can reduce carbon dioxide emissions by up to 75 percent compared to fossil fuels. KLM's ambition

KLM has been a leader in the aviation industry for many years when it comes to sustainability

Sustainable aviation fuel or SAF can be of two types:
– fuel made from biomass, i.e., used cooking oils, waste, or residues from the agricultural and forestry industries
– synthetic sustainable fuel or e-fuel, produced from hydrogen and carbon captured from the atmosphere

THE FIRST ELECTRIC VEHICLE CHARGER "MADE IN BIH"

Awareness of electromobility is continuously growing, and the automotive industry strives to produce more affordable electric vehicles (EVs). However, charging these vehicles can be problematic due to the lack of public chargers. This challenge inspired a team from Bosnia and Herzegovina, who recently presented their work after three years of development.

Recognizing the need for infrastructure development, which, like in many countries in the region, has yet to keep pace with the growing number of electric vehicles, a team of experts developed the first Bosnian electric vehicle charger with all domestic components. The members of this team, including Armin Durmišević (Director), Arslan Hajdarević, Denis Berilo, and Faruk Ćirić, are dedicated to creating innovative solutions. Together with several colleagues, they designed and built the charger.

– "Our team comprises top experts in software engineering, mechanical engineering, and electrical engineering. The charger is a completely Bosnian product. Our expert

Photographs: courtesy of Arslan Hajdarević

team developed all blueprints, sketches, and hardware and software aspects in-house from the beginning. Everything you see on our charger results from our knowledge and experience," explains Hajdarević.

The charger was developed to improve electric vehicle infrastructure in Bosnia and Herzegovina. The team worked on it for over three years, continuously improving every aspect and component to offer the highest-quality product on the market.

The project progressed through several phases and versions, culminating in the current fourth version (v4) of the electronics. In each iteration, the focus was on enhancing functionality, safety, and efficiency. The charger is designed to operate across a wide temperature range, adhering to industrial standards to ensure reliability in various climatic conditions.

The standard cable length is five meters, adjusted to users' needs. Regarding materials and operation principles, the team used components that precisely control current flow, ensuring safety and efficiency during vehicle charging.

They have produced several prototypes, and the company is also focused on obtaining certification to enter the European market. Each prototype underwent rigorous testing and internal quality control processes, followed by improvements based on test results.

The offered charger provides up to 22 kW of power, with plans to develop super-fast chargers capable of delivering up to 350 kW

They already hold several ISO certifications (ISO 9001, 14001, and 27001), positioning them highly in the market. Next month, they plan to send the charger for the final CE certification, making them one of the few companies in Europe with such recognition.

The offered charger provides up to 22 kW of power, and the team plans to develop super-fast chargers capable of delivering up to 350 kW.

The announcement of the first electric vehicle charger made in Bosnia and Herzegovina has received positive reactions from the public.

– "People are excited and proud that we have a domestic product of this kind. We plan to begin mass production immediately after completing the final certification phase, aiming to market the charger not only domestically but also across Europe," Hajdarević says.

According to the Association for Electromobility, Bosnia and Herzegovina currently has around 300 chargers. As the popularity of electric vehicles grows, the infrastructure will need to follow suit. At charging locations, the new "Made in Bosnia" product will be marked with a motif of the Bosnian carpet. This symbol is intended to remain a recognizable branding element, adding authenticity and visibility to the product globally.

Prepared by Jasna Dragojević

WHEN STUDENTS CREATE SOLUTIONS FOR SUSTAINABLE TRANSPORT

The global fight against climate change takes place on many fronts, with innovative technologies serving as our primary tools to effectively reduce harmful emissions, improve energy efficiency, and offer eco-friendly products and services. Innovators worldwide, led by young talents, are at the forefront of creating green solutions. Among them are Anđela Kanjo and Filip Oketić from Serbia, who decided to contribute to this global goal through their unique student company, Moveably.

Their app, which optimizes communication between transporters and clients, is not just a business venture—it's a solution that can help reduce greenhouse gas emissions from traffic. These young entrepreneurs started their journey through student competitions, and today, their app represents an innovative way to improve efficiency in the transport industry.

The story of Anđela and Filip began in high school, where they participated in various competitions and extracurricular activities. Although their first project focused on cultural exchange, the critical turning point came when Anđela, with advice from her father, recognized an opportunity to improve the scheduling process for transport services. This sparked the idea for Moveably—an app that connects transporters and clients through an auction system, allowing users to choose the most affordable and efficient transport solution.

Filip took charge of the technical side of development, while Anđela designed the app's functionalities using basic tools like pen and paper. Their dedication and teamwork led to the forming of a five-member team, which later expanded to ten members through a school audition.

Photographs: Tim Moveably

"We liked the idea of having something we developed that others could use to make their daily lives easier. Personally, the start of this journey allowed me to develop leadership skills and learn how a team functions.

Their app, which optimizes communication between transporters and clients, is not just a business venture—it's a solution that can help reduce greenhouse gas emissions from traffic

At the same time, Filip gained invaluable experience in developing mobile Android apps", says Anđela Kanjo.

With Moveably Towards Lower Emissions

The app offers an innovative solution for optimizing transport services. Users can input details about the cargo they need to transport, and transporters submit their bids. The client then chooses the option that suits them best based on price, speed, or ecological efficiency.

Anđela emphasizes that while competition exists, they identified untapped opportunities and potential improvements for the Serbian market. Their goal is to enhance transportation organization, reduce empty trips, and optimize transporter routes, which directly contributes to lowering fuel consumption and greenhouse gas emissions.

"The project is currently in the final development stage, preparing for market launch. We are communicating with external partners and transporters about the final adjustments they consider necessary. After that, we will enter the testing phase, during which the platform will be free for transporters to thoroughly test it and confirm its functionality and benefits", Anđela Kanjo explains.

The innovation developed by Anđela and Filip has a direct environmental impact. Through better planning and more efficient use of transport capacities, Moveably helps minimize unnecessary trips, empty trucks, and inefficient routes. This not only saves time and money for clients and transporters but also significantly reduces carbon dioxide emissions and other pollutants from traffic. Traffic optimization could become crucial in Serbia's efforts to meet emission reduction targets in accordance with international climate agreements.

Youth as Drivers of Change

Despite initial challenges, such as the lack of interested collaborators, Anđela and Filip managed to build a team and create a solution recognized and awarded at many competitions. Their most significant achievement so far is winning first place at the national student company competition, which qualified them for the European competition in Tallinn, Estonia. Additionally, they secured second place in the competition for the best technological innovation in Serbia.

Beyond technological development, these young entrepreneurs hope their project will become part of a broader ecosystem of sustainable solutions within the transport industry. They believe that young people should be given more opportunities to develop their ideas, as they are often the ones driving changes and innovations with a lasting positive impact on society and the environment.

They exemplify how young people can use their creativity and energy to create innovations that directly contribute to reducing greenhouse gas emissions and promoting sustainable development. Their project, Moveably, is more than just an app—it is a step toward a greener and more efficient future for transportation in Serbia.

Prepared by Milena Maglovski

E-MOBILITY – ABB WAY

In its latest report, the United Nations warns that the world has just 12 years to drastically reduce carbon emissions and limit global warming to 1.5°C. Currently, the temperature is already 1°C higher, and if we continue at this pace, we could see a rise of 3°C. To achieve the target reduction of 1.5°C, it is necessary to reduce carbon emissions by 45 percent by 2030.

With its experience and longevity in the market, ABB stands out as a reliable partner in developing infrastructure for charging electric vehicles, combining technological innovations and high safety standards with financially viable solutions

Given that almost two-thirds of global carbon pollution comes from the transport and energy production sector, the European Union adopted the Alternative Fuel Infrastructure Regulation (AFIR) to facilitate the transition to more sustainable transport. The regulation enables the expansion of fuel stations charging electric vehicles across Europe. By 2030, hundreds of new charging points are planned, including fast chargers for cars and heavy vehicles and hydrogen charging points.

The global stock of electric vehicles is expected to increase from 7.7 million to more than 85 million in the next decade. This change and infrastructure improvements could significantly reduce the transport sector's carbon footprint and contribute to the fight against climate change.

Different technologies are used to charge electric vehicles, and the choice depends on the duration of the vehicle's stay at the place where the charger is located. AC chargers have an effective power ranging from 3.6 to 11 kW, which allows a driving range of 15 to 50 km per hour of charging. Although some AC chargers can theoretically deliver up to 22 kW, in practice, the charging speed is often limited by the car's built-in converter. Because of their relatively low cost, AC chargers are cost-effective for locations where cars stay longer, such as households or offices. On the other hand, DC chargers are preferred in public places where drivers tend to stay for a short time. These chargers allow fast charging, crucial at gas stations or while shopping, where charging is expected to take 15-30 minutes. DC chargers are also useful in retail locations where people stay for an average of one to two hours. It is essential to choose the right type of charger depending on the driver's needs.

With its experience and time on the market, ABB stands out as a reliable partner in developing infrastructure for charging electric vehicles, combining technological innovations and high safety standards with financially viable solutions. The electrical infrastructure design for charging complies with the IEC 61000-6-3 standard, ensuring high safety for use in residential areas, offices, and public places, such as gas stations. ABB also has independent CE certificates, which guarantee safety against electric shocks

Photographs: ABB

and immunity to electromagnetic radiation. In addition, ABB DC fast chargers offer two payment models: membership and payment terminal. In the membership model, electric vehicle drivers opt for one of the offered prices by registering, while in the payment terminal, users simply swipe their credit card to start charging. This flexibility facilitates access to chargers and enables different payment options according to the user's needs.

ABB provides global services with a focus on remote diagnostics. This technology makes it possible to solve more than 90 percent of service cases remotely, reducing costs and travel time while increasing the charging network's availability. In other words, proactive monitoring of the charger, with more than 400 monitored parameters, enables quick identification and resolution of problems, further increasing the efficiency and profitability of services.

The second generation of ABB Terra chargers for electric vehicles

Recently, ABB launched the second generation of Terra DC 124/184 CE fast chargers. These all-in-one fast chargers, with power of up to 180 kW, offer convenient charging times for any electric vehicle, including those with HV batteries. With their compact, modular design, these chargers are ideal for parking lots in front of shopping centers and other retail establishments, stops and pumps on highways, and hotel or company parking lots because they are easy to install and maintain. In addition to various power options, Terra chargers can be configured in a single or dual-output format, with energy-sharing technology in case of simultaneous, parallel charging of two vehicles, favoring a more economical use of space. Their user interface is customizable and intuitive to use. Cable management, payment options, and connectivity options provide owners, operators, and site hosts with customized solutions for every charging station, from public car parks to fleets. All Terra chargers can be connected remotely for servicing, updates, and upgrades. This type of charger is pre-integrated with OCPP networks, payment platforms, and energy management APIs.

