



GREEN NEWS

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INTERVJU / **IRENA VUJOVIĆ** / INTERVIEW

NEZAUSTAVLJIVO MENJAMO ZELENU SLIKU SRBIJE NA BOLJE

We are unstoppably changing
the green image of Serbia for the better

PRAKTIČNI SAVETI / PRACTICAL ADVICE

KAKO DA SMANJITE POTROŠNJU ENERGIJE I UŠTEDITE NOVAC

Reduce Energy
Consumption
and Save
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is Imperative for Us

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Renewable Energy

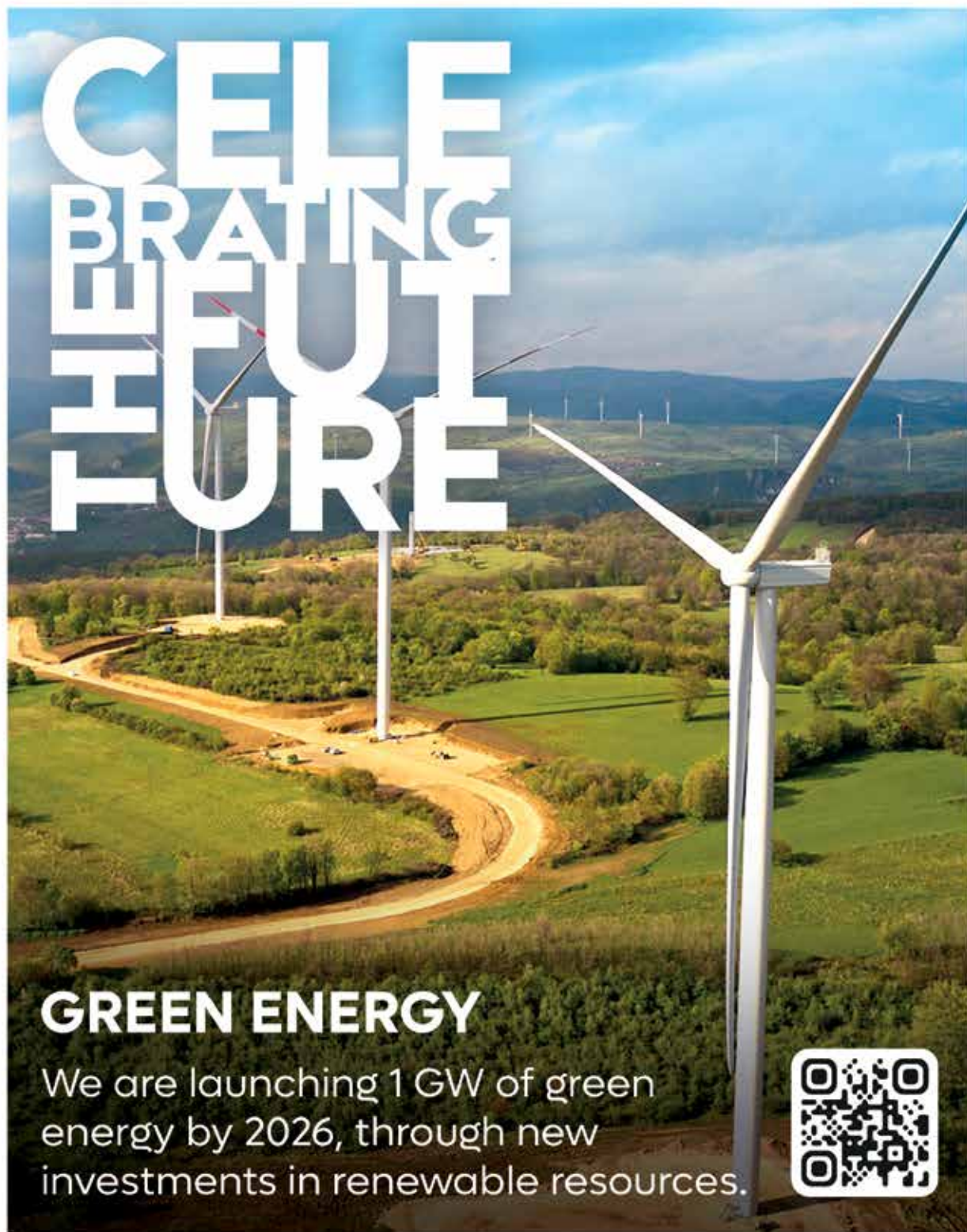
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30 GODINA ISKUSTVA I TRADICIJE



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16

Solarni paneli - solarna štednja

Solar panels - Solar savings



50

Sve što treba da znate o obnovljivoj energiji

Everything you need to know about renewable energy



26

INTERVJU

Veselin Jevrosimović

INTERVIEW



80

Automobili na struju

Electric cars



42

Ubrzanje zelene tranzicije

Accelerating the green transition



62

Štednjom do zdravijeg sveta

Saving for a Healthier World



GLAVNI I ODGOVORNI UREDNIK
Olivera Krstić
EDITOR IN CHIEF

Obnovljiva energija Renewable energy

REČ UREDNIKA

EDITOR WORDS



Poštovani čitaoci,
Sa ponosom vam predstavljamo prvi broj **Green News** magazina o obnovljivoj energiji i zdravoj životnoj sredini. Pružamo vam priliku da istražite svet energetike, koji se sve više okreće prema održivim izvorima energije.

Obzirom na rastuće izazove u vezi sa klimatskim promenama i očuvanjem naše okoline, obnovljiva energija postaje ključna tema današnjice. Magazin **Green News** posvećen je istraživanju i promovisanju inovativnih tehnologija, projekata i ideja koje pomažu u ostvarivanju tranzicije prema čistoj energetskej budućnosti.

Naša misija je da edukujemo i informišemo čitaoce o najnovijim dostignućima iz oblasti obnovljive energije, da istražimo njene različite oblike kao što su energija Sunčevog zračenja, energija vetra, vodne snage, biomasa i biogas, geotermalna energija kao i energija talasa, uključujući energiju plime i oseke. Želimo da vas upoznamo sa primerima uspešne implementacije ovih tehnologija širom sveta, kako bi, u budućnosti, ovi oblici energije preuzeli primat od fosilnih goriva i tako spasili planetu od negativnih efekata globalnog zagrevanja.

Uz to, podstičemo dijalog i angažman, stvarajući platformu za stručnjake, inovatore, industriju i Vladu, kako bi sinergijom ostvarili održivu, svetlu i zelenu budućnost.

Verujemo da obnovljiva energija nije samo nužna, već je i izvor neverovatnih mogućnosti. U **Green News** magazinu upoznate se sa inspirativnim pričama, stručnim analizama, savetima za potrošače i vestima iz industrije, sa ciljem podsticanja vašeg razumevanja i učestvovanja u ovom važnom procesu.

Hvala što ste nam se pridružili na ovom putovanju. Nadamo se da ćemo doprineti širenju svesti o obnovljivoj energiji i podstaći pozitivne promene na globalnom nivou.

Srdačan pozdrav,
Olivera Krstić



Dear readers,
We are proud to present the first issue of the **Green News** magazine on renewable energy and a healthy environment. We offer the opportunity to explore the world of energy, which is increasingly turning towards sustainable energy sources.

In view of the growing challenges related to climate change and the preservation of our environment, renewable energy is becoming a key topic today. **Green News** magazine is dedicated to researching and promoting innovative technologies, projects and ideas that help to achieve the transition to clean energy future.

Our mission is to educate and inform readers about the latest developments in the field of renewable energy, to explore its various forms such as solar and wind energy, hydropower, biomass and biogas, geothermal as well as wave energy, including tidal energy. We want to introduce you to examples of successful implementation of these technologies around the world, so that, in the future, these forms of energy will take precedence over fossil fuels and thus save the planet from the negative effects of global warming.

In addition, we encourage dialogue and engagement, creating a platform for experts, innovators, industry and the Government, in order to achieve sustainable, bright and green future through synergy.

We believe that renewable energy is not only necessary, but also a source of incredible opportunities. In **Green News** magazine, you will be introduced to inspirational stories, expert analysis, consumer advice and industry news, with the aim of encouraging your understanding and participation in this important process.

Thank you for joining us on this journey. We hope to contribute to the spread of awareness about renewable energy and encourage positive change on a global level.

Kind regards,
Olivera Krstić

Irena VujovićMINISTARKA ZAŠTITE ŽIVOTNE SREDINE
U VLADI REPUBLIKE SRBIJE**Nezaustavljivo
menjamo zelenu
sliku Srbije na bolje****Irena Vujović**MINISTER OF ENVIRONMENTAL PROTECTION IN THE
GOVERNMENT OF THE REPUBLIC OF SERBIA**We are unstoppably
changing the green image
of Serbia for the better****NAŠ GENERACIJSKI CILJ****ZELENA
SRBIJA**

Irena Vujović

MINISTARKA ZAŠTITE ŽIVOTNE SREDINE U VLADI REPUBLIKE SRBIJE



GN *Srbija je poslednjih godina postigla značajan napredak u oblasti zaštite životne sredine. Šta nam možete reći o rezultatima i planovima za budućnost?*

Napravili smo ogroman pomak u poslednjih nekoliko godina i time smo pokazali da možemo da realizujemo zelene projekte i podižemo standarde zaštite životne sredine za naše građane. Nije uvek bilo lako, posebno ako imamo u vidu da se ovom oblašću niko pre nas nije ozbiljno bavio, ali nismo odustajali. Imali smo strategiju i planove kako da se iz dana u dan približavamo tom cilju. Sa svakim sprovedenim projektom približavali smo se našoj viziji, a to je zelena Srbija koja se razvija na održiv način - bez nesanitarnih i divljih deponija, bez nagomilanog istorijskog opasnog otpada, sa čistim rekama, očuvanim zemljištem, boljim kvalitetom vazduha za sve.

U kratkom vremenskom periodu, naš rezultat već izgleda ovako: Tokom tri godine biće uklonjeno 900 divljih deponija koje su ruglo Srbije, a sanirali smo i ekološke bombe - sedam nesanitarnih deponija u Prijepolju, Bogatiću, Bečeju, Čačku, Trsteniku, Priboju i Zajači. U ovom momentu saniramo i druga ekološka žarišta, poput nesanitarne deponije u Rumi, Zrenjaninu, Požegi i Šapcu. Izgradnjom transfer stanica za

pretovar otpada u Novoj Varoši, Petrovcu na Mlavi, Smederevu, linije za separaciju otpada u Pančevu, stvaramo uslove za sanaciju drugih nesanitarnih deponija. Istovremeno, mnogo energije ulažemo u kapitalne projekte izgradnje modernih regionalnih i reciklažnih centara širom Srbije, gde će se otpad tretirati po najsavremenijim standardima i koji su osnovni preduslov za upravljanje otpadom na sistemski način.

U ovom momentu gradimo 100 kilometara nedostajuće kanalizacione mreže širom zemlje - u Pećincima, Gornjem Milanovcu, Kopaoniku, Čačku, Kraljevu, Nišu. Uskoro ćemo raspisati tendere i za izgradnju prvih postrojenja za prečišćavanje otpadnih voda.

Kada je reč o unapređenju kvaliteta vazduha, uveli smo praksu subvencionisanja zamene zastarelih kotlova na mazut i ugalj kotlovima na ekološki prihvatljivije energente, kao i zamene individualnih ložišta u domaćinstvima. Tokom tri godine, putem javnih konkursa zamenjeno je više od 100 kotlova u toplanama i javnim ustanovama i više od 3.000 ložišta u domaćinstvima. U Kragujevcu smo kompletno rekonstruisali gradsku toplanu, gde smo izbacili iz upotrebe pola veka stare kotlove na mazut i zamenili ih najmodernijim kotlovima na gas. Podržavamo kupovinu električnih i hibridnih

Irena Vujović

MINISTER OF ENVIRONMENTAL PROTECTION IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA

Green Serbia is our generational goal

GN *Serbia has achieved significant progress in the field of environmental protection in recent years. What can you tell us about the results and plans for the future?*

We have made huge progress in the last few years and have shown that we can implement green projects and raise the standards of environmental protection for our citizens. It was not always easy, especially considering that no one had seriously dealt with this field before us, but we did not give up. We had a strategy and plans to get closer to that goal day by day. With each implemented project, we got closer to our vision, which is green Serbia that develops in a sustainable way - without unsanitary and wild landfills, without accumulated historical hazardous waste, with clean rivers, preserved soil, and better air quality for everyone.

In a short period of time, our result looks like this: Over the course of three years, 900 wild landfills - garbage dumps of Serbia - will be removed, and we have also remedied ecological bombs - seven unsanitary landfills in Prijepolje, Bogatić, Bečej, Čačak, Trstenik, Priboj and Zajača. We are currently rehabilitating other ecological hotspots, such as unsanitary landfills in Ruma, Zrenjanin, Požega and Šabac. By building transfer stations for waste transshipment in Nova Varoš, Petrovac na Mlavi, Smederevo, waste separation lines in Pancevo, we are creating conditions for the rehabilitation of other unsanitary landfills. At the same time, we are investing a lot of energy in capital projects for the construction of modern regional and recycling centers throughout Serbia, where waste will be treated according to the most modern standards, and which are basic prerequisites for waste management in a systemic way.

At this moment, we are building 100 kilometers of the missing sewage network throughout the country - in Pećinci, Gornji Milanovac, Kopaonik, Čačak, Kraljevo, and Niš.

We will soon call for tenders for the construction of the first wastewater treatment plants.

When it comes to improving air quality, we have introduced the practice of subsidizing the replacement of outdated fuel oil and coal boilers with more environmentally friendly energy sources, as well as the replacement of individual boiler rooms in households. Over the course of three years, more than 100 boilers in heating plants and public institutions and more than 3,000 boiler rooms in households were replaced through public tenders. In Kragujevac, we completely reconstructed the city's heating plant and replaced half a century old fuel oil boilers with the most modern gas boilers. We support the purchase of electric and hybrid vehicles, and since 2020, more than 1,500 eco-vehicles have been purchased with subsidies. We also continued with the implementation of afforestation and greening projects, which covered more than 60 cities and municipalities from 2018 to 2023.

And that is not all. In three years, we managed to remove about 6,000 tons of historical hazardous waste, left over from the 2000s, which had a negative impact on the environment. We are continuing, and by the end of the year the result will be about 8,300 tons of historical waste removed. On the other hand, we also took into account Serbia's natural resources, so we have increased the area under protection to 8.31 percent of the country's territory, while, for the sake of comparison, in 2012, 5.91 percent of the territory was under state protection.

In the coming period, we will continue to preserve our natural assets and increase the territory under protection. We will also continue with measures that have had an impact on the improvement of the environment and the quality of life of citizens. The challenge that lies ahead of us is the continuation of the construction of green infrastructure, which is necessary so as to bring order to this area and completely change the face of Serbia. The steps

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MINISTARKA ZAŠTITE ŽIVOTNE SREDINE U VLADI REPUBLIKE SRBIJE

Programom upravljanja otpadom za period od 2022-2031. godine sa Akcionim planom predvideli smo izgradnju modernih regionalnih centara za upravljanje otpadom i prateće infrastrukture

vozila, a od 2020. do sada je uz subvencije kupljeno više od 1.500 eko vozila. Nastavili smo i sa realizacijom projekata pošumljavanja i ozelenjavanja, kojima smo od 2018. do 2023. obuhvatili više od 60 gradova i opština.

I to nije sve. Za tri godine uspeli smo da uklonimo oko 6.000 tona istorijskog opasnog otpada, zaostalog iz 2000-ih godina, koji je negativno uticao na životnu sredinu. Nastavljamo dalje, a do kraja godine rezultat će biti oko 8.300 tona uklonjenog istorijskog otpada. Sa druge strane, vodili smo računa i o prirodnim bogatstvima Srbije, pa smo površinu pod zaštitom povećali na 8,31 odsto teritorije zemlje dok je, poređenja radi, u 2012. godini pod zaštitom države bilo 5,91% teritorije.

U narednom periodu, nastavićemo da čuvamo naša prirodna dobra i povećavamo teritoriju pod zaštitom, a nastavljamo i sa merama koje su uticale na unapređenje stanja životne sredine i kvaliteta života građana. Izazov koji nam predstoji jeste nastavak izgradnje zelene infrastrukture koja je neophodna kako bi se uveo red u ovu oblast i potpuno promenilo lice Srbije. Koraci koje smo do sada napravili, talas promena koje smo pokrenuli i rezultati koje smo postigli, daju nam motiv i snagu da se još upornije borimo. Nezaustavljivo ćemo menjati zelenu sliku Srbije na bolje, jer je naš generacijski cilj da deci koja tek dolaze ostavimo čistu i zelenu Srbiju.

GN *Koliko se godišnje otpada reciklira u Srbiji i koliko smo daleko od evropskog proseka?*

Sa svakim projektom koji realizujemo, a koji se tiče adekvatnog upravljanja otpadom, povećava se i stopa reciklaže. Programom upravljanja otpadom za period od 2022-2031. godine sa Akcionim planom predvideli smo izgradnju

modernih regionalnih centara za upravljanje otpadom i prateće infrastrukture. Ove investicije će u narednim godinama značajno povećati stopu reciklaže koja danas iznosi 17,7%. Situacija u članicama EU je različita. Propisi Unije predviđaju da do 2025. stopa reciklaže dostigne 55%, a do 2035. godine 65%. Te ciljeve mogu da dostignu samo razvijenije države koje imaju modernu zelenu infrastrukturu, na čijoj izgradnji i mi u Srbiji vredno radimo. U godinama pred nama, uz planirane investicije u kapitalne projekte, i mi ćemo dostići evropske ciljeve.

GN *Najavljen je ambiciozni projekat za izgradnju regionalnog reciklažnog centra u opštini Ub. Da li nam možete reći nešto detaljnije o projektu?*

Jedan od najvećih ekoloških problema u Srbiji je neadekvatno upravljanje otpadom. Da bismo rešili taj problem na održiv način, neophodna nam je zelena infrastruktura – regionalni reciklažni centri, transfer stanice za pretovar otpada, postrojenja. Izgradnja takvog centra u selu Kalenić u opštini Ub jedan je od najznačajnijih zelenih projekata u Srbiji, a dok ovaj broj magazina izađe u štampi, očekujem da će početi i radovi na terenu. Na tom mestu, otpad sa teritorije 15 gradova i opština biće tretiran po najsavremenijim standardima, što će popraviti kvalitet života za više od pola miliona građana.

Regionalni i reciklažni centar u opštini Ub, deo je većeg projekta izgradnje sličnih centara širom Srbije, za koji smo obezbedili 150 miliona evra iz kredita Evropske banke za obnovu i razvoj (EBRD) i Francuske agencije za razvoj (AFD). Opština Ub je prva lokacija, jer je imala najspremnije projekte i dobar je primer drugima kako efikasno odgovarati na proceduralne zahteve koji prate ovako velike projekte.

Izazov koji nam predstoji jeste nastavak izgradnje zelene infrastrukture koja je neophodna kako bi se uveo red u ovu oblast i potpuno promenilo lice Srbije. Koraci koje smo do sada napravili, talas promena koje smo pokrenuli i rezultati koje smo postigli, daju nam motiv i snagu da se još upornije borimo

Irena Vujović

MINISTER OF ENVIRONMENTAL PROTECTION IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA



we have taken so far, the wave of changes we have initiated, and the results we have achieved, give us the motivation and strength to fight even more persistently. We will unstopably change the green image of Serbia for the better, because our generational goal is to leave clean and green Serbia to the children who are yet to come.

GN *How much waste is recycled annually in Serbia and how far are we from the European average?*

With every realized project which concerns adequate waste management, the recycling rate also increases. By the waste management program for the period 2022-2031, and the Action Plan, we envisioned the construction of modern regional centers for waste management and supporting infrastructure. In the coming years, these investments will significantly increase the recycling rate, which currently stands at 17.7%. The situation in the EU member states is different. The EU regulations foresee that the recycling rate will reach 55% by 2025, and 65% by 2035. These goals can be achieved only by more developed countries that have modern green infrastructure, on whose construction we are also working hard in Serbia. In the years ahead,

with planned investments in capital projects, we will also reach European goals.

GN *An ambitious project for the construction of a regional recycling center in the municipality of Ub has been announced. Can you tell us more about the project?*

One of the biggest ecological problems in Serbia is inadequate waste management. In order to solve this problem in a sustainable way, we need green infrastructure - regional recycling centers, waste transfer stations, plants. The construction of such a center in the village of Kalenić in the municipality of Ub is one of the most important green projects in Serbia, and by the time this issue of the magazine goes to print, I expect that field work will also begin. At that place, waste from the territory of 15 cities and municipalities will be treated according to the most modern standards, which will improve the quality of life for more than half a million citizens.

The regional and recycling center in the municipality of Ub is part of a larger project to build similar centers throughout Serbia, for which we have provided 150 million euros from the European Bank for Reconstruction

Irena Vujović

MINISTARKA ZAŠTITE ŽIVOTNE SREDINE U VLADI REPUBLIKE SRBIJE



GN *U Srbiji se i aktivno sprovodi akcija uklanjanja divljih deponija. Koliko lokacija je do sada očišćeno i kakvi su planovi za budućnost?*

U prethodne dve godine, uz podršku ministarstva koje vodim uklonjeno je 730 divljih smetlišta. Ovaj veliki posao nastavili smo i u tekućoj godini, a plan je da uklonimo više od 170 divljih deponija u 30 gradova i opština. To znači da će naš rezultat u toku tri godine biti oko 900 uklonjenih divljih deponija širom Srbije. Međutim, uprkos našim naporima da rešimo ovaj višedecenijski problem, i dalje se dešava da pojedini nesavesni građani odlažu različite vrste otpada na lokacijama koje su već jednom očišćene. Ministarstvo stalno apeluje na lokalne samouprave i njihove nadležne inspekcije da redovno kontrolišu, a obezbeđujemo i sredstva za postavljanje video nadzora na očišćenim lokacijama. Važna je i edukacija, jer su u ovom poslu građani naši glavni partneri. Samo zajedno možemo da sačuvamo lokacije koje smo već očistili.

GN *Država je subvencionisala zamenu individualnih ložišta u domaćinstvima. Koliko domaćinstava je obuhvaćeno i kakav je bio odziv građana?*

U sklopu paketa mera za unapređenje kvaliteta vazduha, pre tri godine pokrenuli smo praksu raspisivanja javnog konkursa

Tokom tri godine, podržali smo zamenu više od 3.000 ložišta građana u skoro 30 lokalnih samouprava, kotlovima koji koriste ekološki prihvatljivije energente poput gasa ili peleta

za lokalne samouprave za sufinansiranje projekata zamene ložišta građana u njihovim domaćinstvima. Tokom tri godine, podržali smo zamenu više od 3.000 ložišta građana u skoro 30 lokalnih samouprava, kotlovima koji koriste ekološki prihvatljivije energente poput gasa ili peleta. Želim da zahvalim svim građanima koji su se prijavili za ovu vrstu podrške, jer to govori da imaju svest o tome koliko je važno da svako da svoj doprinos za čistiji vazduh. Benefite ovog projekta osećaju svi koji su menjali ložište, ali i građani koji žive u okolini, jer je vazduh čistiji.

GN *Pored individualnih ložišta, menjaju se i kotlarnice u javnim ustanovama. Koliko je ovo važno, s obzirom da su kotlarnice na mazut i ugalj jedan od najvećih zagađivača vazduha?*

Irena Vujović

MINISTER OF ENVIRONMENTAL PROTECTION IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA

We are currently building about 100 kilometers of a sewage system, and then we are starting to build a plant that would treat wastewater before it is released into the environment



and Development (EBRD) and the French Development Agency (AFD). The municipality of Ub is the first location, because it has had the most ready projects and is a good example for others how to efficiently respond to procedural requirements that accompany such large projects.

GN *The campaign to remove illegal landfills is actively being carried out in Serbia. How many sites have been cleared so far and what are the plans for the future?*

In the previous two years, with the support of the Ministry I lead, 730 illegal garbage dumps have been removed. We continue this great work in the current year, and the plan is to remove more than 170 illegal landfills in 30 cities and municipalities. This means that our result in the course of three years will be about 900 removed wild landfills throughout Serbia. However, despite our efforts to solve this decades-old problem, it still happens that some unscrupulous citizens dump different types of waste in locations that have already been cleaned once. The Ministry constantly appeals to local self-governments and their competent inspections to regularly control, and we also provide funds for installing video surveillance at cleaned locations. Education is also important, because citizens are our main partners in this business. Only together can we save the locations we have already cleaned.

GN *The state subsidized the replacement of individual boiler rooms in households. How many households were covered and what was the response of citizens?*

As part of a package of measures to improve air quality, three years ago, we started the practice of announcing a public tender for local governments to co-finance projects to replace citizens' boiler rooms in their households. Over the course of three years, we supported the replacement of more than 3,000 citizen's boiler rooms in almost 30 local governments, with boilers that use more environmentally friendly energy sources such as gas or pellets. I would like to thank all the citizens who applied for

this kind of support, because it shows that they are aware of how important it is for everyone to contribute to cleaner air. The benefits of this project are felt by everyone who changed boiler rooms, but also by citizens living in the area because the air is cleaner.

GN *In addition to individual boiler rooms, those in public institutions are also being changed. How important is this, given that fuel oil and coal boilers are one of the biggest air pollutants?*

It is of vital importance for us to reduce air pollution, and that is why, along with the tenders for the replacement of individual boiler rooms, for the third year in a row we are also conducting tenders for the replacement of boilers in heating plants and public institutions. We have supported the replacement of more than 100 dilapidated boilers that use solid fuels. We have also replaced boilers in numerous schools and kindergartens, which is crucial for us in order to provide children with better heating and clean air in institutions where they spend most of the day. Tenders for the replacement of boilers are excellent measures, because the result will be visible in the next heating season, and that is why we will continue to allocate funds for these purposes.

GN *The construction of wastewater treatment plants at several locations in Serbia has also been announced. How important is this for the protection of our rivers?*

In order to start building wastewater treatment plants, we need to build the missing sewage network. We are currently building about 100 kilometers of a sewage system, and then we are starting to build a plant that would treat wastewater before it is released into the environment. For these projects that we implement throughout Serbia, we have provided funds from European funds (IPA) and 200 million euros from loans from the Development Bank of the Council of Europe (CEB). Similar projects are also implemented by other ministries, from other credit lines.

Irena Vujović

MINISTARKA ZAŠTITE ŽIVOTNE SREDINE U VLADI REPUBLIKE SRBIJE

Kada sam na terenu, koristim svaku priliku da razgovaram sa građanima i raduje me kad čujem da ih zanima životna sredina, kao i da razumeju na koji način i kojom dinamikom možemo da rešavamo probleme

Za nas je od vitalnog značaja da smanjimo aerozagađenje, i zato paralelno sa konkursima za zamenu individualnih ložišta, već treću godinu zaredom sprovodimo i konkurse za zamenu kotlova u toplanama i javnim ustanovama. Podržali smo, tokom tri godine, zamenu više od 100 dotrajalih kotlova koji koriste čvrsta goriva. Menjali smo kotlove i u brojnim školama i vrtićima, što je za nas ključno kako bismo mališanima obezbedili kvalitetnije grejanje i čist vazduh u ustanovi u kojoj provode veći deo dana. Konkursi za zamenu kotlova su odlična mera, jer je rezultat vidljiv već u narednoj grejnoj sezoni i zato ćemo i dalje odvajati sredstva u te svrhe.

GN Najavljene su i izgradnje prečištača otpadnih voda na više lokacija u Srbiji. Koliko je ovo važno za zaštitu naših reka?

Da bismo krenuli u izgradnju postrojenja za prečišćavanje otpadnih voda, moramo da izgradimo nedostajuću kanalizacionu mrežu. Trenutno gradimo oko 100 kilometara kanalizacije, a zatim krećemo u izgradnju postrojenja koja bi prečistila otpadne vode pre nego što se one ispuste u životnu sredinu. Za ove projekte koje realizujemo širom Srbije obezbedili smo sredstva iz evropskih fondova (IPA) i 200 miliona evra iz kredita Razvojne banke Saveta Evrope (CEB), a slični projekti se realizuju i kroz projekte drugih ministarstava, iz drugih kreditnih linija.

GN Da li Ministarstvo ima plan da uključi građane i lokalne zajednice u donošenje odluka vezanih za zaštitu životne sredine?

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projekte na našim konkursima. Od početka se trudimo da pažljivo slušamo njihove potrebe, što nam je bio jedan od glavnih motiva da napravimo sistem G-react, preko kojeg građani mogu brzo i lako da prijave ekološki problem na koji naiđu u svom okruženju. Sistem nam omogućava da pratimo koji ekološki problemi im najviše smetaju, što je za nas važno i na taj način uključujemo kad određujemo prioritete probleme za rešavanje. Životna sredina se tiče svih nas, zato svi moramo da učestvujemo, jer samo zajedno možemo da je sačuvamo.

GN Koje su strategije Ministarstva za smanjenje zagađenja vazduha?

Čistiji vazduh je za Vladu Srbije i Ministarstvo zaštite životne sredine jedan od neupitnih prioriteta. Pored mnoštva zelenih projekata koje realizujemo a koji utiču i na smanjenje aerorozagađenja, po prvi put je u Srbiji krajem prošle godine usvojen strateški dokument kojim smo trasirali put ka čistijem vazduhu - Program zaštite vazduha u Republici Srbiji za period od 2022. do 2030. godine sa Akcionim planom od 2022. do 2026. godine. Vizija koju smo pretočili u Program jeste da do 2030. godine obezbedimo čist ambijentalni vazduh za sve, a mere koje će nam to omogućiti odnose se na sektore energetike, saobraćaja, poljoprivrede, zatim na velika industrijska postrojenja i individualna ložišta. Radna grupa je u maju donela zaključke koji će doprineti realizaciji strateških mera za smanjenje zagađenja vazduha. Tako ćemo, na primer, po prvi put pošumljavati poljoprivredno zemljište lošijeg kvaliteta na oko 1.500 hektara u naredne tri godine, a nastavićemo sa gašenjem kotlova u institucijama koji sagorevaju mazut i ugalj uz rok da se, tamo gde postoji mogućnost, te institucije priključe na sistem daljinskog grejanja ili gas u naredne dve godine. Ono što paralelno moramo da radimo jesu edukacije i obuke za primenu najboljih praksi i podizanje svesti građana.

GN



Kao jedan od dobrih primera unapređenja saradnje sa građanima je aplikacija **G-react**, preko koje građani mogu brzo i lako da prijave ekološki problem na koji naiđu u svom okruženju

Irena Vujović

MINISTER OF ENVIRONMENTAL PROTECTION IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA



GN Does the Ministry have a plan to involve citizens and local communities in making decisions related to environmental protection?