ABB Terra chargers offer a redundant power supply architecture for maximum availability in the sphere of electric vehicles. These chargers can meet the needs of high-voltage BEVs up to 920 V, making them fully compatible with all current and future electric vehicles. With a multitude of configuration options, Terra DC fast chargers are ready to support the growth of the electric vehicle market over time and, as such, represent a reliable technological response to the challenging visionary demands in this field.

ABB

ABB Terra chargers offer a redundant power supply architecture for maximum availability in the realm of electric vehicles

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Life Is On | Schneider Electric

Delivered **150 chargers** in Serbia and about **30 in Montenegro**.

KLM

The airline's goal is to use **10 percent sustainable aviation fuel**, or SAF, on flights by 2030. Compared to fossil fuel, SAF can reduce carbon dioxide emissions by as much as **75 percent**.

Hungary

16,000 new electric cars purchased in Hungary since the beginning of 2024.

MT-KOMEX D.O.O. ENERGY SOLUTIONS

Built **200+ solar power plants** with **150+ MW** of installed power and mounted more than **300,000 solar panels**.

ЕЛЕКТРОПРИВРЕДА СРБИЈЕ

The **first photovoltaic power plant** will be built in the Nikola Tesla A thermal power plant complex. It will start the production of green kilowatts in the traditional thermal energy sector.

Ministry of Construction, Transport and Infrastructuree

16 green stations equipped with fast electric chargers will be built at rest areas along the highway.

ABB

Since 2010, ABB has delivered more than **840,000 chargers** for electric vehicles in **85 markets**.

ProCredit Bank

From 2023, **100 percent** of the bank's fleet will consist of low-emission cars.

charge&GO

It currently has **27 AC** and **83 DC** connectors, and the number of registered users exceeds **3,500**, which is constantly growing.

The first charger for electric vehicles

The charger offered by the team from Bosnia and Herzegovina has a power of up to **22 kW**, and they plan to produce superfast chargers with a power of up to **350 kW**.

FOUR KEY MEASURES TO SAVE THE PLANET

A new study published in the prestigious journal Science reveals that implementing just four key policies could mitigate the consequences of unsustainable plastic waste management by up to 91 percent, while greenhouse gas emissions linked to plastics could be reduced by a third.

The key measures include mandating that new products contain at least 40 percent recycled plastic from post-consumer waste, capping the production of new plastic at 2020 levels, significant investments in plastic waste management infrastructure, and introducing a symbolic fee on plastic packaging to encourage reduced use and a transition to more sustainable alternatives.

The study, Pathways to Reducing Mismanaged Plastic Waste and Greenhouse Gas Emissions to 2050, was conducted by researchers from the University of California, Berkeley, and Santa Barbara. It was published ahead of critical negotiations in South Korea. These negotiations, which will take place from November 25 to December 1 in Busan, will bring together delegates from over 190 countries to finalize the details of the first legally binding agreement on plastic pollution.

"This is a pivotal moment. The upcoming negotiations in Busan represent our unique opportunity as a planet to unite and tackle plastic pollution. One of the most exciting findings of this study is that we can nearly eliminate plastic pollution with this agreement. I'm cautiously optimistic, but we cannot afford to squander this once-in-a-lifetime chance," emphasized Dr. Douglas McCauley, one of the study's authors.

If the world continues with "business as usual," between 2011 and 2050, it will generate enough plastic waste to cover Manhattan ten times over with piles of plastic exceeding the height of the Empire State Building.

Milena Maglovski

SWEDEN CLOSES THE BALTIC SEA TO OFFSHORE WIND FARMS – 13 PROJECTS CANCELLED

The Swedish government recently canceled 13 offshore wind farm projects, citing military concerns as the reason. This decision has shaken the energy sector, mainly due to the closure of a large part of the Baltic Sea to wind energy development. The suddenly halted projects had a capacity of nearly 32 GW. Besides significantly impacting investors, this decision substantially affects Sweden's energy sector and ability to meet climate goals. Unlike Sweden, other Baltic Sea countries have sought to reconcile concerns by fostering collaboration between the military and the wind industry. At the same time, Sweden has taken a different approach for security reasons.

As mentioned on the website, countries like Poland view offshore wind farms as strategic assets that can enhance military surveillance capabilities by integrating radar systems, thereby strengthening their defense operations.

While Sweden reassesses its strategies, the broader European community continues to monitor and establish a balance between national security and sustainable energy development.

The canceled projects were expected to potentially double the current electricity generation capacity in this Scandinavian country. Although most projects were still in the early stages of development, their cancellation means a loss in renewable energy capacity and private investments that could have increased by several tens of billions of euros.

Sweden's wind energy sector lags despite its extensive coastline along the Baltic Sea, with offshore wind capacities amounting to only 0.2 GW, whereas Denmark, a much smaller country, has 2.6 GW. This starkly highlights Sweden's slow adoption of wind energy, which could be a crucial component of its energy sector given its climatic conditions, as noted on WindEurope's website.

Energy Portal

Photographs: (left) Unsplash/lilshan @seefromthesky; (right) Unsplash/Rachel Cooper

DIVERSIFICATION OF ENERGY SOURCES: NORTH MACEDONIA TURNS TO AZERBAIJAN

North Macedonia has signed an agreement with the State Oil Company of the Republic of Azerbaijan (SOCAR) to enhance its energy security. The partnership formalized through a Memorandum of Understanding on cooperation in the energy sector, focuses on diversifying natural gas supplies and exploring innovative energy project solutions such as gas cogeneration.

Fossil fuels, supplemented by limited hydropower, form the backbone of the country's energy mix. Due to its heavy reliance on imported energy, North Macedonia has been significantly impacted by the energy crisis, making diversification of sources a logical next step. Most of the natural gas consumed in the country comes from Russia, with a smaller share from Greece. This dependence on a single primary source and fluctuating energy prices have repeatedly strained the energy sector.

SOCAR, which has access to vast gas resources from the Caspian Sea region, manages extensive reserves and operates key pipelines, such as the Trans-Anatolian Natural Gas Pipeline (TANAP) and the Trans-Adriatic Pipeline (TAP), which connect directly to Europe. By joining forces with SOCAR, North Macedonia aims to achieve a more stable gas supply and better control over energy prices. However, it is not the only country in the region sourcing gas from Azerbaijan.

Serbia, for instance, has also recently started importing gas from Azerbaijan. Last year, Srbijagas and SOCAR signed an agreement to deliver up to 400 million cubic meters of gas annually until 2026, with projections to increase these volumes to one billion cubic meters after that. Azerbaijani gas reaches Serbia through a new pipeline to Bulgaria, partially financed by the European Union (EU), which commenced trial operations in December 2023. Given the high demand, this project also aimed to diversify Serbia's sources, reducing its reliance on Russian gas.

Milica Vučković

GREEN GROWTH: 30 PERCENT OF WORLD REGIONS ACHIEVE ECONOMIC GROWTH WHILE REDUCING CO_2 EMISSIONS

An increasing number of regions worldwide are succeeding in combining economic growth with a reduction in carbon dioxide emissions, according to a study conducted by experts from the Potsdam Institute for Climate Impact Research (PIK) in Germany. By analyzing data from 1,500 regions over the past 30 years, researchers found that 30 percent of these regions have managed to reduce carbon dioxide emissions while sustaining economic progress.

"We found that 30 percent of regions with available data have decoupled carbon dioxide emissions from economic growth. Regions with high incomes and a history of high-emission industries, as well as those with significant shares in the service and manufacturing sectors, have been particularly successful in reducing CO2 emissions while continuing economic growth," said Anders Levermann, co-author of the study.

Although this trend represents a significant step toward the goals of the Paris Agreement, the authors caution that the current rate of decoupling economic growth from carbon dioxide emissions is insufficient to achieve the global net-zero emissions target by 2050.

Local actions have further bolstered the success of decoupling emissions from economic growth. Maria Zioga, a scientist at PIK and the study's lead author, emphasized that cities in the European Union that have implemented climate change mitigation plans and regions with more significant financial support for climate actions show higher rates of successful decoupling.

"Europe consistently stands out compared to other parts of the world, with many regions recording a continuous decoupling trend over the last 20 years. In contrast, North America and Asia have seen more oscillatory decoupling patterns over the decades, though there has been an improving trend in the past decade," she added.

Milena Maglovski

Photographs: (left) Pixabay/jp26jp; (right) Unsplash/Tobias Tullius

EU INNOVATION FUND SUPPORTS TECHNOLOGY DEVELOPMENT IN THE WIND ENERGY SECTOR

The European Commission recently announced the results of a new call from the EU Innovation Fund, which, for the first time, focused solely on clean energy production. This call aims to support projects contributing to decarbonization and developing new renewable energy technologies. Out of 85 total projects, six were selected to advance wind energy development, and at least four were explicitly related to offshore wind energy.

The allocated funds will contribute to building production capacities for key wind turbine components. These projects include the production of next-generation drive trains and XXL towers for offshore wind farms, as well as new rotor designs and small—to medium-sized wind energy systems.

Successful project locations are planned in Denmark, Germany, Poland, and Spain, further strengthening the competitiveness of the European Union's industry in the global renewable energy market.

4.8 billion euros has been allocated to 85 innovative projects aimed at achieving net zero emissions. These projects are planned to be implemented and become operational before 2030. During their first ten years of operation, they are expected to reduce CO⊠ equivalent emissions by approximately 476 million tons.

The thematic areas within this call relate to five main topics: the general decarbonization of large, medium, and small systems to the production of clean technology focused on renewable energy components, energy storage, heat pumps, and hydrogen production. Also included are projects related to deep decarbonization, aiming to reduce greenhouse gas emissions by at least 75 percent compared to the reference scenario.

The EU Innovation Fund is one of the world's largest programs for financing the demonstration of low-carbon technologies. By 2030, the Fund plans to allocate approximately 40 billion euros in total funding.

Katarina Vuinac

EUROPEAN UNIVERSITIES LAUNCH TRAINING FOR FUTURE DOCTORS ON THE IMPACT OF CLIMATE CHANGE ON HEALTH

Climate change requires numerous societal changes. Therefore, twenty-five universities across Europe have launched a network aiming to educate over 10,000 medical students with the knowledge and skills necessary to address health protection and the impacts of the climate crisis.

The European Network for Climate and Health Education (ENCHE) seeks to integrate lectures on climate and health into curricula. This initiative arises from the fact that healthcare systems are already overwhelmed and now face additional pressure from factors such as extreme temperatures and air pollution. At the same time, the healthcare sector contributes to the climate crisis, accounting for approximately five percent of global greenhouse gas emissions.

According to the University of Glasgow's website, data from the World Health Organization (WHO) indicates that 99 percent of people breathe polluted air, and seven million deaths each year are directly linked to air pollution. Furthermore, the number of heat-related deaths could triple by 2050. It is emphasized that climate impacts on health infrastructure are disrupting access to healthcare worldwide.

ENCHE will act as a regional center of the Global Consortium on Climate and Health Education (GCCHE) at Columbia University, providing expert support and fostering transatlantic cooperation in climate and health education. Additionally, the network will receive backing from leading health organizations and pharmaceutical companies involved in the Initiative for Sustainable Healthcare Systems.