When I am in the field, I use every opportunity to talk to citizens, and I am happy to hear that they are interested in the environment, as well as that they understand how and with what dynamics we can solve problems. It happens that citizens point out a problem, they have an initiative towards the local government, which then submits projects to our competitions. From the beginning, we have tried to listen carefully to their needs, which were one of our main motives to create the G-react system, through which citizens can quickly and easily report an environmental problem they encounter.

The system allows us to monitor which environmental problems bother them most, and thus, we include them when determining priority problems to solve. The environment concerns all of us, that is why we all have to participate, because we can only save it together.

GN What are the strategies of the Ministry to reduce air pollution?

Cleaner air is one of the unquestionable priorities for the Government of Serbia and the Ministry of Environmental Protection. In addition to many green projects that we implement, which affect the reduction of air pollution, for the first time in Serbia, at the end of last year, a strategic document was adopted by which we traced the path to cleaner air - the Air Protection Program in the Republic of Serbia for the period from 2022 to 2030 with the Action plan from 2022 to 2026. The vision that we translated into the Program is to provide clean air for everyone by 2030. The measures that will enable us to do so relate to the sectors of energy, transport, agriculture, large industrial plants and individual boiler rooms. In May, the working group reached conclusions that will contribute to the implementation of strategic measures to reduce air pollution. For example, for the first time, we will reforest poor-quality agricultural land on about 1,500 hectares in the next three years, and we will continue to extinguish boilers in institutions that burn fuel oil and coal. The deadline for those institutions to connect to the district heating system or gas is within the next two years, where it is possible. What we have to do at the same time is education and training for the application of best practices, and raising the awareness of citizens.

GN



Solarni paneli - solarna štednja

Da li instaliranje solarnih panela može da smanji račune za električnu energiju?



Isplati li se ulagati u solarne panele kao izvor struje za vaš dom? Ovde ćemo pogledati troškove, kako to funkcioniše u drugim zemljama i da li je potrebno da živite na izrazito sunčanom području kako bi ovaj sistem funkcionisao.

Ova godina je zabeležila najbrži rast cena električne energije u poslednjih nekoliko godina širom Velike Britanije i Evropske unije, gde prosečno domaćinstvo račun za struju plaća neverovatnih 54 odsto više nego što je isti račun plaćala 2020. godine.

Dok vlade mnogih država u EU nude milijarde evra svom stanovništvu kako bi ublažili posledice ovih promena, Britanci nisu uvereni da će njihova vlada svom narodu ponuditi nešto slično.

Dok budžet prosečnog domaćinstva jedva pokriva osnovne potrebe, mnogo ljudi traži alternativna rešenja za električno napajanje svog doma.

KAKO FUNKCIONIŠU SOLARNI PANELI?

Energija za solarne panele dolazi od Sunca i ona se koristi za proizvodnju struje i toplote. Tehnologija direktno pretvara Sunčeve zrake u struju korišćenjem fotonaponskog efekta. Ovo stvara napon ili električnu struju kad je panel izložen Sunčevoj svetlosti.



SOLAR panels savings



Will installing solar panels in your home cut your energy bills?

Is it worth investing in solar panels for your house? Here we look at costs, how it works in other countries, and whether you need to live in the sunshine for them to work.

This year has seen the steepest rise in energy prices for years with households across the UK and EU now paying a staggering 54 per cent more than in 2020.

While the governments of many EU countries are offering their residents multibillion-euro aid packages to soften the blow, Brits are not feeling reassured that similar help is on its way.

With household budgets being stretched, many people are looking into alternative methods of powering their homes.

HOW DO SOLAR PANELS WORK?

Energy for solar panels is derived from the sun, which can be used to produce electricity and heat. The technology directly converts sunlight into electricity by exploiting the photovoltaic effect. This creates voltage or electrical current when exposed to light.

HOW MANY SOLAR PANELS WILL I NEED?

A three-bedroom, semi-detached property housing four people usually needs about 10 solar panels. Purchasing too many can be an unnecessary expense whilst too few can make your purchase unprofitable. A house of that size would likely have an annual electricity usage of 2,900 kilowatt hours (kWh) every year. 1kWh is able to provide electricity to an appliance for up to one hour.





KOLIKO KOŠTA POSTAVLJANJE SOLARNIH PANELE U VELIKOJ BRITANIJU?

Solarni paneli nisu jeftini. Marta 2022. godine, iz Enerdži Trasta procenili su da bi za ugradnju solarnih panela za gorepomenuto domaćinstvo u Britaniji bilo potrebno 6,500 funti, odnosno 7,827 dolara. Prema Mani sejving ekspertu, ako ste kod kuće tokom dana, trebaće vam manje vremena da povratite uloženi novac. Troškove ugradnje povratite za oko 13 godina u proseku, ako živite na periferiji. Poređenja radi, ako ste kod kuće samo tokom noći, biće vam potrebno 24 godine da povratite uloženo. Mnogi ljudi bi želeli da ugrade solarne panele, ali je ogromno inicijalno ulaganje nešto što većinu odbija od implementacije te ideje.

POSTOJE LI SUBVENCije ZA UGRADNJU SOLARNIH SISTEMA?

Do 1. aprila 2019. godine, nacrt Fid-In tarife (FIT) ponuđen je u pokušaju da ohrabri ljude da počnu sa korišćenjem obnovljive energije za napajanje svojih domova. Danas, britanska vlada ne veruje da je potrebno toliko subvencionisati pojedince jer su same cene sistema solarnih panela pale.

Od prekida Fid-In Tarifa, nova Smart Eksport garancija (SEG) ponuđena je kao alternativa od strane vlade. Novi nacrt dozvoljava domaćinstvima da naplate svu električnu energiju dobijenu iz obnovljivih izvora koju proizvedu, a ne iskoriste.

Ovo znači da ako kod kuće proizvedete višak struje iz obnovljivih resursa, poput sunca ili vetra, moći ćete taj isti višak da prodate.

KOLIKO SOLARNIH PANELE MI JE POTREBNO?

Za dvojni kuću sa tri spavaće sobe i porodicom od četiri člana, potrebno je oko 10 solarnih panela. Kupovina previše panela može biti bespotrebno skupa investicija, dok će se kupovina premalo pokazati kao neisplativa. Takvo domaćinstvo godišnje potroši otprilike 2,900 kilovat časova (kWh) struje. 1 kWh može da proizvede električnu energiju za jedan kućni aparat za period od jednog sata.

GDE U EVROPI SOLARNI PANELE IMAJU VELIKU POPULARNOST?

Solarna energija već igra važnu ulogu u ukupnoj električnoj energiji u Evropi godine 2017. Evropska unija prikupila je 3,6 odsto svoje energije fotonaponskom metodom, a do 2040. godine se prognozira da će solarna energija potkrepiti 20 odsto od ukupne potražnje za električnom energijom u tom bloku.

Kako bi proizvodnja solarne energije postala cenjeniji i razvijeniji izvor čiste energije širom EU i Velike Britanije, troškovi njene proizvodnje moraju da se smanje, a njena efikasnost da se poboljša. Uprkos tome, Švedska, Finska, Letonija, Austrija i Danska trenutno proizvode više od 30 odsto svoje električne energije iz obnovljivih izvora.

U Francuskoj, država je odobrila mogućnost da koristite deo struje koju proizvedete za sebe, a da deo možete da prodate nacionalnoj električnoj mreži – ovaj zakon nosi ime „vente en surplus”, odnosno „prodaja viška”.



HOW MUCH WILL IT COST TO INSTALL SOLAR PANELS ON A UK HOME?

Solar panels aren't cheap. In March 2022, the Energy Trust reported that installation costs approximately £6,500 (€7,827) for a three-bedroom, semi-detached property housing four people.

According to the Money Saving Expert, if you're home during the day, it'll take you less time to make your money back. You'll retrieve the installation costs in about 13 years on average, if you live in the middle of the country.

Comparatively, if you're home in the evenings only, it could take you 24 years. Many people would like to install solar panels, but such a high upfront cost is off-putting.

IS THERE FINANCIAL AID FOR SOLAR POWER INSTALLATION IN THE UK?

Financial aid from the UK Government isn't available. Until 1 April 2019, the Feed-In Tariff (FIT) scheme was offered in an attempt to encourage people to use renewable energy to power their

homes. But now the Government doesn't believe individuals need to be subsidised as much, because the price of solar panel systems has reduced.

Since the discontinuation of the Feed-In Tariff, the new Smart Export Guarantee (SEG) has been offered as an alternative by the Government. The new scheme allows households to get paid for any extra renewable energy they generate.

That means if you generate energy at home from natural resources, such as the wind or sun, you're able to sell any you don't use.

WHERE ARE SOLAR PANELS POPULAR IN EUROPE?

Solar power already plays an important role in the European energy mix. In 2017, the EU generated 3.6 per cent of its energy from photovoltaics and by 2040, solar energy has the potential to meet 20 per cent of the bloc's electricity demand.

But for solar power to become more of an appreciated and developed source of clean energy across the EU, and the UK, costs must be lowered and their efficiency improved. Despite this, Sweden, Finland, Latvia, Austria and Denmark currently produce more than 30 per





DA LI JE U BRITANIJI DOVOLJNO SUNČANO DA BI SE SOLARNI PANELI KORISTILI?

Bez obzira na reputaciju Britanije da ima sivo i oblačno vreme, u ovoj zemlji sakupi se jednaka količina solarne energije kao i u nekim delovima Francuske i Španije.

Zemlje koje koriste solarnu energiju u velikim razmerama poput Švedske, Finske i Letoniji dokazuju da nedostatak toplote nije problem, jer je ćelijama za rad potrebna svetlost, a ne toplota.

Kao i većina električnih aparata, solarne fotonaponske ćelije iznenađujuće bolje funkcionišu u hladnijim uslovima, stoga se ovi sistemi mogu koristiti bilo gde na svetu.

DA LI JE SADA DOBAR TRENUTAK ZA INVESTICIJU U SOLARNE PANELE?

Solarni paneli predstavljaju ozbiljnu investiciju, ali nakon inicijalnog troška, veoma je verovatno da će vam uštedeti novac. Ako ispunjavate uslove za Smart eksport garanciju (SEG), takođe postoji šansa da i zaradite.

Budući da kriza sa povećanjem troškova života ne jenjava, struja koju biste generisali solarnim panelima mogla bi da smanji troškove vašeg računa za struju, a pored toga, smanjili biste emisiju ugljen-dioksida u isto vreme.



Struja koju biste generisali solarnim panelima mogla bi da smanji troškove vašeg računa za struju



cent of their total electricity from renewable sources.

In France, a state grant is available if you plan to use part of the produced electricity for yourself, and sell part of it back to the national grid – known as *vente en surplus*.

IS THE UK SUNNY ENOUGH TO USE SOLAR PANELS?

Despite its reputation for having grey and cloudy weather, the UK gets the same amount of solar energy as certain areas in France and Spain.

And as countries with high solar power use, such as Sweden, Finland and Latvia prove, lack of heat isn't a problem because the cells work with the sun's light.

Like many electrical appliances, solar photovoltaic cells surprisingly perform best in cooler conditions, so solar power works virtually anywhere in the world.

IS NOW A GOOD TIME TO INVEST IN SOLAR PANELS?

Solar panels are a significant investment, but after the initial cost, they're more likely to save you money. If you're eligible for the Smart Export Guarantee (SEG), there's also a chance you could make some money back too.

With the cost of living crisis rising further, the electricity your panels generate could reduce the cost of your energy bills - and you'll be reducing your carbon footprint at the same time.



The electricity your panels generate could reduce the cost of your energy bills



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Plutajuće solarne farme

Floating solar farms



Proizvodnja električne energije zahteva velike površine zemlje i često proizvodi ogromne količine emisija gasova staklene bašte, ali šta ako ne mora? Plutajuće solarne farme su jednostavan koncept, koji bi mogao da bude rešenje ovih problema – i u isto vreme spreči gubitak vode kao posledicu isparenja.

Fotonaponske ćelije povezane su na splavove na vodi, umesto da zauzimaju zemlju pogodnu za poljoprivredu ili izgradnju objekata. Na neki način, ovi splavovi imaju svojevrsnu ulogu poklopca koji smanjuje isparenje vode gotovo do nule – ogromna pogodnost za oblasti, koje su česta meta velikih suša. I, budući da voda hladi solarne panele, oni mogu proizvesti više energije nego što bi proizveli na zemlji, gde gube na efikasnosti kad se zagreju.

Po uzoru na njihovo cvetanje širom Azije, brojna postrojenja ovog tipa pojavljuju se i u Americi.

PLUTAJUĆE SOLARNE FARME POSTAJU SVE POPULARNIJE U SAD

Kris Bartl je direktor prodaje i marketinga kompanije za proizvodnju plutajućih solarnih farmi Kil end Ter, koja je već izgradila 270 projekata u 30 zemalja.

- U Aziji, naročito ostrvske nacije poput Japana i Tajvana, oduševljeni su plutajućim solarnim farmama jer u tim zemljama prosto nema mnogo zemlje pogodne za izgradnju sličnih postrojenja velikih razmera na površini.



Producing electricity uses up huge amounts of land and often generates vast quantities of climate-heating emissions, but what if it didn't need to?

Floating solar panels are a simple concept but they could provide the answer to these problems - and prevent water loss from evaporation at the same time.

Photovoltaic cells are attached to rafts on bodies of water instead of taking up land that could be used for agriculture or buildings. They act as a sort of lid too, reducing evaporation to almost zero - a bonus in areas frequently hit by drought.

And, because the water keeps the solar panels cool, they can produce more energy than they would on land where they become less efficient as they heat up.

Having already boomed in popularity across Asia, now the number of installations like this is growing in the US.

FLOATING SOLAR IS SEEING A BOOM IN THE US

Chris Bartle is director of sales and marketing for floating solar company Ciel & Terre, which has already built 270 projects in 30 countries.

- Asia, especially island nations like Japan and Taiwan, were very keen on floating solar because they just didn't have a lot of land for large scale ground mount solar. So that's been our fastest-growing market and continues to be our fastest-growing market - he says.



Jednu od najvećih plutajućih solarnih farmi u Americi sagradila je upravo kompanija Kil & Ter u Hildzburgu u Kaliforniji

One of the biggest floating solar farms in the United States was built by Ciel & Terre in Healdsburg, California.



Na tom tržištu, u tim zemljama, ostvarili smo izuzetno brz rast - rekao je on.

Dodao je i to da ograničenje mesta na kopnu navodi i druge zemlje na razmišljanje o ovoj tehnologiji.

- Ovde u SAD, gde imamo više zemlje, tržište vidimo na mestima visoke gustine naseljenosti, poput ostrva u Kaliforniji, na severoistoku i Floridi - to su idealna tržišta ovde u Americi, gde nema dovoljno zemlje, ili je zemlja preskupa - objasnio je Bartl.

Jednu od najvećih plutajućih solarnih farmi u Americi sagradila je upravo kompanije Kil end Ter u Hildzburgu u Kaliforniji. Ona generiše 4,8 MW struje - dovoljno za oko 3,400 domaćinstava.

Druga farma instalirana je pre četiri godine iznad postrojenja za prečišćavanje otpadne vode blizu grada Vindzor.

- Gledate u jezero za čišćenje otpadne vode - rekao je Bartl dok je stajao ispred postrojenja.

- A iza mene vidite solarni sistem od 1,8 MW, koji je izgradila firma Kil end Ter pre 3-4 godine. Jedan od prvih takvih sistema u Kaliforniji i takođe jedan od prvih koji generiše više od 1 MW električne energije.

Ovo rešenje ipak nije savršeno. Tehnologija koju koristimo ne može da funkcioniše na vodi koja brzo teče, kao ni na otvorenom okeanu ili ni u priobalju na kom je voda uzburkana.

Duboka voda takođe može da poveća troškove izgradnje, koji su već skuplji nego da se elektrana istog kapaciteta izgradi na zemlji. Ali, dok ova postrojenja isprva koštaju 10-15 odsto više, Bartl tvrdi da će vlasnici na duge staze uštedeti novac.

Inženjeri takođe rade na rešavanju i drugih prepreka. Ako je prevelika površina vode prekrivena, nivoi rastvorenog kiseonika mogu da se promene i temperatura vode može opasti, što bi bio problem za vodeni biodiverzitet. U toku je istraživanje o negativnom uticaju elektromagnetnih polja, koja proizvode kablovi, na vodeni ekosistem, ali još uvek ne postoje dokazi da je ovo slučaj.

U martu, studija objavljena u časopisu Održanje prirode (Nature Sustainability) otkriva da bi hiljade gradova - više od 6,000 gradova u 124 zemlje - moglo da generiše energiju iz plutajućih solarnih farmi. Kada bi prešli na ovaj tip proizvodnje električne energije, izračunato je da bi godišnje uštedeli otprilike toliko vode da bi mogli njom da napune 40 miliona olimpijskih bazena godišnje.



He adds that limited space on land is now driving other countries to consider this technology too.

- Here in the US where we have more land, what we're seeing is where we have population density islands in California, in the Northeast and Florida, those are the hot markets here in the US where again they don't have land or land is very expensive - Bartle explains.

One of the biggest floating solar farms in the US was built by Ciel & Terre in Healdsburg, California. It generates 4.8 MW of power - enough for roughly 3,400 homes.

Another farm, nearby in the town of Windsor, was installed four years ago on top of a wastewater treatment plant.

- You're looking at a wastewater treatment pond - Bartle says as he stands in front of the facility.

- And behind me, you'll see a 1.8 MW floating solar system that Ciel & Terre built about three or four years ago. One of the first ones here in California, one of the first over a megawatt here in California.

Floating solar isn't a perfect solution, however. The technology can't operate on

fast-moving water, the open ocean or on shorelines with big waves.

Deep water can increase installation costs too, and it is already more expensive than on land installation. But, while floating solar costs around 10 to 15 per cent more initially, Bartle says that owners will save money in the long run.

Engineers are also working on other challenges. If too much of the surface of a body of water is covered, dissolved oxygen levels can change and water temperatures drop, causing problems for aquatic life.

There's ongoing research into whether electromagnetic fields generated by cables negatively impact aquatic ecosystems, but there's no evidence of this yet.

In March, a study published in the journal Nature Sustainability found that thousands of cities - more than 6,000 across 124 countries, could generate all of their power from floating solar. If they made the switch, it calculated that they'd also save roughly enough water each year to fill 40 million Olympic-sized swimming pools.



Veselin Jevrosimović

VLASNIK I PREDSEDNIK UPRAVNOG ODBORA COMTRADE GRUPE

Briga o životnoj sredini je naš imperativ

Visoki početni troškovi, nedostatak infrastrukture i pitanja vezana za skladištenje energije često usporavaju usvajanje zelenih tehnologija

Briga o svetu u kojem živimo je obaveza svih nas. Srbija prepoznaje i obnovljive izvore i energetska efikasnost, koji su ključni stubovi energetskog razvoja. U obnovljive izvore spadaju solar, vetar, hidropotencijal.

U tom smislu, dilema kako istovremeno koristiti najnaprednije tehnologije ali dodatno ne narušiti prirodnu ravnotežu u fokusu je kompanije Comtrade, kaže nam u intervjuu Veselin Jevrosimović, predsednik Comtrade Grupe.

Između ostalog, on se posebno osvrnuo na činjenicu koje mnoge kompanije ili zanemaruju ili je nisu svesne - a to je da upotreba naprednih rešenja dovodi do povećane potrošnje struje. Jevrosimović nam otkriva da upravo zbog toga, stručnjaci zaposleni u Comtrade sistemu rade na razvoju modela koji smanjuju potrošnju.

Jevrosimović u tome i vidi izazove daljeg razvoja zelenih tehnologija.

„Visoki početni troškovi, nedostatak infrastrukture i pitanja vezana za skladištenje energije često usporavaju usvajanje ovih tehnologija. Takođe, potrebne su bolje politike i regulatorni okviri kako bi se podstakao prelazak na održive prakse“, ističe on.

Podseća i da su ulaganja u zelene tehnologije u porastu. Naime, u 2022. godini, globalna ulaganja u zelene tehnologije su iznosila 750 milijardi dolara, što je rast od 20% u odnosu na 2021. godinu.

Jevrosimović nam dalje daje i potencijalna

rešenja kako brže da prolazimo kroz zelenu tranziciju, i kao društvo i kao pojedinci.

„Inovativnost će pomoći u rešavanju problema sa kojima se suočava moderno društvo“, zaključuje.

GN U ovo vreme kada je održivost imperativ u svakoj industriji, kako vaša kompanija doprinosi održivom poslovanju i razvoju zelene energije?

- Briga o životnoj sredini je i naš imperativ. Principe održivosti postavljamo kao strateški cilj koji konstanto unapređujemo shodno globalnim i lokalnim potrebama.

Prošle godine, naša kompanija je investirala u solarne panele i pokušavamo u narednoj godini da 70% sopstvene potrošnje pokrijemo iz energije Sunca. Ovaj vid energije može da koristi svaka kompanija, u zavisnosti od podneblja, a zbog rasta cena struje, period isplativosti ovakvih investicija je jako kratak.

Vodimo se veoma važnim podatkom da će EU uskoro da uvede takse na sve proizvode koji su proizvedeni van EU a koji u procesu proizvodnje nisu koristili energiju iz obnovljivih izvora. U 2022. godini je u svetu instalirano 231GW snage u solarima, a u ovoj godini se očekuje da će biti instalirano oko 300GW snage iz solara.

Kako bismo dali svoj doprinos očuvanju životne sredine, pratimo i primenjujemo najbolje prakse u ovoj oblasti.



Veselin Jevrosimović

VLASNIK I PREDSEDNIK UPRAVNOG ODBORA COMTRADE GRUPE



Drago mi je što mogu da se pohvalim da je Comtrade dobitnik Nacionalne nagrade za društveno odgovorno poslovanje „Đorđe Vajfert“, a koja se dodeljuje na svake dve godine upravo kompanijama koje se u poslovanju ističu po principima društvene odgovornosti i koje na etičan, transparentan i održiv način vode brigu o zaposlenima i njihovim porodicama, ekologiji, zajednici u kojoj posluju.

Koliko nam je važna briga o zelenoj energiji govori i to što uvek polazimo od nas samih - plastične čaše, pribor i slamčice u potpunosti smo izbacili iz upotrebe u svim Comtrade kancelarijama u Srbiji.

Svi naši zaposleni dobili su personalizovane staklene flašice za vodu i druge napitke.

Svake godine učestvujemo u ekološkim akcijama i akcijama sadnja breza u Beogradu i Kragujevcu. Ujedno, to je i moj mali apel za druge kompanije, vrlo brzo ćete imati sjajan osećaj da činite nešto za planetu i generacije koje dolaze.

Napomenuo bih da poštovanje principa održivosti danas postaje uslov da uspešno razgovarate, ali i pregovarate sa bankama, velikim stranim partnerima i značajnim institucijama, o čemu takođe brinemo.

GN *Kako vaša kompanija koristi napredne tehnologije poput veštačke inteligencije i analitike podataka kako bi poboljšala efikasnost proizvodnje zelene energije? Možete li nam navesti neka konkretna rešenja?*

- Upotreba najnaprednijih tehnologija, kao što su AI i BlockChain dovodi do povećane potrošnje električne energije, i to u vrlo značajnoj meri. Istraživanja su pokazala da treniranje samo jednog AI modela može konzumirati više energije nego 100 domaćinstava u US za godinu dana. Takođe održavanje sistema ChatGTP, najbrže rastuće platforme u istoriji, na dnevnom nivou košta čak 700 hiljada dolara, što kreatorima OpenAI nameće pitanje isplativosti odnosno mogućnosti bankrota krajem 2024.

Naši stručnjaci rade na razvoju algoritama i modela koji treba da smanje ukupnu potrošnju električne energije u Data Centrima.

Verujem da će kompanije koje imaju periodične obrade velike količine podataka (banke mesečne izvode, telekom operateri mesečne račune, Infostan, elektroprivreda itd) uskoro ubaciti u svoje zelene agende (ili ESG) smanjenje potrošnje energije u data centrima.

U svakom slučaju, ako su društveno odgovorne, treba to da urade.

Veselin Jevrosimović

OWNER AND CHAIRMAN OF THE BOARD OF COMTRADE GROUP



Caring for the Environment is Imperative for Us

High initial costs, lack of infrastructure and issues related to energy storage often slow down the adoption of green technologies

Caring for the world we live in is the responsibility of all of us. Serbia recognizes renewable sources and energy efficiency, which are key pillars of energy development. Renewable sources include solar, wind, and hydro potential.

In this sense, the dilemma of how to simultaneously use the most advanced technologies but not to additionally disturb the natural balance is the focus of Comtrade company, says Veselin Jevrosimović, the president of the Comtrade Group, in an interview.

He specifically refers to a fact that many companies either ignore or are not aware that the use of advanced solutions leads to increased electricity consumption. Jevrosimović reveals that, because of this, experts employed in the Comtrade system work on the development of models that reduce consumption.

In this, Jevrosimović sees the challenges of the further development of green technologies.

„High initial costs, lack of infrastructure and issues related to energy storage often slow down the adoption of these technologies. Better policies and regulatory frameworks are also needed to encourage the transition to sustainable practices,” he points out.

He also reminds that investments in green technologies are on the rise. Namely, in 2022, global investments in green technologies amounted to 750 billion dollars, which is a growth of 20% compared to 2021.

Jevrosimović also gives us potential solutions to go through the green transition faster, both as a society and as individuals.

„Innovativeness will help to solve the problems that modern society faces,” he concludes.

GN *At a time when sustainability is imperative in every industry, how does your company contribute to sustainable business and green energy development?*

- Caring for the environment is our imperative. We set the principles of sustainability as a strategic goal that we constantly improve according to global and local needs.

Last year, our company invested in solar panels, and we are going to try to cover 70% of our own consumption from the energy of the sun in the following year.

This type of energy can be used by any company, depending on the climate, and due to the rise in electricity prices, the payback period for such investments is very short.

We are guided by very important information that the EU will soon introduce taxes on all products that have been produced outside the EU and that have not used energy from renewable sources in the production process. In 2022, 231GW of solar power was installed in the world, and in this year, it is expected that around 300GW of solar power will be installed.

Veselin Jevrosimović

VLASNIK I PREDSEDNIK UPRAVNOG ODBORA COMTRADE GRUPE

Moje iskustvo govori da je veoma, veoma važno da kompanija ima stručnjake koji razumeju tehnologije i koji mogu da primene AI u kontekstu proizvodnje zelene energije.

Kada je reč o konkretno alatima, izdvojio bih nekoliko principa kojih se mi pridržavamo:

1. Predviđanje proizvodnje energije iz obnovljivih izvora: Detaljno pratimo podatke o vremenskim uslovima, sezonskim varijacijama i drugim faktorima kako bismo precizno predvideli proizvodnju energije iz solarnih panela. Ovo nam pomaže da bolje planiramo i upravljamo distribucijom energije.

2. Optimizacija i predviđanje održavanja: Pratimo performanse solarnih panela i na osnovu ovih podataka, AI nam predviđa kada će biti potrebno održavanje ili zamena komponenata, tako smanjujemo između ostalog i troškove.

3. Optimizacija rada električne mreže: Analiziramo podatke o potrošnji energije i kapacitetima mreže kako bismo optimizovali raspodelu energije. Nama je ovo posebno važno kada se varijabilni izvori energije, poput solara, integrišu u mrežu.

4. Analiza potrošnje energije: AI i analitika podataka pomažu nam ovde za praćenje i analizu potrošnje energije u stvarnom vremenu. Na osnovu ovih podataka, vidimo gde možemo da postignemo veću efikasnost i smanjimo potrošnju energije.

5. Optimizacija skladištenja energije: Koristimo AI za optimalno upravljanje skladištenjem energije, kao što su baterije. To uglavnom radimo za druge kompanije. Algoritmi mogu dinamički da prilagode punjenje i pražnjenje baterija na osnovu trenutnih uslova i potreba mreže.

6. Analiza ekološkog uticaja: Stalno analiziramo uticaj svojih energetskih projekata na životnu sredinu. To uglavnom uključuje procenu emisija gasova staklene bašte, potrošnje vode i drugih faktora.

Međutim, moje iskustvo govori da je veoma, veoma važno da kompanija ima stručnjake koji razumeju tehnologije i koji mogu da primene AI u kontekstu proizvodnje zelene energije. Takođe, transparentnost, sigurnost i usklađenost sa zakonima i propisima su ključni aspekti prilikom implementacije ovih tehnologija, a sve to radimo u okviru Comtrade sistema.

GN Poznato je da se u proizvodnji koriste sirovine. Koliko je teško napraviti balans,

naročito što je svima poznato koliki uticaj promene imaju na šume, prirodne resurse?

- Tačno, ali isto tako, eksperti tvrde da su i geotermalni izvori sami za sebe dovoljni da čovečanstvo snabdeju ekološki čistom energijom. Kao i snaga vetra. Problem je što na ova dva izvora, zajedno sa suncem, otpada tek nekoliko procenata ukupne svetske proizvodnje.

To je nešto što moramo da promenimo u veoma kratkom roku ako želimo da izbegnemo ekološku katastrofu.

Geotermalna energija je toplota koju isijava zemljino jezgro, prisutna je u svakoj tački planete i praktično neograničena.

Nažalost, tek u retkim tačkama izbija na površinu i dostupna je bez potrebe za bušenjem zemljine kore

Istraživao sam i pisao pre nekoliko meseci o ideji da se voda kroz bušotine spušta na takve stene, da bi se zatim u vidu vodene pare pod pritiskom vratila nazad na turbine postojećih termoelektrana. Na taj način mogli bismo da iskoristimo „prljava“ postrojenja i da ih pretvorimo u ekološki prihvatljive elektrane. Ostaje problem bušenja do dubina od nekoliko kilometara.

Paralelno sa tim moramo da širimo svest o potrebi za čistim i obnovljivim izvorima energije, pokrećemo ekološke teme i trudimo se da čovečanstvo vratimo suživotu sa prirodom.

GN Današnji potrošači biraju proizvode i ambalažu koja je po principima održivog razvoja. Idu i dalje, vezuju se za takve brendove - kako to tumačite?

- Primećujem da kupci sve više gledaju na tehnologiju kao način za promovisanje zdravijeg života, uočavaju poboljšane performanse i spremni su da investiraju u kupovinu aparata u pogledu dizajna, kvaliteta ali i jednostavnosti u korišćenju.

Imamo iskustva u toj oblasti. Činjenica je da živimo u vremenu kada se dosta govori o štednji i energetici, a brigu o tome ogledamo i u kompaniji Tesla, čiji su proizvodi energetski efikasni.

Samo na dizajnu Tesla proizvoda radi više od 400 ljudi i sve je njihov know how.