ENCHE has invited other universities across Europe to join this initiative and contribute to the education of future healthcare professionals. The training could also be expanded to include other healthcare professions in the future.

Energy Portal

Photographs: (left) Pixabay/ELG21; (right) Pixabay/Bru-nO

WHAT CHANGES IN THE ENERGY LAW BRING TO THE RENEWABLE ENERGY SECTOR

The draft amendments to Serbia's Energy Law introduce significant changes regarding connecting power plants to the distribution system, especially for plants utilizing renewable energy sources.

The connection procedure is prescribed to begin with submitting a request to the distribution system operator to prepare a connection study. However, a connection study is not required for power plants with an installed capacity of less than 50 kW.

The connection study must also include temporary power restrictions during the operation of the power plant, for which the distribution system operator is not obligated to pay financial compensation to the producer. This applies if the study shows that the connection of the power plant at certain times could result in the transfer of total active power to the transmission system, exceeding the legally prescribed limits governing the use of renewable energy sources.

It is also prescribed that the distribution system operator and the applicant regulate rights and obligations in detail through a contract to prepare the connection study.

Additionally, the applicant must provide a bank guarantee for power plants with an installed capacity above 400 kW within the specified period, ensuring that the plant will be constructed within the defined timeframe. If the total required capacity for power plants is reduced after the deadline for providing the bank guarantee, the distribution system operator is obliged to update the connection study ex officio.

The distribution system operator must issue the conditions for design and connection within 15 days of receiving the application, provided that the applicant has secured a planning document and developed a conceptual solution. Furthermore, the operator must create and publish a connection procedure on its website.

The distribution system operator is the investor who constructs a connection to the distribution system. At the entity's request, with the connection study and location conditions, the operator must conclude a connection agreement authorizing the entity to construct the connection on behalf of the distribution system operator.

The distribution system operator is obliged to enable priority access for power plants using renewable energy sources with an installed capacity of less than 400 kW and those with an installed capacity of less than 200 kW that begin operation after January 1, 2026. Priority access is also granted to plants with demonstration project status, limited to the necessary period and scope required to achieve the project's purpose. It is specified when the Agency may grant an exemption from priority access at the operator's request, with the obligation to inform the Energy Community Secretariat.

The draft law also regulates the certification of installers for facilities utilizing renewable energy sources. Introducing certification for installers of renewable energy facilities will bring numerous benefits to Serbian citizens, including increased safety and security, installation quality that ensures optimal efficiency and system longevity, better protection, and consumer trust from professionally executed installations that prevent potential losses and system issues.

"Standards and guidelines for installation will be established, helping to achieve consistency across the industry, thereby contributing to market order. This, in turn, can facilitate the quicker adoption of renewable energy as part of the energy mix and promote sustainable energy technologies," the document states.

The draft law stipulates in the section on energy permits that an energy permit is not required to construct facilities built under the law on the use of renewable energy sources and for energy storage.

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Photograph: Pexels/mrganso

NEW SOLAR CAPACITY IN FRANCE EXCEEDS 3 GW IN THE FIRST NINE MONTHS

France has taken another step forward in developing its solar capacity in 2024. The country has further advanced its renewable energy capabilities by installing approximately 3.32 gigawatts (GW) of new solar systems in the first nine months. According to data from the French power grid operator Enedis, around 1,351 megawatts (MW) of new solar installations were added in the third quarter alone this year. The growth was most pronounced in the sector of commercial rooftop solar installations, where small businesses increased their installations from 318 MW at the end of the first quarter to 547 MW by the end of the third quarter.

Reports indicate that over one million renewable energy installations, most of which are solar systems, have been connected to the power grid. The primary reason for this growth is the interest in self-consumption, particularly among individuals. Interest in self-consumption has more than tripled over the past two years, exceeding 610,000 prosumers.

France generates about 70 percent of its electricity from nuclear power. In addition to its nuclear capacity and the expansion of solar capacity, especially among individuals, France also generates an average of slightly more than 10 percent of its energy from hydropower and around 10 percent from wind power, depending on the season.

Alongside this, Enedis data from September shows developments in the electric mobility sector. It indicates that more than 800,000 chargers are currently installed in company parking lots across France, accounting for more than a third of the country's chargers, double the number compared to 2022. These figures on the solar sector and charger infrastructure highlight the development of green technologies within the business sector.

Overall, this indicates France's steady progress in sustainable development. Last year, Enedis set a record by connecting 4.2 GW of new renewable energy capacities, compared to 3.7 GW in 2022. With one quarter left in the current year, it's clear that these figures are likely to be surpassed once again.

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TREE PLANTING IN THE ARCTIC COULD ACCELERATE GLOBAL WARMING, SCIENTISTS WARN

Tree planting is widely promoted as a cost-effective way to reduce global warming, as trees can store large amounts of carbon from the atmosphere. However, an international group of scientists argues that planting trees in northern regions may accelerate planetary warming rather than slow it down.

Their study, published in the journal Nature Geoscience, states that tree planting possibilities are shifting north due to global warming. Many governments and corporations have proposed large-scale afforestation projects in the Arctic to mitigate climate change. However, planting trees in unsuitable locations, such as tundras, wetlands, or vast sections of boreal forests with sparse canopies, may actually worsen the problem.

Associate Professor Jeppe Kristensen from Aarhus University in Denmark explains that the specific characteristics of Arctic and sub-Arctic ecosystems make them unfavorable for afforestation as a climate change mitigation strategy.

Kristensen explains that Arctic soils store more carbon than all the vegetation on the planet, but they are susceptible to changes. Activities such as land preparation for forestry or agriculture and the penetration of tree roots can disturb this carbon in the soil. Additionally, during spring and early summer, when snow still covers the ground, the region experiences semi-continuous daylight, further affecting the Arctic's energy balance. Since snow reflects sunlight, the white snow surface helps deflect heat. However, the presence of darker (green and brown) trees reduces the ground's reflectivity and allows for more heat absorption, contributing to the region's warming.

The researchers note that while carbon storage is essential for the overall energy balance, in northern regions, the focus should be on how much sunlight is reflected into space without being converted into heat (known as the albedo effect).

Milena Maglovski

Photographs: (left) Unsplash/Mariana Proença; (right) Unsplash/Sergei A

PROPOSED LAW ON AMENDMENTS TO THE ENERGY LAW: WHAT CHANGES ARE BEING INTRODUCED?

Since the Energy Community Treaty, an agreement between the European Community, Serbia, and other regional countries, came into effect in 2006, Serbia has been obligated to align its national legislation in the energy sector with the European Union's legal standards. To advance the reform process in the energy sector, Serbia adopted the Energy Law in 2014. This law aims to establish conditions for the development and efficient operation of all entities conducting energy-related activities according to market principles while harmonizing this law with EU regulations.

The Energy Law Amendment Acts of 2021 and 2023 were adopted as part of this ongoing process.

Following the Energy Community's decisions in 2022 requiring Serbia to incorporate specific EU regulations from the Third and Fourth Energy Packages, a deadline for alignment was set for December 31, 2023. However, additional obligations in December 2023 extended the deadline for incorporating EU Regulation 869/2022 concerning trans-European infrastructure guidelines to December 31, 2024.

The draft law on amendments to the Energy Law, adopted by the Government of Serbia, explicitly addresses fulfilling this obligation. It allows for incorporating regulations from both packages so that Serbia can meet its commitments to the Energy Community.

Key Provisions Introduced in the Draft Law

Below are some significant changes included in the draft law on amendments to the Energy Law.

The draft law introduces new terms and their definitions, including "energy poverty."
It provides for the adoption of a Hydrogen Development and Usage Program and a Program for the Development and Use of Thermal Energy. These programs aim to define the directions and public policies for production and utilization in these sectors. Additional provisions cover the transportation and storage of hydrogen.

In terms of supply security, a Special Working Group for Energy and Energy Supply Security must be established to monitor the supply to the domestic market. Additionally, according to the Agency's recommendation, the Ministry must set system reliability standards in a Supply Security Report.

The draft law mandates appointing a competent authority in Serbia responsible for planning and managing risks in the electricity sector, identifying scenarios for energy crises, and developing and implementing a readiness plan. Based on crisis scenarios, a Risk Readiness Plan will be adopted as per the Ministry's proposal and updated every four years.

A new activity, "aggregation as a market activity," is introduced regarding energy activities. New conditions are specified when an energy permit is not required for constructing energy facilities, and new requirements for issuing energy permits are also specified. The scope of electricity production has been expanded to include power plants using two or more electricity generation technologies, including storage facilities integrated into a single production system.

The capacity assurance mechanism is also addressed, including when the Government can implement it to eliminate deficiencies in electricity production and transmission systems. From July 2025, generation capacities emitting more than the permitted CO_2 level will not be eligible for this mechanism. The transmission system operator will be responsible for procuring the necessary capacities.

Responsibilities have been increased for both transmission and distribution system operators.

The process of connecting power plants to the distribution system begins with submitting a request to the distribution system operator to prepare a connection study. The study is not required for power plants with an installed capacity of less than 50 kW.

Concerning advanced metering systems, it specifies the cases in which end-users are entitled to an advanced meter.

Provisions related to nuclear energy have also been added, defining phases in developing a civil nuclear energy program. The law states that the Ministry will perform expert and executive tasks related to assessing the justification for adopting a nuclear energy program, its jurisdiction, and sources of funding for activities within the stages of evaluating the justification of nuclear energy development. Additionally, the Law on the Ban of Nuclear Power Plants in the Federal Republic of Yugoslavia will be repealed on the day this law comes into effect.

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Photograph: Pixabay/u_wut388h40q

NEW AUCTION REGULATIONS – GREATER OPPORTUNITIES FOR WIND AND SOLAR

The Government of Serbia has adopted three key regulations that pave the way for the second round of market premium auctions for wind and solar power plants, with significantly lower maximum prices than the previous year.

The maximum auction price for wind power plants is now set at 79 euros per megawatt-hour (MWh), while for solar power plants, it is 72 euros per MWh. This marks a substantial decrease from last year's levels of 105 euros for wind and 90 euros for solar, according to the Renewable Energy Sources Association of Serbia (OIE Srbija).

During its recent session, the Government adopted regulations defining rules for market premiums, feed-in tariffs, and quotas for wind and solar power plants. Specifically, the Regulation on Wind Power Plant Quotas provides for a capacity of 300 megawatts, while the quota for solar power plants is set at 124.8 megawatts.

It should be noted that Rade Mrdak, an advisor at the Ministry of Mining and Energy, announced at the OIE Serbia 2024 conference that auctions would be launched in November. This announcement highlighted new opportunities for investors and further momentum for developing renewable energy sources in Serbia.

Last year's auctions demonstrated high market competition. The lowest accepted price for wind power was 64.48 euros per MWh, and the highest for solar power was 89.8 euros per MWh. This year, even more favorable offers for green energy are anticipated.