Veselin Jevrosimović

OWNER AND CHAIRMAN OF THE BOARD OF COMTRADE GROUP



In order to contribute to the preservation of the environment, we follow and apply the best practices in this area.

I am glad I can boast that Comtrade is the winner of the „Đorđe Vajfert” National Award for Socially Responsible Business, which is awarded every two years to companies that stand out in their business based on the principles of social responsibility and ethical, transparent and sustainably care of employees and their families, the environment, and the community in which they operate.

How important the care for green energy to us is also shown by the fact that we always start from ourselves - we have completely removed plastic cups, utensils and straws from the use in all Comtrade offices in Serbia.

All our employees have received personalized glass bottles for water and other beverages.

Every year we take part in environmental and birch planting campaigns in Belgrade and Kragujevac. At the same time, this is my small appeal for other companies, very soon you will have a great feeling that you are doing something for the planet and future generations.

I would like to mention that respecting the principle of sustainability today becomes a requirement to talk and negotiate successfully with banks, large foreign partners and important institutions, which we also take care of.

GN How does your company use advanced technologies like artificial intelligence and data analytics in order to improve the efficiency of green energy production? Can you give us some concrete solutions?

- The use of the most advanced technologies, such as AI and BlockChain, leads to increased electricity consumption to a very significant extent. Research has shown that training just one AI model can consume more energy than 100 US households in a year. Also, maintaining the ChatGTP system, the fastest growing platform in history, on a daily basis costs as much as 700 thousand dollars, which poses the question of profitability for the creators of OpenAI, i.e. the possibility of bankruptcy at the end of 2024.

Our experts are working on the development of algorithms and models that should reduce the total consumption of electricity in data centers.

I believe that companies that have periodic processing of large amounts of data (banks - monthly statements, telecom operators - monthly bills, Infostan, electricity industry, etc.) will soon include the reduction of energy consumption in data centers in their green agendas (or ESG).

In any case, if they are socially responsible, they should do it.

Veselin Jevrosimović

VLASNIK I PREDSEDNIK UPRAVNOG ODBORA COMTRADE GRUPE



GN *Kada sve to uzmemo u obzir, kako bi, prema vašem mišljenju, trebalo da izgleda proizvod budućnosti?*

- Verujem da će fokus proizvođača biti na razvoju pametnih proizvoda i uređaja koji će potrošači u toplini svog doma, ili udaljeni miljama, moći da uvežu i koriste brzo, efikasno i lako. Dakle, akcenat će biti na IOT (Internet of Things).

Smatram svakako da uređaji koji budu predstavljeni u narednom periodu moraju biti smart, digitalizovani, umreženi, zeleni, energetske efikasni i optimalni.

GN *Koliko je važna saradnja privatnog i državnog sektora, odnosno svih činilaca društva?*

- Važno je udruživanje, pre svega kako bi ponudili neke od odgovora i rešenja, ali i kako bi se ukazalo na potrebu da je za održivu budućnost neophodno učešće svih, a za velike rezultate zajedničko delovanje.

Primitio sam da konačno teme održivosti pune konferencijske sale, i da se poslednjih deset godina promenio i imidž našeg okruženja zbog toga.

Verujem da je jedan od neophodnih uslova za održivi rast i svestrani razvoj zemlje da u njoj postoji razvijena naučno-tehnološka zajednica,

sposobna da generiše novo znanje i da ga koristi.

GN *Na kraju, na koje sve načine tehnologija utiče na zelenu energiju?*

- Tehnološka rešenja i ideje postoje, samo je potrebno da dovoljno ulažemo u njihov razvoj. O tome pišem u svojim kolumnama često. Upućujem na važnost solarnih panela i efikasnije baterije, ali i potencijal vetra.

Tvrđi se da ukupan potencijal vetra prevazilazi trenutne potrebe za električnom energijom cele planete. Postoje, naravno, brojni izazovi. Snaga vetra varira od regiona do regiona, ali i tokom godine, pa je teško predvideti i planirati proizvodnju.

Tu na scenu stupaju softverska rešenja koja analizom istorijskih podataka i kreiranjem preciznih modela mogu da optimizuju procese i pronađu načine za idealno iskorišćenje vetrova.

Slični programi pomažu i pri projektovanju turbina i definisanje idealnog oblika lopatica. Dalje, vetroparkovi mogu da predstavljaju problem za ekosisteme, migracije ptica i drugih životinja.

Zbog toga je ideja da se oni sve više grade na morima, daleko od obale. To je nešto što moramo da promenimo u veoma kratkom roku ako želimo da izbegnemo ekološku katastrofu.

Najpre vidim primenu tehnologije u tome.

Veselin Jevrosimović

OWNER AND CHAIRMAN OF THE BOARD OF COMTRADE GROUP



When it comes to specific tools, I would single out a few principles that we adhere to:

1. The forecast of energy production from renewable sources: We closely monitor data on weather conditions, seasonal variations and other factors in order to accurately predict energy production from solar panels. This helps us to plan and manage energy distribution in a better way.

2. The optimization and maintenance prediction: We monitor the performance of solar panels, and based on this data, AI predicts when maintenance or replacement of components will be necessary, thus reducing costs, among other things.

3. The optimization of the electrical grid operation: We analyze data on energy consumption and grid capacities in order to optimize the distribution of energy. This is especially important to us when variable energy sources, such as solar, are integrated into the grid.

4. Energy consumption analysis: AI and data analytics help us here for real-time monitoring and analysis of energy consumption. Based on this data, we see where we can achieve greater efficiency and reduce energy consumption.

5. The optimization of energy storage: We use AI to manage optimally energy storage, such as batteries. We mostly do that for other companies. Algorithms can dynamically adjust the charging and discharging of batteries based on current conditions and needs of the grid.

6. Environmental impact analysis: We constantly analyze the impact of our energy projects on the environment. This mainly involves estimating greenhouse gas emissions, water consumption and other factors.

However, from my experience, it is very important for a company to have experts who understand technologies and can apply AI in the context of green energy production. Also, transparency, security and compliance with laws and regulations are key aspects when implementing these technologies, and we do all of these within the Comtrade system.

GN *It is known that raw materials are used in production. How difficult is it to create a balance, especially when everyone knows how a big impact changes have on forests, natural resources, etc.?*

- True, but experts also claim that geothermal sources are enough by themselves to supply mankind with ecologically clean energy. It is the same with wind power. The problem is that these two sources, together with the sun, account for only a few percent of the world's total production.

This is something that we must change in a very short time if we want to avoid an environmental disaster.

Geothermal energy is the heat radiated by the earth's core, present on all points of the planet and practically unlimited.

Unfortunately, it only comes to the surface in rare places and is accessible without the need to drill into the earth's crust.

I researched and wrote a few months ago about the idea that water is brought down to such rocks through boreholes, and then returned to the turbines of existing thermal power plants in the form of steam under pressure. In this way, we could use „dirty“ plants and turn them into environmentally friendly power plants. The problem of drilling to depths of several kilometers remains.

At the same time, we must spread awareness of the need for clean and renewable energy sources, raise environmental issues and try to bring humanity back to coexistence with nature.

GN *Today's consumers choose products and packaging that follow the principles of sustainable development, they even go further and get attached to such brands - how do you interpret that?*

- I notice that customers increasingly look at technology as a way to promote healthier life, they perceive improved performance and are ready to invest in the purchase of devices in terms of design, quality and the ease of use.

We have experience in that area. The fact is that we live in a time when there is a lot of talk about savings and energy, and we care about this in Tesla company, whose products are energy efficient. More than 400 people alone work on the design of Tesla products, and everything is their know-how.

GN *Taking all that into account, in your opinion, what should the product of the future look like?*

- I believe that the focus of manufacturers will be on the development of smart products and devices that consumers will be able to

Veselin Jevrosimović

VLASNIK I PREDSEDNIK UPRAVNOG ODBORA COMTRADE GRUPE



Ja sam optimista po pitanju razvoja tehnologije i smatram kako će inovativnost pomoći u rešavanju problema sa kojima se suočava moderno društvo

GN Gde još vidite potencijalna rešenja za čistiju, zeleniju sredinu?

- Budući da trošimo sve veće količine električne i drugih vidova energije, a da fosilna goriva zagađuju okolinu i prete da izazovu ekološku katastrofu, ostaje nam kao što sam i istakao, da se okrenemo snazi vode, sunca, vetra i geotermalnih izvora.

Verujem da značajnija primena veštačke inteligencije i blokčejn mehanizama tek sledi, a nadam se jačem povezivanju virtuelnog i realnog sveta, ali i izgradnje naprednijeg interneta.

Kada sve sumiramo, jasno je da se približavamo tački nakon koje nema spasa, pa je izuzetno važno da zajednički nastavimo unapređenje zelenih tehnologija, primenu čistih i obnovljivih izvora energije, ali i širenje svesti o ekološkim problemima.

Najpre vidim šansu i rešenja u dodatnom unapređenju u oblasti korišćenja solarnih panela i vetrenjača, dostupnijoj opremi i boljem načinu za transport i čuvanje sakupljene energije.

Opet, napredni softverski sistemi, mašinsko učenje i veštačka inteligencija značajno će pomoći u svim vrstama automatizacije i monitoringa.

Ja sam optimista po pitanju razvoja tehnologije i smatram kako će inovativnost pomoći u rešavanju problema sa kojima se suočava moderno društvo, pre svega u domenu ekologije, održivog razvoja i energetske efikasnosti.

Primeru radi, Svetski ekonomski forum je uključio održivo računarstvo u jedan od deset najvažnijih trendova u oblasti tehnološkog razvoja. Time je jasno naznačeno da postoji potreba za uspostavljanjem ravnoteže između rasta broja data centara i njihovog uticaja na čovekovu okolinu.

Plašim se da je pred svima težak zadatak, ali i jedini pravi izlaz iz situacije u kojoj se nalazimo. Oni koji ne veruju u klimatske promene, neka izađu napolje i provedu nekoliko sati pod vrelin letnjim suncem.

Veselin Jevrosimović

OWNER AND CHAIRMAN OF THE BOARD OF COMTRADE GROUP

connect and use quickly, efficiently and easily in the warmth of their homes, or miles away. Therefore, the emphasis will be on IOT (Internet of Things).

I definitely think that the devices that will be presented in the coming period must be smart, digitized, networked, green, energy efficient and optimal.

GN How important is the cooperation between the private and state sectors, that is, all elements of society?

- It is important to team up, first of all in order to offer some of the answers and solutions, but also to point out that everyone's participation is necessary for a sustainable future, and a joint action is needed for great results.

I have noticed that the topics of sustainability finally fill the conference halls, and that the image of our environment has changed because of it in the last ten years.

I believe that one of the necessary conditions for sustainable growth and comprehensive development of the country is that it has a developed scientific and technological community, capable of generating new knowledge and using it.

GN Finally, in what ways does technology affect green energy?

- Technological solutions and ideas exist, we just need to invest enough in their development.

I often write about this in my columns. I refer to the importance of solar panels and more efficient batteries, but also the potential of wind.

It is claimed that the total potential of wind exceeds the current electricity needs of the entire planet. There are, of course, numerous challenges. Wind power varies from region to region, but also during the year, so it is difficult to predict and plan production.

This is where software solutions come into play, which, by analyzing historical data and creating precise models, can optimize processes and find ways to ideally use the wind.

Similar programs help in designing turbines and defining the ideal shape of the blades. Furthermore, wind farms can pose a problem for ecosystems, migrations of birds and other animals.

That is why the idea is that they should be increasingly built on the seas, far from the coast.

This is something that we must change

in a very short time if we want to avoid an environmental disaster.

First of all, I see the application of technology in it.

GN Where else do you see potential solutions for cleaner and greener environment?

- Since we consume increasing amounts of electricity and other forms of energy, and fossil fuels pollute the environment and threaten to cause an ecological disaster, it remains for us, as I have pointed out, to turn to the power of water, sun, wind and geothermal sources.

I believe that a more significant application of artificial intelligence and blockchain mechanisms is still to come, and I hope for a stronger connection of the virtual and real world, as well as the construction of more advanced Internet.

When we sum it all up, it is clear that we are approaching the point after which there is no escape, so it is extremely important to jointly continue the improvement of green technologies, the application of clean and renewable energy sources, but also the spread of awareness of environmental problems.

First of all, I see a chance and solutions in additional improvement in the area of using solar panels and windmills, more available equipment and a better way to transport and store the collected energy.

Again, advanced software systems, machine learning and artificial intelligence will significantly help in all types of automation and monitoring. I am optimistic about the development of technology and believe that innovation will help solve the problems faced by modern society, primarily in the field of ecology, sustainable development and energy efficiency.

For example, the World Economic Forum has included sustainable computing in one of the ten most important trends in the field of technological development. This clearly indicates that there is a need to establish a balance between the growth in the number of data centers and their impact on the environment.

I am afraid that a difficult task is ahead of everyone, but also the only real way out of the situation in which we find ourselves. Those who do not believe in climate change should go outside and spend a few hours under the hot summer sun.

SOLARNI LIDER Holandija

THE LEADER IN SOLAR ENERGY Netherlands



U ovoj maloj zemlji nema previše kopnenih površina. Ipak, kombinacija vlade usmerene ka budućnosti i inovativnih rešenja savladavaju ovu prepreku.

Na udaljenosti od oko 130 km od Amsterdama, u jednom selu, neobično brdo nadvilo se i sija iznad seoskih kućica, beživotnog drveća i blatne prerije.

Brdo visoko 25 metara sagrađeno je od konstantnog priliva kućnog i poslovnog otpada u periodu od 15 godina. Ono što je fascinantno je da ovo brdo smeća prekriva 23,000 solarnih panela.

Sredinom 2020. godine, Holandski developer TPSolar otvorio je postrojenje, koje može da proizvede i do 8,9 megavata (MW) struje u Armhodu, u istočnoj Holandiji. Bivša deponija sada proizvodi dovoljno električne energije da snabde 2,500 domaćinstava. Projekat je deo široko rasprostranjenog državnog projekta Holandije, koja ima više od 48 miliona instaliranih solarnih panela, koji se ogleda u traženju inovativnih mesta na kojima mogu da se sgrade generatori obnovljivih izvora energije. Danas, Holandija ima u proseku 2 solarna panela po glavi stanovnika i kapacitet od više od 1 kilovata (KW) po osobi, što je čini neprikosnovenom evropskom velesilom na ovom polju prema podacima industrijske asocijacije Solarna energija Evrope.

KAKO HOLANDIJA PRONALAZI MESTA ZA SOLARNE PANELE

Budući da je gotovo svuda u svetu „netašica“ zemlje na kojoj se mogu graditi generatori obnovljivih izvora energije, holandska praksa, u kojoj se solarni paneli ugrađuju na parkinzima, jezerima, pašnjacima, farmama jagoda, napuštenim crkvama, železničkim stanicama i aerodromima, mogla bi da inspiriše postavljanje ovakvih postrojenja globalno.

- Pošto imamo toliko malo mesta u Holandiji, važno je da se ista zemlja koristi za više stvari – rekao je Bernd Nijen Twilhaar, koordinator holandske razvojne firme Solarfilds, koja upravlja velikim solarnim farmama i koja je instalirala najmanje 450,000 panela u zemlji.

- Moramo biti inovativni i kreativni kako bismo proizveli električnu energiju u Holandiji koja mora da bude zelena - dodao je.

Developeri i analitičari za solarnu energiju kažu da je holandska ekspanzija podstaknuta ogromnim padom cena opreme, efikasnim subvencijama i ambicioznim ciljevima vlade da se smanji efekat staklene bašte.



This tiny country is short on land. But a forward-thinking government and innovative solutions are overcoming the lack of space.

In the Dutch countryside, about 130 km east of Amsterdam, an unusual-looking hill towers and glistens above farmhouses, leafless trees, and muddy grassland.

The hill - 25 metres tall - is built from 15 years' worth of household and business waste. What is remarkable is what covers it: 23,000 solar panels.

Dutch solar developer TPSolar opened the array, in Armhoede, in the east of the Netherlands, in mid-2020. The former landfill now generates enough electricity for about 2,500 households.

The project reflects a wider drive in the Netherlands - which now has more than 48 million solar panels installed - to find innovative places to put new renewable energy capacity.

The Netherlands today has an average of two solar panels per inhabitant - and installed capacity of more than 1 kilowatt (KW) per person - making it Europe's per-capita solar powerhouse, according to industry association Solar Power Europe.

HOW IS THE NETHERLANDS MAKING SPACE FOR SOLAR POWER?

With land for renewables short nearly everywhere in the world, the Dutch experience - including putting solar on car parks, commercial lakes, sheep grazing fields, strawberry farms, disused churches, train stations and airfields - could inspire better placing of renewables globally.

„Because we have so little space in the Netherlands, it is important to use the ground for multiple reasons,” said Bernd Nijen Twilhaar, a coordinator at Dutch solar developer Solarfilds, which manages large solar farms and has installed at least 450,000 panels in the country.

„We have to be innovative and creative so we can produce the electricity. The Netherlands needs to go green,” he added.

Solar developers and analysts say the Dutch expansion has been driven by a huge drop in equipment prices, an effective energy subsidy scheme, and ambitious government targets to reduce greenhouse gas emissions.

Cilj holandske vlade jeste da do 2030. godine 70 odsto proizvedene električne energije u zemlji bude iz obnovljivih izvora energije, a u tom cilju najviše će se osloniti na širenje solarne mreže i vetrogeneratora i na ovaj način smanji emisije gasova koje zemlja proizvodi. Trenutno, Holandija je u prvih šest država najvećih zagađivača vazduha u Evropi.

Kao i mnoge druge države članice EU, i Holandija prekida energetska zavisnost od Rusije zbog rata u Ukrajini.

Holandske solarne i vetrovne farme pomogle su da se popuni ta rupa u energetskom kapacitetu zemlje, koja je nastala kada su elektrane na fosilna goriva postale neprofitabilne, usled rekordno visokih cena goriva.

Ipak, holandsko zemljište pogodno za zemljoradnju je među najskupljima u Evropskoj uniji, što čini pronalaženje adekvatnog mesta za postavljanje solarne farme užasno skupo.

Ova nepogodnost, u kombinaciji sa visokom gustinom naseljenosti u zemlji, navele su firme, koje se bave razvojem i proizvodnjom solarnih panela, da traže inovativna rešenja po pitanju pronalaženja prostora.

PREDVODI EVROPU

Poslednjih godina, Holandija u svoj zakonik uvodi i klimatske ciljeve, poput ovog vezanog za obnovljive izvore energije, obećavši da će ograničiti bušotine nafte i gasa na kopnu i podstaći širenje zelenih izvora energije generalno.

Godine 2022. budžet zemlje za obnovljive izvore energije iznosio je 13 milijardi evra.

Prošle godine, Holandija je generisala 14 odsto svoje električne energije iz solarnih farmi, što je povećanje od 1 odsto u odnosu na 2015. godinu, po prvi put prestigavši proizvodnju električne energije na ugalj.

Procenat električne energije dobijen u Holandiji bio je najviši u celoj Evropskoj uniji, rekli su iz Ember Klajmat konsultantske grupe.

Poređenja radi holandski sistem „mrežnog merenja“, pokrenut 2004. godine, koji je omogućio domaćinstvima sa solarnim panelima da nadoknade svoju proizvodnju zelene električne energije u poređenju sa njihovom potrošnjom, sada ima više od dva miliona domaćinstava, koja proizvode električnu

energiju iz obnovljivih izvora, prema podacima ministarstva energetike.

Holandska vlada procenjuje sve promene koje bi mogle da podstaknu izgradnju još solarnih farmi koje su bolje integrisane u različite predele, pisalo je u mejlu ministarstva energetike.

Džori Jakobs, koji je fokusiran na izgradnji projekata zelene energije u kompaniji za upravljanje otpadom Afvalzorg, opisuje holandski pristup obnovljivim izvorima energije kao „ekstremno Mekdžajverovski“, referirajući na američki TV šou iz osamdesetih u kome snalažljivi tajni agent sklapa genijalne naprave od svakodnevnih predmeta.

- Uzimamo različite energetske tehnologije, stavljamo ih na gomilu i pokušavamo da napravimo kombinaciju koja će stvarno da radi - rekao je Jakobs, čija se kompanija udružila sa lokalnim komunalnim preduzećem u cilju pretvaranja zemljišta koje nije u upotrebi u solarne farme.

- Ovo nije promena koja će se desiti preko noći, ali kada se svi ukrcaju na taj voz, narod u Holandiji probleme rešava relativno brzo - rekao je.

SOLARNE FARME

Gotovo 20 odsto ove zemlje prekriva voda, a firme za razvoj solarnih panela, uključujući i GroenLevin, iskoristile su ovo tako što su solarne farme izgradile na površinama veštačkih jezera.

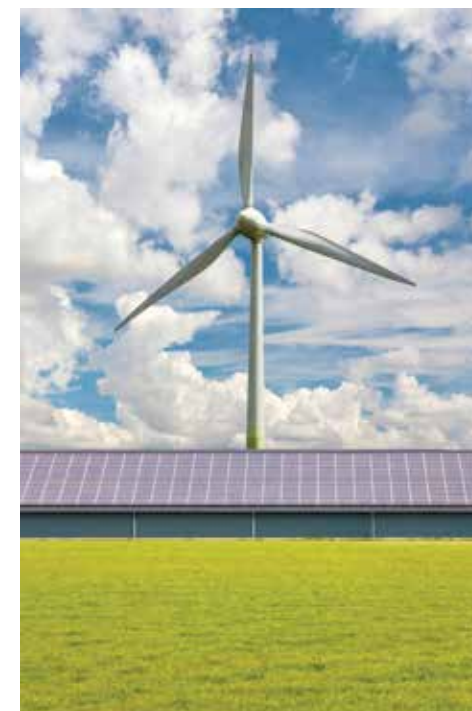
GroenLevin je instalirao više od 500,000 solarnih panela na holandskim vodama, što je Holandiju po ovom pitanju postavilo tik iza Kine, na visokom drugom mestu u svetu.

- Ova ideja o plutajućim solarnim farmama stigla je u Holandiju ranije nego u ostale zemlje - rekao je Benedikt Ortman, globalni direktor solarnih projekata u nemačkoj kompaniji za obnovljive izvore energije BayWa r.e., koja je otkupila GroenLevin 2018. godine.

Inspirisan holandskim primerom, iz ove firme rekli su da se sve više plutajućih solarnih farmi pojavljuje širom Evrope, naročito u Belgiji, Austriji i Francuskoj.

Holandske kompanije takođe su u potrazi za rešenjima kako da solarne farme funkcionišu zajedno sa poljoprivredom te zemlje.

- Umesto borbe za prevlast nad zemljom, pronašli smo rešenja kako zajedno možemo da je koristimo -



The Dutch government aims to make 70 per cent of its electricity renewable by 2030, mainly through expanding solar and wind power capacity as it seeks to cut its emissions. It currently stands as one of Europe's top six polluting countries.

Like many EU nations, the Netherlands is cutting energy reliance on Russia following its invasion of Ukraine.

Dutch solar and wind farms have helped fill the electricity supply gap left by gas-fired power stations that have become unprofitable amidst record high gas prices.

But the Netherlands' farmland is among the most expensive in the EU, making it costly to find space for solar.

That reality, combined with the country's high population density, means solar firms have had to be inventive when it comes to finding space.

THE NETHERLANDS LEADS EUROPE IN SOLAR POWER

In recent years, the Netherlands has enshrined climate targets like its renewable energy goal into law, vowed to limit onshore gas and oil drilling, and boosted green spending generally.

The nation's 2022 renewable energy budget was 13 billion euros.

Last year, the Netherlands generated 14 per cent of its electricity from solar farms - up from 1 per cent in 2015 - overtaking coal-fired power generation for the first time.

The proportion of electricity from solar was the highest generated in the EU, said Ember Climate, a consultancy group.

In parallel, the country's „net metering“ system - set up in 2004 and allowing households with solar panels to offset their green electricity production against their consumption - now has more than two million homes generating renewable power, according to the energy

ministry.

The Dutch government is assessing what could be changed to encourage more solar farms that are better integrated into the landscape, an energy ministry spokesman says via email.

Joeri Jacobs, who focuses on building green energy projects at waste management company Afvalzorg, describes the Dutch approach to renewables as „extremely MacGyver-ish“ - referring to a 1980s US TV show about a resourceful secret agent who assembled ingenious devices from everyday objects.

„We take the different energy technologies, we stack them and we try to make a combination that really works,“ says Jacobs, whose company has teamed up with a local utility to turn disused landfill sites into solar farms.

„It takes a while but once everybody hops on the train we actually execute relatively quickly in the Netherlands.“

SOLAR FARMS ON MAN-MADE LAKES

Nearly 20 per cent of the low-lying country's surface is water, and solar power developers including GroenLevin have taken advantage by installing farms on man-made lakes.

The company has installed more than 500,000 solar panels on Dutch waters, leaving the Netherlands behind only China globally in such siting, it noted.

„This idea of floating solar came up in the Netherlands earlier than in other countries,“ says Benedikt Ortman, global director of solar projects at German renewable energy company BayWa r.e., which acquired GroenLevin in 2018.

Inspired by the Dutch example, BayWa r.e. said it is now rolling out more floating solar sites in European countries such as Belgium, Austria and France.

Dutch firms are also looking for ways to make solar plants work alongside agricultural production.





rekao je Carel Kooij, menadžer poslovnog razvoja za veliku fotonaponsku (PV) holadsku filijalu švedske Vattenfal kompanije.

Jedan od ovih tzv. „zemljofotonaponskih“ (Agri-PV) projekata sastoji se od uzgajanja jagoda i malina ispod krova napravljenog od solarnih panela, ovime zamenjujući tradicionalne plastične staklenike.

Na polovini puta četvorogodišnjeg test-perioda, vođe projekta rekle su da je biljkama bilo potrebno 25 odsto manje vode, jer su bile zaštićene od sunca, potencijalno štedeći vodu koja bi bila potrošena na navodnjavanje u budućnosti u kojoj će klimatske promene doneti sve toplija i sušnija leta.

LOKALNI INTERESI

Holandske firme za razvoj solarnih panela kažu da novi projekti moraju biti izvršavani tako da je u njihovom glavnom fokusu interes lokalne zajednice.

Klimatski plan iz 2019. godine, na primer, predviđa da bi projekti obnovljivih izvora energije mogli da izdvoje 50 odsto svoje proizvedene zelene energije i ustupe je lokalnom stanovništvu.

Dok ovo nije pravna obaveza, kompanije planiraju da investiraju u zajednicu – slanjem dela proizvedene obnovljive električne energije lokalnim energetskeim zadrugama, i/ili osnivanjem socioekonomskog fonda za poboljšanje energetske efikasnosti.

- Budući da je Holandija toliko mala zemlja, uvek ćete raditi u nečijem dvorištu - rekao je Robert van der Horst, projektni menadžer u TPSolaru.

- Uvek morate da razgovarate sa ljudima i diskutujete o tome šta je najbolja opcija za neku oblast – dodao je, - Tada možete da pokušate da poboljšate situaciju svojom solarnom farmom.



„Rather than having to fight over who's going to get the access to the land, we come up with solutions to jointly use it,” says Carel Kooij, business development manager for large-scale photovoltaic (PV) at the Dutch subsidiary of Swedish utility Vattenfall.

One so-called ‚Agri-PV‘ project involves growing strawberries and raspberries below a solar panel roof, replacing the plastic cover traditionally used by farmers.

Halfway through a four year pilot project, project leaders said the plants needed 25 per cent less water because they were sheltered from the sun, potentially saving irrigation water in the future where climate change brings hotter and drier summers.

LOCAL INTERESTS HAVE TO COME FIRST

Across the board, Dutch solar developers say new projects must be conceived with local interests taking centre stage.

The country's 2019 climate plan, for instance, stipulates that renewable energy projects should aim to allocate 50 per cent of the green energy they produce to local inhabitants.

While this is not legally binding, developers tend to invest in the community - from sending a percentage of renewable power generated to local energy cooperatives, for example, or setting up a socioeconomic fund to make energy efficiency improvements.

„Because the Netherlands is so small, you are always working in someone's backyard,” says Robert van der Horst, project developer at TPSolar.

„You always have to talk to the people and discuss what should be done.



Čista energija za zelenu budućnost

Kompanija GREEN ENERGY 360 posvećena je održivom razvoju, očuvanju prirodnih resursa i energetske transformaciji kroz primenu solarne energije.

Uz distribuciju vrhunske solarne tehnologije, nudimo vam i najsavremenija rešenja u projektovanju i montaži solarnih elektrana, kao i usluge planiranja, organizacije, izgradnje i održavanja.

greenenergy360.com



UBRZANJE zelene tranzicije



Savremena tehnologija nam može pomoći da zaštitimo životnu sredinu i živimo održivijim životom. Nedavne tehnološke inovacije, kao što su 5G mreže i blokčejn tehnologija, mogu podržati globalne napore za prelazak na čistije izvore energije. Slično tome, daljinski senzori integrirani sa veštačkom inteligencijom mogu pomoći u sprečavanju degradacije životne sredine i podržati napore nauke o klimi. Istražujemo devet revolucionarnih tehnoloških inovacija koje nam mogu pomoći da ubrzamo zelenu tranziciju.

Većina postojećih modernih tehnologija je u sukobu sa naporima da se zaštiti životna sredina. Automobili proizvode milijarde tona ugljenika, fabrike emituju štetne gasove koji

oštećuju ozon, a poljoprivreda je odgovorna za široko rasprostranjenu degradaciju životne sredine i proizvodnju metana.

Međutim, tehnologija sutrašnjice može nam pomoći da živimo u sinergiji sa životnom sredinom. Električna vozila i povećana digitalizacija znače da možemo da živimo sa manje otpada i minimalnom upotrebom fosilnih goriva.

Moderna tehnologija može čak i da popravi deo štete koju smo prouzrokovali. Daljinska detekcija pomaže organizacijama za zaštitu životne sredine da nadgledaju ranjive ekosisteme, a „poljoprivreda ugljenika” nam pomaže da skladištimo gasove staklene bašte u poljoprivrednim zemljištima.



Tehnologija sakupljanja kišnice može da se instalira u svakom domu kako bi se proizvela čista, pitka voda iz površinskog oticanja



Accelerating the green transition

Rainwater harvesting technology can be installed in every home to produce clean, potable water from surface runoff.



Modern technology can help us protect the environment and live more sustainable lives. Recent technological innovations, such as 5G networks and blockchain technology, can support global efforts to transition to cleaner energy sources. Similarly, remote sensors integrated with artificial intelligence can help prevent environmental degradation and support climate science efforts. We are presenting nine revolutionary technological innovations that can help accelerate the green transition.

Most existing modern technologies are in conflict with efforts to protect the environment. Cars produce billions of tons of carbon emissions, factories emit harmful gases that damage the ozone layer, and agriculture is responsible for widespread environmental degradation and methane production.