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ELECTRIC VEHICLE AS AN ENERGY STORAGE SOLUTION

Electric vehicles (EVs) hold untapped potential to enhance the shift to clean energy and transform the energy system. A study by the Fraunhofer ISI and ISE Institutes, published by Transport & Environment, reveals that implementing bidirectional charging could turn electric vehicles into virtual power plants while delivering significant economic benefits.

Bidirectional charging technology enables electric vehicles to draw power from the grid while charging and return power to the grid when needed. This technology allows EV owners not only to charge their vehicles but also to feed electricity back into the power grid or into their own homes.

How Does Bidirectional Charging Work, and Why Is It Beneficial?

Unlike fast charging, which is necessary at public chargers, bidirectional charging is particularly advantageous for home use. When an electric vehicle charges, it draws power from the grid or solar panels if the household has them. When the vehicle does not use all the energy stored in the battery, this energy can be returned to the grid or used to power the home, essentially turning the electric vehicle into an energy storage unit.

Several benefits make bidirectional charging highly advantageous:

- ECONOMIC BENEFIT—When electricity is fed back into the grid when prices are high, users can be compensated for that energy. Additionally, if the stored energy is used to power the home, electricity costs are reduced during high-price periods.
- PROMOTING RENEWABLE ENERGY USE—When solar panels generate more electricity than needed, the excess energy can be stored in the vehicle's battery and returned to household use as needed. This further reduces CO_2 emissions and supports renewable energy adoption. Research indicates that bidirectional charging could encourage an additional 430 GW of solar capacity by 2040, almost double the current capacity of the European Union.
- GRID STABILIZATION—If a large number of EV users adopted bidirectional charging, it would help stabilize the national power grid. During periods of high electricity demand, vehicles can return energy to the grid, preventing overload.
- LONGER BATTERY LIFE—Bidirectional charging has been shown to extend the battery life of electric vehicles by up to nine percent compared to standard charging methods.

Milena Maglovski

Photographs: (left) Unsplash/Andreas Gücklhorn; (right) Unsplash/Michael Fousert

THE HUM (BALKAN) INVESTMENT ENERGY SUMMIT CONFERENCE

The regional conference Hum (Balkan) Investment Energy Summit – Conference on Renewable Energy Sources (RES), Energy Efficiency, and Environmental Protection was held in September at the Bosnian Pyramids – Ravne 2 Park site in Visoko, Bosnia and Herzegovina (BiH).

Participants in this conference discussed regulatory frameworks, EU directives, challenges in development, staffing, and investments in renewable energy and the energy sector. The discussions also covered strategies for environmental protection, new investments, and best practices in local economic development, including public-private partnerships as a comparative advantage for local growth.

This was an ideal platform for MT-KOMEX to present itself and outline the various stages of constructing a solar power plant. Operating in Serbia for over three decades, MT-KOMEX has built and delivered equipment for more than 200 solar power plants, both ground and rooftop installations, with a total installed capacity exceeding 150 MW. Following a turnkey approach, the company's expert team highlights its readiness to provide clients with full support at every project stage, from development to documentation for technical approval and operational licensing.

To support renewable energy projects in Bosnia and Herzegovina, MT-KOMEX's management has decided to open MT-KOMEX BiH. The company's expert team was available throughout the conference to answer questions on solar power plants.

The event was organized by the Association of Entrepreneurs Wood Cluster of Bosnia and Herzegovina and Business Club agency EventExpo – KiK BiH, in partnership with the Foreign Trade Chamber of BiH, Federation of BiH Chamber of Commerce, the Archaeological Park Bosnian Pyramid of the Sun led by Osmanagić, PhD, Diaspora Invest, the Academic Community, the WMTA Banja Luka Vocational Training Institution, the Federation of BiH Ministry of Energy, BiH Ministry of Finance, the Foreign Investors Council, FIPA (Foreign Investment Promotion Agency of BiH), the Union of Local Communities of the Western Balkans, development agencies, entrepreneurs and employers' associations in BiH, investment funds, commercial and development banks, companies, media outlets, and others.

Prepared by Milica Radićević

Photograph: Association of Entrepreneurs Wood Cluster of Bosnia and Herzegovina

SOLAR POWER PLANTS – LONG-TERM PROFITABILITY

Achieving energy independence has become a crucial issue for many countries and companies. Due to increasing concerns about climate change, instability in the fossil fuel market, and the need to reduce greenhouse gas emissions, renewable energy sources are becoming more important. They offer the possibility of reducing dependence on traditional energy sources and provide significant environmental benefits. Investments in renewable energy enable businesses and communities to generate clean energy, reduce costs, and contribute to sustainable development. More and more companies in Bosnia and Herzegovina recognize the advantages of energy independence through investments in renewable energy sources. The importance of energy independence has also been acknowledged by AgrekS d.o.o. from Donji Žabar.

The company uses state-of-the-art technology and equipment from renowned manufacturers

Photographs: MT-KOMEX BH

The solar power plants, Jeremičak 1 and Jeremičak 2, each with a capacity of 222.72 kWp, will produce 540 megawatt-hours of electricity annually.

"The location is favorable for building a solar power plant due to high solar irradiation and many sunny days. The roof area is open and oriented southwest, enhancing the system's efficiency. The panels will be installed at a 6° angle, aligning with the roof slope," said Bojan Lazić, an electrical engineer on the project.

The solar power plants will utilize solar panels from AIKO Solar and Huawei's inverter systems. Other equipment from globally renowned brands guarantees long-term use and stable electricity production.

These two facilities will be connected to the existing 10-kilovolt power line Batkuša–Obudovac and integrated into the power distribution network. A new transformer station will be built to meet the power plants' needs.

Investments in renewable energy enable businesses and communities to generate clean energy, reduce costs, and contribute to sustainable development

As a leader in the production of consumer eggs in Bosnia and Herzegovina, this company promotes a healthy environment by offering high-quality food products and environmental care. Now, it plans to use renewable energy in its production. The company is preparing to construct two solar power plants on the roof of its business premises, which will further enhance its operations and reduce its dependence on traditional energy sources.

Thanks to its extensive experience in renewable energy, MT-KOMEX BH has been recognized as a reliable and trusted partner for constructing solar power plants. Their expert team provides a comprehensive turnkey approach, covering all phases—from planning and designing the power plant model to equipment delivery, construction, and system functionality checks.

The company uses state-of-the-art technology and equipment from renowned manufacturers, further guaranteeing the efficiency and longevity of its solutions.

Their commitment to green technologies reduces environmental impact and optimizes resource usage, enabling clients to achieve sustainable goals.

The quality of the company's work is best reflected in the list of satisfied clients who have used its services and achieved significant energy savings, thus improving their operations, reducing costs, and becoming energy independent.

Additionally, the company actively assists clients in transitioning to green practices, facilitating their shift towards sustainable operations and reducing carbon emissions. This support will help them adapt to new regulations when the CBAM mechanism becomes active in 2026.

Prepared by Jasna Dragojević

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DESIGN AWARD 2023

INNOVATIVE SOLUTION FOR ARSENIC REMOVAL FROM WATER

One of the biggest global challenges facing modern society today is the decreasing availability of safe, potable water resources. Elevated arsenic levels in groundwater, a primary drinking water resource worldwide, seriously threaten public health.

A multidisciplinary team of scientists from the Faculty of Sciences at the University of Novi Sad and the Institute for Multidisciplinary Research at the University of Belgrade is implementing the NanoCompAs project to develop an innovative and long-term sustainable solution for arsenic removal from water. The significance of research in this area has been recognized by the Science Fund of the Republic of Serbia, which has facilitated the NanoCompAs project as part of the Green Program for Science and Industry Collaboration.

Adsorption is the most commonly applied technique for arsenic removal in drinking water treatment due to its high cost-effectiveness, efficiency, and technical simplicity in handling and process control. Most commercially available adsorbents require pretreatment to convert arsenic into a removable form, but this adds to the cost of water treatment, making it less feasible for less-developed areas most affected by this

Photograph: Pixabay/Anna

Adsorption is the most commonly applied technique for arsenic removal in drinking water treatment due to its high cost-effectiveness, efficiency, and technical simplicity in handling and process control

issue. Researchers are actively developing high-efficiency nanomaterial-based adsorbents to find an effective and affordable solution. One next-generation material is Fe-Mn binary oxide (FMBO) nanoparticles, which have already shown high arsenic removal efficiency in laboratory settings but are challenging to implement in continuous-flow systems.

To overcome these limitations, the NanoCompAs project will develop a bifunctional nanocomposite filter medium (FMBOnc), forming the basis for commercializing the product—a filter applicable to continuous water treatment processes. The next step will involve scaling up the production of the filter medium to ensure sufficient material quantities for further laboratory and semi-industrial research. Initial testing of the filter will include physical-chemical characterization, quality control, and arsenic removal efficiency assessments.

The project team is exploring potential solutions to extend the lifespan of FMBOnc and enable its reuse. Depending on requirements, they are also evaluating options for stabilizing the material before disposal in landfills. Semi-industrial-scale research, which includes treating larger quantities of groundwater from the Autonomous Province of Vojvodina, will confirm the effectiveness of FMBOnc in reducing arsenic levels in water.

As a team, we anticipate that the NanoCompAs project will develop an economical and efficient solution for removing arsenic from drinking water, significantly improving the health and quality of life of people in regions affected by this problem. The project's results will also benefit policymakers and the academic community focused on environmental protection technologies.

The NanoCompAs Project Team

Arsenic pollution

Arsenic, which occurs naturally in soil and rocks, can enter groundwater through erosion and chemical processes. Consuming water with a high arsenic content can have serious consequences, including an increased risk of various diseases, such as cancer, cardiovascular disorders, and skin problems. In addition, long-term exposure to this toxic element can cause chronic health problems, which often manifest themselves later, making their recognition and treatment even more difficult.

In many countries, especially developing countries, the lack of water purification infrastructure and inadequate regulatory frameworks make it difficult to access safe sources of drinking water. Given global climate change, decreasing water availability becomes an even more significant challenge, with droughts exacerbating the situation and increasing communities' dependence on contaminated sources.

Because of these problems, it is essential to invest in the research and development of new technologies for water purification and raise awareness of the importance of protecting water resources.

Photograph: private archive, member of the NanoCompAss project team Marija Maletin

HOW GREEN ZONES ARE TRANSFORMING THE URBAN LANDSCAPE

In recent years, numerous initiatives have emerged in major European cities to make transportation more sustainable and reduce harmful gas emissions. The European Commission and local authorities are working to accelerate the transition to eco-friendly vehicles. One of the key steps in this process is the introduction of green zones—areas in cities where access to polluting vehicles is restricted or prohibited.