However, the technology of tomorrow can help us live in harmony with the environment. Electric vehicles and increased digitization mean that we can live with less waste and minimal use of fossil fuels.

Modern technology can even help reverse some of the damage we have caused. Remote sensing assists environmental organizations in monitoring vulnerable ecosystems, and „carbon farming” helps us store greenhouse gases in agricultural lands.



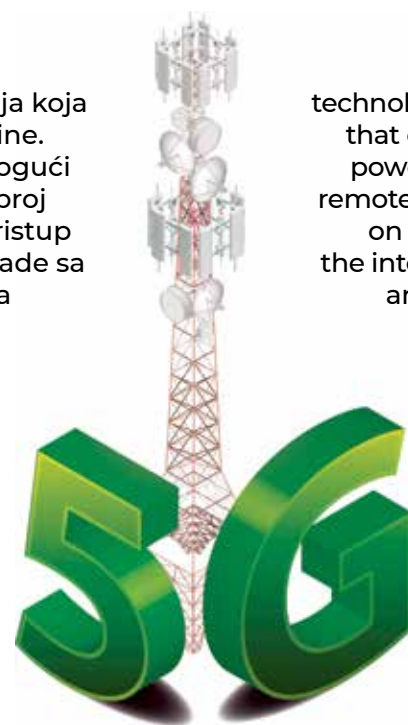
Tehnološke inovacije za zaštitu životne sredine



5G MREŽA

Prva na našoj listi revolucionarnih tehnoloških inovacija je 5G tehnologija koja korisnicima interneta nudi velike brzine. Ova moćna tehnologija može da omogući nesmetan rad od kuće i skloni veliki broj automobila sa ulica. Oni koji imaju pristup internetu preko 5G mreže mogu da rade sa bilo kog mesta u svetu i ne moraju da putuju do posla.

5G takođe može pomoći u sprečavanju požara. Uređaji za detekciju požara napajani veštačkom inteligencijom mogu da se povežu sa širim internetom (IoT) da bi detektovali i preneli vizuelne podatke stručnjacima za brže odgovore. Ovo može pomoći u borbi protiv degradacije šuma i podržati ranjive ekosisteme.



5G NETWORK

First on our list of revolutionary technological innovations is 5G, a technology that offers users high internet speeds. This powerful technology can enable seamless remote work and reduce the number of cars on the streets. Those who have access to the internet via a 5G network can work from anywhere in the world and do not have to commute to the office. 5G can also help in preventing wildfires. Artificial intelligence-powered fire detection devices can be connected to the wider Internet of Things (IoT) to detect and transmit visual data to experts for faster responses. This can aid in combating forest degradation and supporting vulnerable ecosystems.

ELEKTRIČNA VOZILA

Električna vozila (EV) su bez sumnje jedna od najvažnijih tehnoloških inovacija današnjice.

Iako se stvara određena količina ugljenika tokom procesa proizvodnje i punjenja, povećanjem upotrebe obnovljive energije, troškovi ugljenika za pokretanje električnih vozila će se neizbežno smanjiti. To znači da bi električna vozila trebala da budu sastavni deo našeg udaljavanja od fosilnih goriva. EV baterije se takođe mogu reciklirati. Prva generacija električnih vozila bliži se kraju svog životnog ciklusa i investitori kao što je Redwood Materials žele da recikliraju ostatke. Ovo je i unosno i dobro za životnu sredinu. Vrednost starih litijum-jonskih baterija znači da one neće završiti na deponijama i umesto toga će biti deo toka reciklaže zatvorene petlje.



ELECTRIC VEHICLES

Electric vehicles (EVs) are undoubtedly one of the most important technological innovations of today.

Although a certain amount of carbon is generated during the manufacturing and charging process, with the increased use of renewable energy, the carbon footprint associated with powering electric vehicles will inevitably decrease. This means that electric vehicles should be an integral part of our transition away from fossil fuels.

EV batteries can also be recycled. The first generation of electric vehicles is near the end of its lifecycle, and investors like Redwood Materials want to recycle the remnants. This is both profitable and beneficial for the environment. The value of old lithium-ion batteries means that they will not end up in landfills and will instead be part of a closed-loop recycling process.

Technological Innovations for Environmental Protection



ZELENA GRADNJA

Građevinske kompanije širom sveta usmeravaju svoju pažnju na održivije materijale. Prema anketi, preko 47 odsto preduzeća planira da koristi neki oblik zelene gradnje u narednim godinama. Očekuje se da će ove „zelenе zgrade” smanjiti upotrebu CO2 za 34 odsto i mogu uštedeti 40 odsto ukupne potrošnje vode. Zelena gradnja takođe može da zaštiti divlje životinje. Zgrade prepune košnica i krovova od divljeg cveća sigurno su utočište za insekte i ptice. Ovo može stvoriti mrežu minijaturnih zelenih površina koje mogu pomoći populaciji životinja koje se bore da povrate uporišta u sve urbanizovanijem svetu.



INTERNET INTELIGENTNIH UREĐAJA

Internet inteligentnih uređaja pravi revoluciju u poljoprivredi. Poljoprivredna IoT tehnologija osigurava da farmeri koriste tačnu količinu đubriva i pesticida. Ovo može sprečiti nepotrebnu ekološku štetu i smanjiti otpad uzrokovan lošim upravljanjem zemljištem. Poljoprivredna IoT tehnologija takođe može da prati kvalitet zemljišta i podrži precizno zalivanje. Polje pokriveno IoT senzorima tačno zna koliko je potrebno zalivati useve i može pomoći poljoprivrednicima da smanje otpad.



GREEN BUILDING

Construction companies worldwide are shifting their focus towards more sustainable materials. According to a survey, over 47 percent of companies plan to use some form of green construction in the coming years. These „green buildings” are expected to reduce CO2 emissions by 34 percent and can save 40 percent of overall water consumption. Green building can also protect wildlife. Buildings filled with beehives and rooftops covered in wildflowers are certainly a refuge for insects and birds. This can create a network of miniature green spaces that can help struggling animal populations regain habitat in an increasingly urbanized world.

INTERNET OF THINGS DEVICES

The Internet of Things (IoT) is revolutionizing agriculture. Agricultural IoT technology ensures that farmers use the precise amount of fertilizers and pesticides. This can prevent unnecessary ecological damage and reduce waste caused by poor land management. Agricultural IoT technology can also monitor soil quality and support precision irrigation. Fields equipped with IoT sensors precisely determine the water needs of crops and can help farmers reduce waste.

Tehnološke inovacije za zaštitu životne sredine



DIGITALIZACIJA

Digitalizacija je poboljšala operativnu efikasnost preduzeća širom sveta. Bez papira je odlično i za životnu sredinu. Povećano usvajanje digitalne tehnologije dovelo je do smanjenja proizvodnje papira. To znači da se manje stabala seče, a proizvođači papira diverzifikuju svoju ponudu tako što nabavljaju sirovine iz šuma kojima se održivo upravlja.



DIGITALIZATION

Digitalization has improved the operational efficiency of companies worldwide. Going paperless is not only great for the environment. The increased adoption of digital technology has led to a reduction in paper production. This means fewer trees are being cut down, and paper manufacturers are diversifying their offerings by sourcing raw materials from sustainably managed forests.



DALJINSKO PREPOZNAVANJE

Nauka o klimi je ključna za zaštitu životne sredine i smanjenje gasova staklene bašte. Danas, tehnologija daljinskog otkrivanja podstiče napore za očuvanje divljih životinja i praćenje uticaja klimatskih promena.

Tehnologija daljinskog otkrivanja koristi bespilotne letelice i satelite u kombinaciji sa tehnologijom zasnovanom na oblaku za spajanje podataka iz različitih izvora. Ovo daje kreatorima politike informisaniji pogled na degradaciju životne sredine i osigurava da organizacije za zaštitu klime imaju sve informacije koje su im potrebne.

REMOTE SENSING

Climate science is crucial for environmental protection and reducing greenhouse gas emissions. Today, remote sensing technology is driving efforts to conserve wildlife and monitor the impacts of climate change.

Remote sensing technology utilizes unmanned aerial vehicles and satellites together with cloud-based technology to integrate data from various sources. This provides policymakers with a more informed view of environmental degradation and ensures that climate protection organizations have all the information they need.

Technological Innovations for Environmental Protection



SAKUPLJANJE KIŠNICE

Letimo ka klimatskoj katastrofi, a suše su sve češće. Iz ovog razloga, moramo da usvojimo tehnologiju sakupljanja kišnice koja može da ublaži pritisak na podzemne vode.

Tehnologija sakupljanja kišnice može da se instalira u svakom domu kako bi se proizvela čista, pitka voda iz površinskog oticanja. Iako ovaj pristup neće rešiti klimatsku krizu, ipak nam može pomoći da usmerimo vodu na one kojima je ona neophodna.

VETROELEKTRANE

Vetroelektrane su obećavajući metod proizvodnje energije. Mogu se podići na moru i na otvorenim površinama.

Energija vetra radi putem kinetičke energije. Vetar gura turbine i generator se koristi za pretvaranje ove mehaničke snage u električnu energiju. Trenutno su vetroturbine efikasne između 30-45 odsto i imaju minimalan ugljenični otisak. Njihov minimalni ekološki uticaj čini ih povoljnom alternativom za hidroelektrane, koje imaju ogroman uticaj na lokalni ekosistem.



WIND TURBINES

Wind turbines are a promising method of energy production. They can be erected at sea and on open surfaces.

Wind energy operates through kinetic energy. The wind pushes the turbines, and a generator is used to convert this mechanical power into electrical energy. Currently, wind turbines are efficient between 30-45% and have a minimal carbon footprint. Their minimal environmental impact makes them a favorable alternative to hydroelectric power plants, which have a significant impact on the local ecosystem.

RAINWATER HARVESTING

We are heading towards a climate catastrophe, with droughts becoming more frequent. For this reason, we must adopt rainwater harvesting technology that can alleviate the pressure on groundwater. Rainwater harvesting technology can be installed in every home to produce clean, drinkable water from surface runoff. Although this approach will not solve the climate crisis, it can help us redirect water to those who need it.



Tehnološke inovacije za zaštitu životne sredine

Technological Innovations for Environmental Protection



SOLARNI PANELI

Investicije u obnovljive izvore energije stalno su rasle u poslednjih nekoliko decenija i prema Međunarodnoj agenciji za energiju (IEA), obnovljiva energija će postati najveći izvor globalne proizvodnje električne energije do 2025. godine, a do 2027. godine svet će imati dvostruko više obnovljivih kapaciteta nego u prethodnih pet godina.

Uprkos ovim obećavajućim procenama, lanac snabdevanja solarnih panela će trebati remont u narednim godinama. Polisilicijum – ključna sirovina za solarne panele – uglavnom se dobija iz Sindžijanga, regiona u severozapadnoj Kini koji je ozloglašen zbog ugroženih ljudskih prava. Pored toga, kineski proizvođači koriste metode koje intenzivno koriste ugljenik za proizvodnju i isporuku tih panela.

Jasno je da se mnogo toga mora učiniti kako bi se osiguralo da se propisi o radu uspostave. Ovo će zahtevati multinacionalni pristup regulaciji koji može uticati na pristupačnost solarnih panela.



Šta smo dobili?

Tehnologija sutrašnjice može da reši klimatsku krizu. Solarni paneli i vetroelektrane stvaraju ogromne količine obnovljive energije koje poboljšavaju efikasnost u proizvodnji električnih vozila i omogućavaju zelenu gradnju. Široko rasprostranjena digitalizacija takođe znači da više ljudi može raditi od kuće i smanjiti svoje lične emisije gasova staklene bašte. Usvajanje digitalne revolucije ključno je i za napore u zaštiti životne sredine, jer IoT tehnologija može da smanji poljoprivredni otpad, uoči šumske požare i smanji upotrebu štetnih đubriva i pesticida.



What have we gained?

The technology of tomorrow can solve the climate crisis. Solar panels and wind turbines generate vast amounts of renewable energy that improve efficiency in electric vehicle production and enable green construction. The widespread digitization also means that more people can work from home and reduce their personal greenhouse gas emissions. Embracing the digital revolution is crucial for environmental protection efforts as IoT technology can reduce agricultural waste, detect forest fires, and minimize the use of harmful fertilizers and pesticides.



SOLAR PANELS

Investments in renewable energy have been steadily growing over the past few decades, and according to the International Energy Agency (IEA), renewable energy will become the largest source of global electricity production by 2025. By 2027, the world will have twice as much renewable capacity as in the previous five years. Despite these promising projections, the supply chain of solar panels will require refurbishment in the coming years. Polysilicon, a key raw material for solar panels, is mostly sourced from Xinjiang, a region in northwest China notorious for human rights violations. Additionally, Chinese manufacturers employ carbon-intensive methods for the production and delivery of these panels. It is clear that much needs to be done to ensure that labor regulations are established. This will require a multinational approach to regulation that can impact the accessibility of solar panels.



OBNOVLJIVA ENERGIJA

SVE ŠTO TREBA DA ZNATE

Ekspanzija u obnovljivim izvorima se dešava u velikim i malim razmerama, od ogromnih priobalnih vetroelektrana do krovnih solarnih panela na kućama

RENEWABLE ENERGY

EVERYTHING YOU NEED TO KNOW

Expansion in renewables is happening a large and small scale, from giant offshore wind farms to rooftop solar panels on homes



Obnovljivi izvori energije sve više istiskuju „prljava” fosilna goriva u energetsom sektoru, nudeći niže emisije ugljenika i drugih vrsta zagađenja. Međutim, nisu svi izvori energije koji su označeni kao „obnovljivi” korisni za životnu sredinu. Biomasa i velike hidroelektrane stvaraju teške kompromise kada se razmatra uticaj na divlje životinje, klimatske promene i druga pitanja. Evo šta treba da znate o različitim vrstama obnovljivih izvora energije i kako možete da koristite ove nove tehnologije u svom domu.

ŠTA JE OBNOVLJIVA ENERGIJA?

Obnovljiva energija dolazi iz prirodnih izvora ili procesa koji se stalno obnavljaju. Na primer, sunčeva svetlost i vetar nastavljaju da sijaju i duvaju, čak i ako njihova dostupnost zavisi od vremenske prognoza.



Renewable energy sources are increasingly displacing „dirty” fossil fuels in the energy sector, offering lower emissions of carbon and other types of pollution. However, not all energy sources labeled as „renewable” are good for the environment. Biomass and large hydro generate difficult trade-offs when considering impacts on wildlife, climate change and other issues. Here’s what you need to know about the different types of renewable energy sources and how you can use these new technologies in your home.

WHAT IS RENEWABLE ENERGY?

Renewable energy comes from natural sources or processes that are constantly renewed. For example, sunlight and wind continue to shine and blow, even if their availability depends on weather forecasts.



OBNOVLJIVA ENERGIJA

Dok se obnovljiva energija često smatra novom tehnologijom, iskorišćavanje energije prirode već dugo se koristi za grejanje, transport, osvetljenje i još mnogo toga. Tokom poslednjih 500 godina, ljudi su se sve više okretali jeftinijim izvorima energije, kao što je uglj.

Sada kada imamo inovativne i manje skupe načine da uhvatimo i zadržimo energiju vetra i sunca, obnovljivi izvori postaju važan izvor energije, koji čine više od 12 procenata proizvodnje energije u SAD. Ekspanzija u obnovljivim izvorima se dešava u velikim i malim razmerama, od ogromnih priobalnih vetroelektrana do krovnih solarnih panela na kućama. Čak se i čitave ruralne zajednice (na Aljasci, u Kanzasu i Misuriju) oslanjaju na obnovljivu energiju za grejanje i osvetljenje.