Green zones, also known as Low Emission Zones (LEZs), are areas where vehicle movement is strictly controlled based on environmental performance. Vehicles that emit high levels of pollutants, such as nitrogen dioxide and carbon dioxide, are often restricted from entering these zones. These measures aim to reduce air pollution, particularly severe in large cities, and encourage citizens to switch to cleaner modes of transportation, such as electric cars, bicycles, or walking.

Examples from European Cities

London has pioneered green zones by introducing the Ultra Low Emission Zone (ULEZ). This zone covers a large part of central London and requires all vehicles to meet strict environmental standards. Those who fail to meet these standards must pay a daily charge. ULEZ is expected to expand soon to cover more areas of London, aiming to reduce pollution and promote the use of electric and hybrid vehicles.

Paris is another leader in eco-friendly initiatives, with its

Photographs: (top) Pixabay/wal_172619; (bottom) Pixabay/Mircea Iancu

Restricting high-emission vehicles helps reduce CO_2 emissions, a crucial step toward climate neutrality, which the European Union aims to achieve by 2050

Low Emission Zones (Zones à faibles émissions). Vehicles with low environmental standards are banned from certain areas, and the city has ambitious plans to eliminate all fossil fuel vehicles by 2030. Paris is also known for its extensive network of bike lanes, which helps reduce traffic congestion and pollution in the city center.

Berlin was one of the first cities to introduce a green zone back in 2008. Only vehicles with a special eco-sticker indicating low emissions are allowed to enter these zones. The German capital demonstrates its commitment to reducing gas emissions and improving air quality by continuously tightening environmental standards within these zones.

The world's fashion capital, Milan, has established a Low Emission Zone called Area C. This zone covers the city center, and vehicles not meeting the required standards must pay a fee to enter. Milan enforces strict regulations for older and diesel cars and strongly promotes the use of public transport and eco-friendly vehicles.

Known for its biking culture, Amsterdam introduced green zones in 2009. Older diesel vehicles are banned from certain parts of the city, and local authorities have set the ambitious goal of phasing out fossil fuel-powered vehicles by 2030. This initiative encourages the development of electric vehicles and supports the expansion of the city's well-established biking culture.

How Green Zones Work

To ensure that green zones remain effective, many European cities use video surveillance systems that scan license plates to verify whether vehicles meet environmental standards. If a car fails to meet the criteria, the driver may be fined or denied access to the zone.

In addition, cities across Europe issue eco-stickers that allow people to identify environmentally friendly vehicles quickly. Vehicles with lower emissions receive better ratings, granting them free access to green zones.

The primary objective of green zones is to motivate citizens to opt for electric vehicles, public transport, bicycles, or walking, thereby reducing the use of fossil fuel-powered cars. Limiting high-emission vehicles helps lower CO_2 emissions, a critical step toward achieving climate neutrality—a goal the European Union aims to reach by 2050.

In addition to reducing air pollution, electric vehicles and bicycles also help reduce noise pollution in urban areas, highlighting the significance of green zones.

Undoubtedly, green zones will become an essential component of urban planning in most major European cities, bringing numerous benefits to both urban residents and the climate. Although they are just one part of a broader strategy for transitioning to sustainable transport, green zones have already proven to be an effective tool in the fight for a cleaner world.

Prepared by Milena Maglovski

Photographs: (middle left) Pixabay/Dimitris Vetsikas; (middle) Pixabay/Greg Reese

GREEN MOBILITY IS A KEY PART OF THE EUROPEAN GREEN DEAL

The European Green Deal sets ambitious goals for all EU members, which are essential to addressing today's biggest challenge: climate change. Along with the efficient and rational use of energy, one of its most important areas is the transition to green mobility, which includes electric vehicles and the infrastructure for charging them.

According to the European Commission's "Ready for 55" legislative package, road traffic will move towards zero-emission mobility by 2050, reducing average emissions from new cars by 55 percent by 2030.

It is also important to note that, in accordance with the new and amended directives EU ETS (European Emissions Trading System), EED (Energy Efficiency Directive), and EPBD (Energy Performance of Buildings Directive), road traffic will be included in the emissions trading system. Darko Zeljković, in charge of further developing e-mobility in Southeastern Europe at Schneider Electric, talks about green mobility.

Q: From Schneider Electric's perspective, what awaits us in the field of green mobility in the context of the new and amended directives?

A: The new obligations facing us as producers, buyers, and consumers will lead to a significant increase in the use of electric cars. Statistics show that the number of electric vehicles sold in the European Union is growing three times faster than the number of chargers for those vehicles. That is why it is necessary to start building the infrastructure for charging vehicles for short and long trips in our region. Regarding infrastructure, we must be aware that it includes not only publicly accessible areas but also private areas, i.e., private connections.

The leaders of the current wave of traffic electrification in Serbia and Montenegro are primarily companies that are increasingly introducing electric vehicles to their company car fleets and equipping their existing garages and parking spaces with adequate chargers. One of them is our company, Schneider Electric, which,

Photograph: Schneider Electric

as a signatory of the global initiative EV100, has the ambition to replace its vehicle fleet with electric vehicles by 2030 completely. In addition to them, a significant role is played by hotels, catering facilities, shopping centers, public garages, and parking spaces, which want to provide more services to their users.

Q: We know that publicly available chargers will not be able to meet the charging needs of electric cars. Can we expect them in private buildings and houses?

A: It is essential to develop a network of publicly accessible chargers along the highways, near the hubs of crucial roads and public transport stations. Here, the great importance of domestic companies (Charge Point Operators and eMobility Service Providers), which in previous years, regardless of the small number of electric cars registered in Serbia, recognized this need and started or continued their business in the direction of infrastructure development charger. Thanks to them, today, through their networks and applications for charging and payment, we have around 150 chargers available in Serbia and around 30 in Montenegro.

The efforts of PE Roads of Serbia to expand its network of publicly accessible chargers along the main road routes in Serbia, which currently has eight fast chargers, by the end of this year from a new 50 and by the end of 2025 to total of 114 fast chargers of different power, are commendable.

We have around 150 chargers available in Serbia and around 30 in Montenegro

I hope that their intentions will come true. Along with the already mentioned domestic companies, they will provide electric vehicle drivers with a safe and secure ride and a user experience of the highest level, especially during the summer months, when a large number of transit passengers from Europe are on our roads.

I want to emphasize that the latest amendments to the Law on Planning and Construction of the Republic of Serbia will significantly contribute to the further development of infrastructure and the increase in the number of chargers in residential buildings, commercial buildings, and along roads. Commercial, multi-apartment buildings and houses play a significant role in the provision of infrastructure because vehicles are regularly parked there for long periods of time.

Cars with internal combustion engines are usually charged on the road. Expert estimates show that in the future, as much as 90 percent of electric car charging will be at the destination, home, or work. Charging at the destination will increase electricity consumption by 40 percent in buildings, ultimately leading to an increase in electricity costs for each building, that is, for each household. That is why, right now, there is an ideal opportunity for buildings undergoing some renovation to adapt to the future increased electricity consumption and the need to prepare installations for electric vehicle chargers.

Q: What about once the infrastructure and chargers are in place – how do they work?

A: When investing in building installations, it should be known that chargers are not independent products and that the entire system should be coordinated so that increased electricity consumption does not cause unwanted problems. Schneider Electric provides a solution to the aforementioned challenge through an electricity management system based on smart charging and digitization technologies. It integrates all elements into a unique solution for e-mobility under the commercial name EcoStruxure for eMobility.

Connecting the EV charger to the real-time electricity consumption management system enables the smooth and simultaneous operation of several energy consumers in a building.

EcoStruxure for eMobility is a system that measures the total electricity consumption in the building and, based on the obtained data, instructs the electric vehicle charger to change the charging speed. This ensures the uninterrupted operation of all other devices that use electricity in the facility.

Due to the expected infrastructure development, exponential growth in the number of electric vehicle chargers, and increased energy demand, Schneider Electric continues to develop various series of AC and DC chargers and energy management software solutions to provide end users with the highest-level smart charging and user experience.

Also, one imperative in electrifying traffic to produce green electricity is to use renewable energy sources and energy storage systems to the maximum extent. At the same time, individual buyer-producers will also make up a significant part of an active and decentralized power system.

With its solutions, Schneider Electric has already established itself as a leader in digitizing electricity and decentralizing power systems. In the future, these will represent essential prerequisites for the proper functioning of all systems, including the network of electric vehicle chargers. As you know, in Novi Sad, within our HUB, we are developing one of our most famous software programs, ADMS, which, among other things, also contributes to this.

Schneider Electric

SOLAR TRICYCLE – A REVOLUTION IN SUSTAINABLE MOBILITY

In an era of climate change and increasing environmental pollution, innovations in sustainable transport are becoming crucial for the future of our planet. Sustainable transport solutions, such as electric and solar-powered vehicles, not only reduce greenhouse gas emissions but also help conserve natural resources and reduce dependence on fossil fuels.

Aleksandar Ilijevski from Leskovac, an electromechanical technician and electric vehicle enthusiast, has a unique story about his passion for innovations in sustainable transport. His love for electric bikes, which began more than a decade ago, eventually led him to the idea of creating a solar tricycle. Although the initial concept faced obstacles due to the underdeveloped technology of solar panels at the time, Aleksandar never lost sight of his vision.

He built his first electric tricycle in 2013 but soon realized that the solar panels available at the time lacked the power to run it. For years, the tricycle operated solely on battery power, with the idea of mounting a solar panel on the roof, waiting for the right moment. Nearly ten years later, with more powerful solar panels available, Aleksandar installed one on his electric tricycle once again.

– The idea ended up in a drawer until I recently saw an ad for solar panels. When I read the specifications and saw how much stronger they've become compared to those ten years ago, I immediately realized they could power the electric tricycle we had already built. I decided to give it a try. Our first test rides were without a battery, proving that

Photograph: Pixabay/Angel Taioli

the solar tricycle could run solely on sunlight—and at a decent speed. The feeling was truly surreal, Aleksandar explains.

Solar Energy for the Sustainable Transport of the Future

The importance of solar energy in sustainable transport is immense. Solar-powered vehicles offer the possibility of unlimited range under the right conditions, making them not only environmentally friendly but also economical. With the ongoing development of more powerful and affordable solar panels, solar-powered vehicles are gradually entering the realm of practical application, providing sustainable alternatives for future transport.

The innovator from Leskovac has demonstrated this with his solar tricycle, sending a message that solar-powered vehicles can belong to everyone and can be made from readily available materials. Thanks to technological advances, his tricycle now has the potential for unlimited range under ideal solar conditions. Additionally, a small battery allows it to run even when sunlight is insufficient.

The first test rides were without a battery, proving that the solar tricycle could run solely on sunlight—and at a decent speed. The feeling was truly surreal

– Since solar conditions are not always ideal, or at night, I installed a small 1,000 Wh battery as a backup for moments without sun. The tricycle currently has a 1,000 W motor, limited to 500 W for reliability, but I plan to add two more motors in the front wheels. This will make it easier to tackle hills and significantly improve acceleration, explains Ilijevski.

He adds that solar panels not only provide an unlimited range but also offer protection from sun and rain, making this three-wheeler even more practical.

While the vehicle draws attention wherever Aleksandar goes, there are no orders yet. However, he remains optimistic, stating that although the initial investment is significant, the solar tricycle's great advantage is that it can be driven almost for free afterward.

The takeaway from Aleksandar's story is clear—this is just the beginning. He believes that solar panels will continue to improve and become more accessible while vehicles like his tricycle will become lighter, faster, and more compact. His journey exemplifies how creativity and perseverance can lead to innovations that change the way we think about transportation and sustainability.

Prepared by Milena Maglovski

Photographs: (bottom left) Pixabay/Iulian Scutelnicu; (top right) courtesy of Aleksandra Ilijevskog; (middle) Pixabay

EDUCATION OF CHILDREN IS CRUCIAL FOR CREATING ENVIRONMENTALLY AWARE GENERATIONS

A child's upbringing is a period during which they discover themselves and the world around them. Through tailored play, learning, and other activities, a child develops the ability to think critically, behave responsibly, and take a stance with knowledge and arguments. Fundamental values and life understanding should also include an ecological aspect. Although the issue of climate change is very complex, introducing this topic step by step will instill in children a sense of responsibility for stopping climate change and preserving nature in general.

We spoke with Igor Leščešen, PhD, a scientific associate at the Faculty of Natural Sciences and Mathematics in Novi Sad and an elementary school geography teacher, about how much attention is devoted to climate change in elementary schools and whether children at that age are ready to absorb such environmental knowledge. He was part of an expert team that researched how climate change is taught in elementary schools in Serbia.

The research was conducted as part of two projects, ClearClimate EU Horizon Europe and CoolClimate Erasmus+. The questionnaires were designed by Leščešen, PhD, Biljana Basarin, PhD,a full professor at the Department of Geography, Tourism, and Hotel Management at the University of Novi Sad, and Miroslav Vujičić, PhD an associate professor

Photograph: Pixabay/Tung Lam

at the same department, were distributed online. The questions in the questionnaire tested students' knowledge about the causes and consequences of climate change, and the research results showed that the curriculum needs to be improved to provide children with a deeper understanding of this issue.

Our interlocutor explains that the research idea came from his ten years of experience as an elementary school geography teacher.

The Complexity of the Climate Change Topic

The topic of climate change is complex and challenging for children to understand. The professor says it is essential to introduce children to ecological topics from an early age, but the approach needs to be carefully selected according to their age.

Regarding elementary schools in Serbia, Leščešen says that climate change is taught through geography and biology, but only in one lesson—geography in the fifth grade and biology in the eighth grade

"Environmental topics such as nature conservation, proper waste disposal, waste separation, and water conservation can and should be covered as early as kindergarten. However, the topic of climate change is extremely complex, and I believe that children in the fifth grade are not yet mature enough to grasp all aspects of this problem."

As a solution, the professor suggests that related content should gradually be introduced in textbooks for each grade. For example, in the sixth grade, the focus could be on climate refugees; in the seventh grade, on the impact of glacier disappearance in the Himalayas on people's lives in the valleys of major Asian rivers. In the eighth grade, the topic of climate change and its effects on Serbia could be covered, as by then, children have enough background knowledge in biology, physics, and chemistry to understand the complexity of the topic. Additionally, children learn much better by the principle of "proceed from the known to the unknown," which is why issues they can experience in their environment can be closer and more understandable than problems faced by people on the other side of the world.

Leščešen's experience with students has shown that they are

Photographs: (bottom) Unsplash/Zoe Schaeffer; (top) Pixabay/Sobima

somewhat aware of the importance of environmental protection and possess a certain level of environmental consciousness. Most students are interested in environmental preservation, especially when faced with specific ecological problems. The topic of climate change becomes particularly engaging for them when connected with concrete examples.

"I often ask them: 'When was the last time we had snow for Christmas?' because Christmas always comes with snow in all the holiday movies. This prompts them to think about the changes they've noticed in their everyday lives. However, students mostly cannot grasp the scale of the problem. In their understanding, the solution is simple—ban the use of fossil fuels. These simplistic solutions reflect their desire to take action but also highlight the need for a deeper understanding of the complexities of climate change and ecological issues. Nevertheless, their interest and willingness to learn provide a positive foundation for further education and the development of awareness about the importance of environmental protection."

One of the challenges PhD Leščešen encounters when teaching about climate change is the students' lack of life experience. As the professor explains, these are children aged 10 to 14, for whom it seems normal that there isn't much snow in winter, that summers are extremely hot, or that there are huge amounts of rainfall in a short period.

"My stories about how things were when I was a child are just that to them—stories."

Regarding elementary schools in Serbia, Leščešen says that climate change is taught through geography and biology, but only in one lesson—geography in the fifth grade and biology in the eighth grade. Ecological topics are also covered at younger ages through the school subject called The World Around Us and in higher grades through biology. Still, climate change is generally underrepresented in the curriculum.

Our interlocutor notes that the situation is similar across the region. Ecological topics are present but not sufficiently covered, and climate change is also poorly covered.

"This points to a regional issue that could be addressed through regional cooperation, considering that, according to the latest IPCC report, the Balkan Peninsula is a hotspot that will be particularly affected by climate change. The educational systems in the region must adapt and expand their curricula so that children are better informed and prepared to face the challenges of climate change."

Improving the Education System Regarding Climate Change

Improving children's education can be viewed from several perspectives. According to Leščešen, PhD, this should be done by increasing their interest in educational content through concrete, real-life examples instead of mere theorizing. Although theory is important, it loses its significance without practical application, as children more easily understand and absorb content through real-life examples, which could be crucial to improvement. For instance, he would enrich ecology lessons by incorporating more outdoor activities, though organizing such activities within the standard 45-minute class periods can be challenging, especially in urban environments.

"I remember that in my elementary school, the biology teacher regularly organized the cleaning of the schoolyard every month, which allowed us students to participate directly in maintaining the environment. However, in today's society, I understand that such an approach might be more difficult to accept, especially by parents who think that cleaning the yard is beyond the role their children should play at school."

Additionally, necessary knowledge from related subject groups could be defined, which students should acquire by the end of a certain grade. Then, plans for their implementation could be made at the departmental level. The solution could lie in interdisciplinarity, meaning that a

Photograph: Pixabay/Rita

single topic could be covered across multiple subjects simultaneously.

Building on the previously mentioned possibility of shaping how ecological topics are addressed in the education system, the professor also notes that he would support thematic months during the school year, where one topic would be covered across multiple subjects simultaneously. For example, one month could be dedicated to the theme of water, where students in geography would learn about watercourses, in biology about aquatic ecosystems, in chemistry about chemical processes in water, in mathematics about calculating water consumption and resource efficiency, and in technical education about hydro energy as a renewable energy source.

"This multidisciplinary approach would allow students to see how different aspects of a single topic are interconnected, contributing to a deeper understanding of ecological problems and their solutions. This approach would also address a problem I have noticed among students: when they learn geography, for example, they don't realize how that knowledge could be applied to biology, history, technical education, etc."

Environmental topics such as nature conservation, proper waste disposal, waste separation, and water conservation can and should be covered as early as kindergarten

However, as he explains, achieving this would require a change in the education system. This would allow teachers greater freedom to design their own curricula instead of strictly following the curricula prescribed by the relevant ministry.

When asked whether it is too late to introduce more class hours related to ecology or even specific school subjects, the professor says he doesn't think it is. Still, it is high time to increase the number of hours dedicated to ecology. Nevertheless, he doubts that the number of hours devoted to climate change issues will increase in the near future, and introducing a new subject isn't even worth discussing. It mostly comes down to individuals' creativity and initiative.

Prepared by Katarina Vuinac

Photographs: (bottom) Pixabay/Sharon Ang; (middle) Pixabay/Victoria

ECOLOGICAL TRANSPORT AS A CORE VALUE

ProCredit Bank has been operating in Serbia for over two decades. Sustainability is not just a part of our corporate culture – it represents our essence, which we strive to integrate into every business process. We are proud to be the first bank with an environmental management system, adapting all our operations to sustainable practices.

Since 2023, 100 percent of our fleet consists of low-emission vehicles

Environmental Protection as a Business Priority

All banks within the ProCredit Group adhere to high standards regarding the environmental impact of their business activities. Our internal environmental management system involves monitoring the bank's energy and other resource consumption, systematically reducing energy and resource usage, and raising employee awareness while cooperating with green suppliers.

We actively work on reducing our environmental footprint by implementing various measures, including monitoring and measuring CO_2 emissions arising from our operations. We continuously analyze emissions—such as electricity consumption, heating, and vehicle use (emission range 1 and 2)—to identify areas for improvement and apply effective strategies to reduce emissions. One such measure includes increasing the use of renewable electricity by investing in our photovoltaic systems and collaborating with clean energy suppliers.

The Future of Ecological Transport

Although ecological transport is still considered an innovation, many responsible organizations have already implemented it. It involves using

Photographs: ProCredit Banka

transportation methods that emit fewer greenhouse gases.

Recognizing the negative environmental impact of motor vehicles, we decided to expand our fleet of company vehicles with electric and hybrid cars. We acquired our first electric vehicle in 2016. Since 2023, 100 percent of our fleet consists of low-emission vehicles (electric, plug-in hybrid, and hybrid vehicles).

As part of our efforts to promote sustainable mobility, we have installed 42 electric vehicle chargers across Serbia, not only in cities where we have branches but also in key locations such as highways, rest stops, and hotels. This initiative aims to provide users with easier access to charging infrastructure. The free ProCredit Charging Stations mobile app shows the exact location of chargers and can significantly assist users in finding them.

All banks within the ProCredit Group adhere to high standards regarding the environmental impact of their business activities

Electric vehicles offer numerous benefits, both for users and the environment. They produce significantly fewer CO_2 emissions and other harmful gases, contribute to reducing air pollution, and help minimize noise in urban areas. Additionally, maintenance costs and electricity consumption are lower compared to traditional vehicles.

Replacing and maintaining our fleet of low-emission vehicles is an ongoing process as we strive to stay updated with the latest technologies and sustainable mobility standards. This year, as part of this process, we offered employees the opportunity to purchase electric vehicles replaced by newer and more advanced models. These vehicles were available at significantly lower prices than market rates, providing our employees with an excellent opportunity to own environmentally friendly cars under favorable terms.

In addition to actively using low-emission company vehicles, we offer special loan programs to our clients to purchase environmentally friendly vehicles. In collaboration with renowned automotive industries, we provide favorable financing conditions to facilitate the transition to green mobility.

We will continue improving our fleet and supporting clients and partners in adopting green mobility. Our vision remains unchanged: to provide responsible, long-term support to initiatives that protect the environment and create a sustainable future. We are committed to supporting the ecological transition, believing that adopting eco-friendly solutions is necessary and highly beneficial for future generations. Our commitment to electromobility is an investment in a better and cleaner world for all of us.

ProCredit Bank

REGIONAL COOPERATION FOR A GREENER FUTURE

The Energy Week Western Balkans 2024 conference, one of the most significant energy events in the region, was recently held in Montenegro, bringing together over 250 key decision-makers. Participants had the opportunity to discuss current issues related to renewable energy, energy transition, market challenges, and more, all aimed at shaping a greener future for the region.

At the conference's opening, Milutin Đukanović, Chairman of the Board of Directors of the Electric Power Industry of Montenegro (EPCG), addressed the attendees, emphasizing the importance of regional cooperation in developing renewable energy sources (RES).

"A lot of cooperation memoranda have been signed, but these documents remain dead letters until project implementation begins," Đukanović noted.

On the first day of the conference, a panel titled "Together Towards Tomorrow: Regional Integration Strategies for Advancing Renewable Energy in the Western Balkans" was held, moderated by Nevena Đukić, Editor-in-Chief of the Energy Portal.

According to Petar Đokić, Minister of Energy and Mining of the Republic of Srpska, deepening and expanding regional cooperation is crucial for increasing production and transmission capacities.

"We must be aware of the issues we face. This year, a technical issue occurred that underscored the importance of this cooperation, which must be enhanced with other countries," Đokić said.

The Energy Week Western Balkans 2024 conference, one of the most significant energy events in the region, was recently held in Montenegro, bringing together over 250 key decision-makers

Photographs: Energy Week Western Balkans

and have entered this process fully understanding its goals. That's why I want to highlight the importance of cooperation, particularly with European financial institutions, because we lack the funds and conditions to generate them ourselves. We need support from developed European countries to finance green projects so that the Balkans doesn't lag behind

investors often cause delays in RES project development and expressed hope that new grid rules would address this issue.

MT-KOMEX's commitment to implementing RES projects is evident in its focus on securing permits solely for land with clear urban planning and technical documentation.

"We purchased 74 hectares in Lapovo and began implementing two projects there. We submitted applications only for land we knew would meet urban planning and technical requirements to expedite our projects. Last year, we demonstrated this commitment with three projects—two received auction prices,

Decarbonization – A Duty and Challenge for the Western Balkans

The increasingly severe climate crisis requires Western Balkan countries to reduce their use of fossil fuels and commit more decisively to energy transition. However, switching to RES is not an easy task for this part of Europe due to the limited resources available for green project implementation.

"We recognize the significant decarbonization demands ahead of us and become a black hole on the path to energy transition," Đokić said.

Energy Transition and Market Challenges

There was high interest in the panel discussion "Navigating Market Challenges: From Land Acquisition to Balancing Requirements," where participants shared valuable insights on overcoming market challenges for green energy.

Miloš Kostić, CEO of MT-KOMEX, noted that insufficiently serious

and both were completed," Kostić emphasized.

Besides this panel, the first day of the conference also addressed topics such as the coal-to-clean energy transition in the Western Balkans, investments in grid resilience, energy storage technology, and regional integration strategies. The second day focused on equally important themes, including RES sector policy development, unlocking financing sources for projects.

Prepared by Milena Maglovski

BOOSTING GREEN MEGAWATTS FOR KRAGUJEVAC

Thanks to ongoing efforts to enhance energy efficiency and the growing interest in clean energy, new solar power plants have enriched Serbia, further expanding its solar capacity with additional green megawatts. These investments reduce dependence on fossil fuels and lay the foundation for a sustainable future, creating new opportunities for local economic development.

Solar power plants on the rooftops of Pavilion 1, Pavilion 2, Pavilion 3 (in preparation), and Pavilion 4 serve as an excellent example of how change can be initiated. These plants were implemented based on the investor's needs, the Student Center Kragujevac, which recognized the importance of renewable energy. With the support of these and similar projects, Kragujevac is joining cities focused on improving the local energy sector, where every project, regardless of its scale, is a bold step toward sustainable development.

The comprehensive technical and project documentation for the student complex was handled by CEEFOR, a company renowned for its extensive experience in the renewable energy sector. Over the years, CEEFOR has tackled a wide range of challenging projects, demonstrating adaptability in designing various solar systems, whether for

CO_2 Savings

For all four pavilions of the Student Center in Kragujevac, the estimated combined annual CO_2 savings amount to 4.85 tons.

Photographs: CEEFOR

The solar power plant on the rooftop of Pavilion 1 at the Student Center Kragujevac, with a capacity of 15 kW AC, was installed to increase energy efficiency and the energy independence of the building

ground-mounted installations or, as in this case, rooftop projects.

Pavilions of the Future

The solar power plant on the rooftop of Pavilion 1 at the Student Center Kragujevac, with a capacity of 15 kW AC, was installed to increase energy efficiency and the energy independence of the building. The roof houses 32 photovoltaic panels from Luxor Solar, each with a power output of 545 Wp. Mounted on an aluminum substructure by Chiko, the panels are designed to withstand diverse weather conditions, including winds up to 60 m/s and snow loads of up to 1.8 kN/m², ensuring system durability. The DC electricity generated by the panels is converted into AC by a 15 kW Fronius inverter. The plant is expected to produce approximately 20,809.6 kWh of electricity annually and save 1.3 tons of CO_2 annually.

On Pavilion 2, a solar power plant with a capacity of 35 kW AC has been installed, resulting in different specifications compared to the first pavilion. The roof of Pavilion 2 features 74 photovoltaic panels from Luxor Solar, each with a power output of 545 Wp, arranged on the northwest and northeast sides of the roof at a 6° angle and on the southwest side at a 13° angle. The system utilizes two Fronius inverters, one with a capacity of 20 kW and the other with 15 kW. It is estimated that this pavilion will annually reduce CO_2 emissions by 1.2 tons, a tangible step toward cleaner air and a healthier city.

For Pavilion 3, a solar power plant with the same output capacity of 35 kW AC is in preparation. The plant will cover a total area of approximately 186.2 m² on the roof of the third pavilion. It is planned to install 72 photovoltaic panels, each with a power output of 570 Wp, again from Luxor Solar, as in the previous cases. The system will use two Fronius inverters, one with a capacity of 20 kW and the other with 15 kW. The facility is expected to produce 41,149.2 kWh of electricity annually, with a projected CO_2 savings of 1.1 tons.

On Pavilion 4, a solar power plant with a capacity of 25 kW AC has been designed. The roof has 49 photovoltaic panels from Luxor Solar, each with a power output of 545 Wp. The plant will use two inverters: a 15 kW and a 10 kW model, both manufactured by Fronius. Similar to the other pavilions, the estimated annual CO_2 savings for this pavilion are 1.25 tons.

All electricity generated by the solar power plants on these pavilions will power their internal systems, with any excess energy supplied to the distribution grid following the prosumer model.

CEEFOR, responsible for designing these solar power plants, will continue to advance its vision through a series of diverse projects in the future, reaffirming its commitment to sustainable solutions and adherence to the principles of environmental responsibility and energy efficiency.

Prepared by Milica Vučković

ONE MAN – MANY RECYCLED BOTTLES

Plastic bottles and caps are among the most common types of waste that fill up landfills and litter streets, taking hundreds of years to decompose. Therefore, every contribution and reuse is valuable, whether it comes from large companies or individuals. Recycling is a simple and accessible way for everyone to contribute to preserving our planet. This is the story of Dragan Janković from Čoka, who crafts brooms from plastic bottles. In doing so, he not only helps combat plastic pollution but also provides himself with additional income.

After retiring due to health issues in 2011, Dragan faced the challenge of increasing his budget. While searching for ideas, he came across a video in Spanish about making brooms from plastic bottles. Although the translation was poor, Dragan persevered and mastered the technique through determination and effort.

He started collecting bottles around the village, and when his friends heard about his plan, they began bringing him plastic bottles. It took him a long time and many failed attempts to make his first broom. Fortunately, his persistence paid off. When his neighbors saw Dragan making brooms, they began collecting bottles and delivering them to his doorstep to help him and contribute to the fight against pollution. Today, it takes him about an hour and a half to make one broom, with his only cost being the purchase of wooden handles.

These brooms are not only durable but also ideal for sweeping leaves

As Dragan explains, the process of making the brooms is far from easy. First, the bottles must be washed, and the labels and caps must be removed before drying. Next, the bottles are cut into thin strips, which are then wound onto frames and boiled in water. Once dried, the strips are used for the final assembly. These brooms are durable and ideal for sweeping leaves. They are often purchased at fairs or directly from Dragan.

Although he lives in a small community with low demand, Dragan is satisfied with the positive feedback and reactions.

"There aren't many customers since this is a small place, but I regularly attend fairs, and people also come directly to me to pick out the broom they want. Most customers are happy with the brooms, and the feedback has been positive. The brooms last a long time and are irreplaceable for sweeping leaves," Dragan shares.

Photographs: courtesy of Dragan Janković

Recycling as a Way of Life

The stretch between Ostojićevo and Čoka is littered with discarded bottles, a sight that, unfortunately, is not uncommon in the country. While citizens mostly ignore plastic waste on the streets and municipal services still struggle to clean up improperly disposed of garbage, Dragan sees an opportunity to do something useful by crafting brooms from recycled bottles.

In addition to brooms, Dragan also makes briquettes for heating from cardboard, paper, and sawdust. This mixture is soaked, mixed in a concrete mixer, pressed, and left to dry in the sun. Once dry, the briquettes are ready for use and, when combined with wood, can be used for heating.

Dragan Janković

"Cardboard and paper are cut into small pieces and soaked in water. They stay in water for three to four days, and then they are mixed with sawdust and water in a concrete mixer before being placed in a press. The mixture is compressed, resulting in briquettes the size of bricks," Janković explains.

The bottles must first be washed, with labels and caps removed, and then dried

Although he currently offers only brooms and briquettes, there is no doubt that this modest man from Čoka will continue his noble mission of recycling available materials, contributing both to environmental protection and his budget.

Despite being on a disability pension, Janković proves that persistence and creativity can bring about change—not only in an individual's life but also in the fight against global plastic pollution. His contribution demonstrates that anyone, regardless of life circumstances, can find a way to protect the environment—because every small step matters.

Prepared by Milena Maglovski

Plastic pollution

Recycling plastic packaging is crucial for reducing environmental pollution and conserving resources. In addition to preventing plastic from ending up in landfills or oceans, where it takes hundreds of years to break down, recycling reduces the demand for fossil fuels used in production. Currently, about 10 percent of the world's plastic waste is recycled. Despite efforts to improve recycling infrastructure, most plastic waste is either sent to landfills or incinerated, while a significant portion ends up in the environment. Although most plastic bottles are made from recyclable PET (polyethylene terephthalate), current recycling methods remain inefficient, resulting in lower-quality products with a shortened lifespan. Therefore, promoting better practices and creating more efficient systems for the sustainable recycling of plastic bottles is essential.

DRIVE ELECTRIC

Although electromobility has well-known advantages, often discussed in the media, it's equally essential to highlight its challenges, uncertainties, and concerns. The rise in electric and hybrid vehicles globally has raised important safety questions, especially concerning fire risks. Although the overall fire risk is lower compared to conventional vehicles, the flammability of batteries presents a significant challenge. The difficulty of extinguishing such fires and the possibility of re-ignition remain critical safety issues in e-mobility.

For this reason, we spoke with Zorana Đorić, the manager of the Drive Electric initiative, to help us understand what must not be overlooked when dealing with battery-powered vehicles.

In the event of an electric vehicle fire, the flames spread more quickly, and emergency services often cannot respond in time

"Statistics show that for every 10 million electric vehicles, about 500 fires are recorded. This means the probability of fire in electric vehicles is 29 times lower than in vehicles with internal combustion engines," explains Zorana.

However, despite the lower probability, fires in electric vehicles require a much quicker response than in traditional cars. Fires in electric vehicles spread faster, and emergency services often cannot respond within the required timeframe. Moreover, the same fire suppression methods used for conventional vehicles cannot be applied to electric ones. Traditional cars can be extinguished using standard techniques, but battery cooling methods are required for electric vehicles.

Consequently, the global community and individual countries must

Photograph: Pexels/David Gallie

develop new, more effective safety technologies. While advancements are already being made worldwide, anyone opting for an electric vehicle must acquire the necessary knowledge to handle it properly.

One key piece of information for electric vehicle owners is the Emergency Sheet, which indicates the position of safety switches that disconnect the vehicle from power. This document contains essential safety information for handling the vehicle in emergencies, including the location of the battery, instructions for turning off main electrical switches to minimize the risk of electric shock, safe points for cutting the vehicle to facilitate rescue operations, and guidelines for effective fire suppression. This sheet is also a critical resource for emergency responders.

How to Extinguish a Fire

Innovative fire suppression methods used in countries with more advanced electromobility include water mist, which effectively cools the battery and surrounding area, reducing the risk of spread or re-ignition. For more intense fires, firefighting teams use specialized extinguishers containing specific gases or foams.

In extreme cases where standard methods fail, controlled submersion is applied. This involves completely immersing the battery or the entire vehicle in large water containers to ensure the fire is fully extinguished and cannot reignite.

However, these methods require specialized firefighter training to ensure they know how and when to apply specific techniques and how to isolate the area. Careful assessment of each incident is crucial for successful fire suppression in battery fires.

Owners must also familiarize themselves with indicator lights, which differ significantly from those found in vehicles with internal combustion engines. These lights warn of faults or conditions that may endanger the driver.

"Electric vehicles are now part of our present and are becoming more common in cities worldwide. It's human nature to resist the unfamiliar, but that doesn't exempt us from understanding safety systems and acquiring the necessary knowledge to protect ourselves and others," Zorana emphasizes.

There have been cases where electric vehicle fires were not due to faulty batteries but other factors, such as inappropriate chargers. Zorana explains that most fires are caused by improper handling by unlicensed individuals working on high-voltage batteries.

Charging electric vehicles involves some fire risks due to additional wiring and connectors, so it's essential to follow the manufacturer's instructions and use the appropriate equipment for each vehicle type. This includes using only the correct home chargers and outlets the manufacturer recommends.

Zorana and her team at "Drive Electric" also advise that batteries stored in homes, garages, or offices should never be left unattended and should not be charged overnight when monitoring potential hazards is impossible. Home chargers should be installed by qualified electricians following the manufacturer's instructions, and users must adhere to these guidelines just as they would with other home appliances.

Professional Training Programs

The Drive Electric team has been involved in electromobility for six years, primarily through technical innovation. They organized the First Battery Conference and the International Symposium on E-Mobility. Over time, however, they realized the need to go further, leading to the creation of the Green Drive Academy. The academy aims to provide in-depth knowledge of systems, technical details, and medical aspects, highlight potential hazards, and explain the differences between electric and conventional vehicles.

The team comprises licensed professionals specializing in electric vehicle maintenance and repair, court experts, mechanical and electrical engineers, and medical experts responsible for health recommendations and safety advice.

To conclude, Zorana emphasizes that electromobility has arrived, and we must familiarize ourselves with all its aspects. Her advice: "Be responsible".

Prepared by Milica Vučković

Photographs: Drive Electric initiative

LARVAE AS A SOLUTION FOR POLLUTION AND SUSTAINABLE AGRICULTURE

Opinions about insects are often divided, ranging from fear to admiration. Some view them as pests and worthless creatures, while others recognize their crucial role in maintaining healthy and balanced ecosystems. It's also important to mention experts who study insects and discover that they can provide multiple benefits. In fact, some of these tiny creatures can be extremely useful in solving certain environmental challenges that humanity faces. Boris Vasiljev from the Belinda Animals Company reveals how larvae impact the environment and contribute to ecology.

The larvae of the mealworm beetle, or *Tenebrio molitor* larvae (commonly known as mealworms), play a significant role in sustainable animal feed production, reducing greenhouse gas emissions, and preserving the environment through plastic degradation and organic fertilizer production. They are naturally found in grain and mill product storage facilities and can often be found in household environments—such as flour.

These larvae utilize various plant-based wastes, such as silo waste, broken grains, and various animal feed leftovers on farms. Additionally, they consume green plant waste, such as fruits and vegetables unsuitable

Pilot Center for the Breeding of Tenebrio molitor Larvae in Ulcinj

In 2022, the Belinda Animals Company established a Pilot Center in Serbia dedicated to breeding and producing parent stock or foundational colonies of larvae. Recently, another Pilot Center was opened in Ulcinj, representing a transfer of domestic technology supported by UNDP Serbia and the Serbian government.

Photographs: courtesy of Boris Vasiljev

for sale or use, stale bread, and more. Their usefulness is also evident in their ability to concentrate proteins in their bodies while feeding on plant waste. Compared to cattle, which emit as much as 2,850 grams of greenhouse gases for every kilogram of body mass gained, larvae emit only one gram.

As Vasiljev points out, cattle, whose meat meal is used in animal feed, emit 2,850 times more CO2 equivalent compared to larvae. Moreover, larvae feed on waste that would otherwise end up in landfills.

Mealworm larvae are rich in proteins (45–60 percent of dry mass), fats (30–45 percent of dry mass), as well as vitamins, omega 3, 6, and 9 fatty acids, and fibers and minerals. This indicates that their nutritional composition is superior to that of other components of animal feed. Practically, protein meals from larvae could completely replace soybean meals and fish meals in poultry, pig, and fish feed.

In addition to being used in animal feed production, these creatures also find their place in agriculture for vegetable and fruit growers. During their cultivation, a type of manure is produced, known globally as FRASS. This includes larvae excrement, food residues, shed skins, and the remains of deceased individuals, which collectively represent high-quality organic microbiological fertilizers. It can be applied as pellets alone or with added mineral fertilizers in various formulations.

Speaking about Serbia, Vasiljev notes that the cultivation of *Tenebrio* larvae is still a topic discussed mainly in scientific circles. Their team is preparing to organize mass education and training for this cultivation, as insect protein is officially approved for animal feed in Serbia.

The Great Potential of Larvae

In the European Union, larvae are also used in human nutrition, most commonly as an additive in bakery products. Additionally, due to the high-value proteins they contain, they are used as a supplement in food for athletes. Larval exoskeletons also have potential because they are used to obtain chitin, a natural polymer particularly utilized in the pharmaceutical and cosmetic industries.

These larvae utilize various plant-based wastes, such as silo waste, broken grains, and various animal feed leftovers on farms

The Role of Larvae in Combating Plastic Pollution

Due to specific microorganisms present in their intestines, larvae can successfully degrade certain types of plastics, such as polystyrene (styrofoam). While the natural degradation time of polystyrene is at least 400 years, larvae readily consume it. This could be particularly useful for farms producing protein meal, which is further used as animal feed. As larvae are raised on such farms, if polystyrene were added to their feed, they would simultaneously break down the plastic while feeding, thus converting it into a protein meal.

Through a practical example, Vasiljev illustrated the potential of these creatures. If a farm in France that produces 100,000 tons of protein meal annually were to mix just one percent of polystyrene into the larvae's feed, that farm alone would consume over 4,000 tons of polystyrene annually, which averages around 25,000 cubic meters of polystyrene. However, at this moment, commercial farms are not interested in implementing such practices, as the price of protein meal in Europe is high, exceeding 45 euros per kilogram wholesale, and adding polystyrene requires preparation that increases production costs. Nevertheless, Vasiljev believes there is potential in Serbia, and he is confident it will flourish in the future.

In addition to waste reduction, this process also benefits the reduction of CO_2 emissions. When one kilogram of styrofoam is burned, about 3.96 kilograms of CO_2 is released into the atmosphere. However, if larvae degrade the styrofoam, there will be no emissions.

Prepared by Katarina Vuinac

SUSTAINABLE FUTURE: INTERNATIONAL ENERGY FAIR

Under the unique slogan Nature has the Message, the 19th International Energy Fair and the 20th International Environmental Protection and Natural Resources Fair, EcoFair, were held. Over three days in Hall 3 of the Belgrade Fair, more than 50 domestic and international exhibitors from around 10 countries showcased their work.

Experts, enterprises, companies, organizations, investors, and decision-makers from various sectors of the energy industry presented the latest advancements in the field. The environmental aspect of energy – the other side of the coin – plays an increasingly significant, often crucial role in designing and developing new energy sources. In light of climate change and increasingly stringent regulations, sustainability is becoming a key criterion in selecting technologies and approaches for energy production.

During the ceremonial opening of this unique fair event, Stefan Srbljanović, State Secretary at the Ministry of Mining and Energy, reminded attendees that energy is a shared legacy that impacts all those involved in managing the energy sector, including public and private companies, investors, civil society organizations, and all citizens and consumers. He highlighted energy efficiency as one of the ministry's most important goals and priorities.

Ivana Hadži Stošić, State Secretary at the Ministry of Environmental Protection, emphasized the event's significance as it connects stakeholders from various sectors, both from Serbia and abroad, to exchange experiences and best practices. She presented the ministry's ongoing initiatives, noting that work is underway to establish regional recycling centers in the village of Kalenić near Ub and Pirot, with a center in Užice planned to open by the end of the year.

Numerous exhibitors allowed visitors to explore the latest developments in renewable energy, energy efficiency, smart grids, energy storage, and other related technologies.

MT-KOMEX, a local company, was among the exhibitors. Its expert team shared their extensive experience constructing solar power plants. Thanks to companies such as Luxor Solar, Kıraç Metal, SKE, and Huawei, visitors received comprehensive insights into every element of a solar power plant—from equipment to practical advice on implementation—directly from seasoned professionals in Hall 3.

Additionally, engineers from CEEFOR were available to provide guidance on developing quality solar power projects. Those interested in e-mobility and charging infrastructure had the opportunity to consult with engineers from Charge&GO.

Prepared by Milica Radičević

Photograph: MT-KOMEX

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