Kako upotreba obnovljivih izvora energije nastavlja da raste, ključni cilj će biti modernizacija električne mreže, čineći je pametnijom, sigurnijom i bolje integrisanom u regionima.



NEOBNOVLJIVA ENERGIJA



Neobnovljiva energija uključuje fosilna goriva kao što su nafta, gas i uglj. Neobnovljivi izvori energije dostupni su samo u ograničenim količinama.

Neobnovljivi izvori energije se nalaze u određenim delovima sveta, što ih čini brojnijim u nekim zemljama od drugih. Nasuprot tome, svaka zemlja ima pristup suncu i vetru. Davanje prioriteta obnovljivoj energiji može poboljšati nacionalnu bezbednost smanjenjem oslanjanja zemlje na uvoz iz zemalja bogatih fosilnim gorivima.

Mnogi neobnovljivi izvori energije mogu ugroziti životnu sredinu ili zdravlje ljudi.

Na primer, bušenje nafte može zahtevati eksploataciju šuma; tehnologija povezana sa frakingom može izazvati zemljotrese i zagađenje vode, a elektrane na uglj zagađuju vazduh. Povrh svega, sve ove aktivnosti doprinose globalnom zagrevanju.



SOLARNA ENERGIJA



Ljudi iskorišćavaju sunčevu energiju hiljadama godina. Prema Nacionalnoj laboratoriji za obnovljivu energiju, „više sunčeve energije padne na Zemlju za jedan sat nego što je svi na svetu utroše u jednoj godini“. Danas koristimo sunčeve zrake na mnogo načina, za grejanje domova i preduzeća, za zagrevanje vode i za napajanje uređaja.

Solarne ili fotonaponske (PV) ćelije su napravljene od silicijuma ili drugih materijala koji pretvaraju sunčevu svetlost direktno u električnu energiju. Distribuirani solarni sistemi proizvode električnu energiju lokalno za domove i preduzeća, bilo preko krovnih panela ili projekata u zajednici koji napajaju čitava naselja. Solarne farme mogu proizvesti dovoljno energije za hiljade domova, koristeći ogledala za koncentrisanje sunčeve svetlosti preko hektara solarnih ćelija. Plutajuće solarne farme mogu biti efikasna upotreba postrojenja za otpadne vode i vodnih tela koja nisu ekološki osetljiva.

Solar snabdeva skoro 3 procenta američke proizvodnje električne energije (neki izvori procenjuju da će dostići skoro 4 procenta 2022. godine), ali 46 odsto svih novih proizvodnih kapaciteta dolazi iz solarne energije 2021.

RENEWABLE ENERGY

While renewable energy is often considered a new technology, harnessing nature's energy has long been used for heating, transportation, lighting, and more. Over the last 500 years, people have increasingly turned to cheaper sources of energy, such as coal.

Now that we have innovative and less expensive ways to capture and store wind and solar energy, renewables are becoming an important source of energy, accounting for more than 12 percent of US energy production. The expansion in renewables is happening on a large and small scale, from giant offshore wind farms to rooftop solar panels on homes. Even entire rural communities (in Alaska, Kansas, and Missouri) rely on renewable energy for heating and lighting.

As the use of renewable energy sources continues to grow, a key goal will be to modernize the electricity grid, making it smarter, safer and better integrated across regions.



NON-RENEWABLE ENERGY



Non-renewable energy includes fossil fuels such as oil, gas and coal. Non-renewable energy sources are available only in limited quantities.

Non-renewable energy sources are found in certain parts of the world, making them more abundant in some countries than others. Conversely, every country has access to sun and wind. Prioritizing renewable energy can improve national security by reducing the country's reliance on imports from fossil fuel-rich countries.

Many non-renewable energy sources can threaten the environment or human health. For example, oil drilling may require the exploitation of forests; the technology associated with fracking can cause earthquakes and water pollution, and coal-fired power plants pollute the air. On top of that, all these activities contribute to global warming.



SOLAR ENERGY



Humans have been harnessing solar energy for thousands of years. According to the National Renewable Energy Laboratory, „more solar energy hits Earth in one hour than the entire world uses in one year.„ Today we use the sun's rays in many ways, to heat homes and businesses, to heat water and to power devices.

Solar or photovoltaic (PV) cells are made of silicon or other materials that convert sunlight directly into electricity. Distributed solar systems generate electricity locally for homes and businesses, either through rooftop panels or community projects that power entire neighborhoods. Solar farms can produce enough energy for thousands of homes, using mirrors to concentrate sunlight over acres of solar cells. Floating solar farms can be an efficient use of waste water facilities and water bodies that are not environmentally sensitive.

Solar supplies nearly 3 percent of U.S. electricity generation (some sources estimate it will reach nearly 4 percent in 2022), but 46 percent of all new generating capacity came from solar in 2021.

OBNOVLJIVA ENERGIJA



ENERGIJA VETRA



Prešli smo dug put od staromodnih vetrenjača. Energija vetra okreće lopatice turbine, koja napaja električni generator i proizvodi električnu energiju. Vetar, koji čini 9,2 odsto američke proizvodnje električne energije, postao je jedan od najjeftinijih izvora energije u zemlji. Najveće države za energiju vetra uključuju Kaliforniju, Ajovu, Kansas, Oklahomu i Teksas, mada se turbine mogu postaviti bilo gde sa velikom brzinom vetra - kao što su vrhovi brda i otvorene ravnice.



DRUGI ALTERNATIVNI IZVORI ENERGIJE



Hidroenergija je najveći obnovljivi izvor električne energije u Sjedinjenim Državama, mada se očekuje da će energija vetra uskoro preuzeti vodeću ulogu. Hidroenergija se oslanja na vodu, obično vodu koja se brzo kreće u velikoj

reci ili vodu koja se brzo spušta sa visoke tačke i pretvara silu te vode u električnu energiju okretanjem lopatica turbine generatora.



ENERGIJA BIOMASE

Biomasa je organski materijal koji potiče od biljaka i životinja, a uključuje useve, otpadno drvo i drveće. Kada se sagoreva biomasa, hemijska energija se oslobađa kao toplota i može proizvesti električnu energiju pomoću parne turbine.

Biomasa se često pogrešno opisuje kao čisto, obnovljivo gorivo i zelenija alternativa uglju i drugim fosilnim gorivima za proizvodnju električne energije.



GEOTERMALNA ENERGIJA



Ako ste se ikada opuštali u toplom izvoru, koristili ste geotermalnu energiju. Zemljino jezgro je toplo kao i površina Sunca, zbog sporog raspadanja radioaktivnih čestica u stenama u centru planete. Bušenje dubokih bunara dovodi veoma toplu podzemnu vodu na površinu kao hidrotermalni resurs, koji se zatim pumpa kroz turbinu da bi se stvorila električna energija. Geotermalna postrojenja obično imaju niske emisije ako pumpaju paru i vodu koju koriste nazad u rezervoar. Postoje načini za stvaranje geotermalnih postrojenja tamo gde nema podzemnih rezervoara.

RENEWABLE ENERGY



WIND ENERGY



We've come a long way from old-fashioned windmills. Wind energy turns the blades of a turbine, which feeds an electric generator and produces electricity. Wind, which accounts for 9.2 percent of US electricity generation, has become one of the cheapest sources of energy in the country. The top states for wind power include California, Iowa, Kansas, Oklahoma and Texas, although turbines can be placed anywhere with high wind speeds - such as hilltops and open plains.



OTHER ALTERNATIVE SOURCES OF ENERGY



Hydropower is the largest renewable source of electricity in the United States, although it is expected that wind energy will soon take the leading role. Hydropower relies on water,

usually fast-moving water in a large river or water coming down quickly from a high point, and converting the force of that water into electricity by turning the blades of a generator turbine.



BIOMASS ENERGY



Biomass is organic material derived from plants and animals, and includes crops, waste wood and trees. When biomass is burned, chemical energy is released as heat and can generate electricity using a steam turbine.

Biomass is often wrongly described as a clean, renewable fuel and a greener alternative to coal and other fossil fuels for electricity generation.



GEOTHERMAL ENERGY

If you've ever relaxed in a hot spring, you've used geothermal energy. The Earth's core is as warm as the surface of the Sun, due to the slow decay of radioactive particles in the rocks at the center of the planet. Drilling deep wells brings very hot underground water to the surface as a hydrothermal resource, which is then pumped through a turbine to generate electricity. Geothermal plants typically have low emissions if they pump the steam and water they use back into the reservoir.

Možemo li da izgradimo solarne sisteme u svemiru?

Sa sve očiglednijim uticajem klimatskih promena na našu planetu, naučnici širom sveta prave ogroman napredak u osmišljavanju novih tehnologija koje bi usporile globalno zagrevanje. Obnovljivi izvori energije su naša najbolja šansa da dostignemo neto nultu emisiju. Među novim revolucionarnim tehnologijama za dobijanje električne energije iz prirodnih resursa, jedan inovativni predlog se izdvojio i sada pretenduje da postane rešenje za kojim se tragalo. Stanica za solarnu energiju stacionirana u svemiru (SSP), tvrde stručnjaci, bi mogla da ispadne ključna u ublažavanju klimatskih promena. Koje su prednosti i izazovi izgradnje solarnog energetskog sistema u svemiru i može li tako nešto uopšte postati stvarnost?

ŠTA JE U STVARI STANICA ZA SOLARNU ENERGIJU STACIONIRANA U SVEMIRU?

Koliko god futuristički zvučalo, izgradnja stanice za solarnu energiju u svemiru uskoro bi mogla da postane stvarnost. Ruski naučnik i matematičar Konstantin Cjolkovski prvi je predstavio koncept upotrebe solarne energije iz svemira i njenog prenosa na Zemlju još u 1920-im godinama. Naučnici su od tada proučavali načine kako da pretvore njegov koncept u stvarnost i izgleda da smo konačno blizu realizacije.

Kada je reč o izgradnji solarnog energetskog sistema stacioniranog u svemiru, potrebno je razmišljati u velikim skalama. Procenjuje se da bi satelit trebao da ima površinu od otprilike 10 kvadratnih kilometara - što je ekvivalentno veličini 1.400 fudbalskih terena - i morao bi da bude opremljen sa naprednim solarnim panelima. Akumulirana energija na satelitu mogla bi se preneti na Zemlju putem radio talasa visoke frekvencije, koju bi, zatim, zemaljska antena pretvorila u električnu energiju i gotovo momentalno isporučila elektroenergetskim mrežama na različitim lokacijama.



Can We Build Solar Power Systems in Space?

With the effects of climate change on our planet becoming increasingly evident, scientists worldwide are making huge strides in designing new technologies to slow down global warming. Renewable energy sources are one of our best shots at achieving net-zero emissions. In the race to design breakthrough technologies to obtain electricity from natural resources, one innovative proposal seeks to be the solution that we have been waiting for. A Space-based Solar Power (SSP) station, experts argue, would have the potential to mitigate climate change through the provision of clean energy. What are the advantages and the challenges of building a solar power system in space and will this ever become a reality?

WHAT IS A SPACE-BASED SOLAR POWER STATION?

As futuristic as it might sound, building a solar power station in space could soon become a reality. Russian-born scientist and mathematician Konstantin Tsiolkovsky first presented the concept of capturing solar power from space and then transferring it to Earth in the 1920s. Scientists have studied ways to turn

his concept into reality ever since and it looks like we are finally nearing a turning point.

When it comes to building a space-based solar power station in space, you have to think big. It is estimated that for the satellite to efficiently capture the sunlight, it would have to be approximately 10 square kilometers in area - or the equivalent of 1,400 football pitches - and equipped with avant-garde solar arrays. The power accumulated on the satellite could be transferred to Earth through high-frequency radio waves, which a ground antenna would then convert into electricity and deliver almost instantly to power grids across different locations.

The global demand for energy is projected to increase by approximately 50% by 2050, paired with the urgency to find more sustainable energy sources, make looking into alternatives involving renewables a necessity. Climate change is the greatest challenge of our time and as we begin to understand the immense value of these unlimited energy sources in the race to stop global warming, new ideas to make groundbreaking SSP-project feasible could not come at a better time. But why exactly are we looking at building a solar power station in space?

WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF SPACE-BASED SOLAR ENERGY?

No other renewable energy source is comparable to the sun in terms of availability. Indeed, solar energy is the most abundant energy source on the planet. Throughout the years, scientists have developed innovative technologies that could allow us to depend entirely on solar for the rest of our existence.

As opposed to solar panels on Earth, which capture sunlight that has been absorbed and filtered through the atmosphere before reaching the ground, panels in space would be continuously and directly exposed to more powerful sunlight.





Procenjuje se da će globalna potražnja za energijom do 2050. godine porasti za oko 50%. Stoga, istraživanje alternativa koje uključuju obnovljive izvore postaje neophodno. Klimatske promene predstavljaju najveći izazov našeg vremena, a ogromna vrednost neograničenih izvora energije poput Sunca, postaju ključna mogućnost za zaustavljanje globalnog zagrevanja. Nove ideje, koje bi dovele do realizacije revolucionarnog SSP-projekta, dolaze u pravi čas. Međutim, zašto bismo takav solarni energetska sistem uopšte slali u svemir?

ŠTA SU PREDNOSTI, A ŠTA NEDOSTACI?

Nijedan drugi obnovljivi izvor energije ne može da se meri sa Suncem po pitanju njegove dostupnosti. Jednostavno, solarna energija je najobilniji izvor energije na planeti. Tokom godina, naučnici su razvili inovativne tehnologije koje bi mogle omogućiti da se potpuno oslonimo na nju.

Za razliku od solarnih panela na Zemlji, koji hvataju sunčevu svetlost koja je već apsorbirana i filtrirana kroz atmosferu, paneli u svemiru bi bili neprekidno i direktno izloženi snažnijem sunčevom svetlu. To bi omogućilo SSP-stanici da neprekidno generiše ogromnu količinu električne energije. Procenjuje se da solarni panel postavljen u svemiru može konstantno generisati do 2.000 gigavata električne snage, što je skoro 40 puta više energije nego što solarni panel na Zemlji godišnje generiše. Ne samo da se SSP smatra efikasnijim od solarnih stanica na zemlji, već je i besprekorno čist, beskrajno dostupan i nema uticaja na prirodnu sredinu jer ne zahteva upotrebu zemljišta.

Iako su prednosti svemirskog solarnog energetska sistema mnogobrojne, postoji i nekoliko nedostataka. Najveća mana solarnog energetska sistema u svemiru je trošak lansiranja. Kada se pogleda trenutna cena slanja raketa u svemir, stručnjaci procenjuju da bi trošak lansiranja solarnog panela dimenzija 20 stopa sa 20 stopa (1,2 sa 1,2 metara) bio oko 1,56 miliona dolara, i to bez troškova lansiranja drugih neophodnih delova kao što su predajnik, kućište satelita i unutrašnja elektronika. Još jedan potencijalni rizik su nepoznati bezbednosni problemi koji mogu nastati tokom funkcionisanja SSP sistema. Tačne rizike je nemoguće predvideti. Mogući scenariji mogu uključivati svemirski otpad koji može oštetiti solarne panele i dovesti do bržeg propadanja panela usled intenzivnijeg sunčevog zračenja. Pošto naučnici ne mogu tačno predvideti prirodu takvih problema, samim time je teško proceniti troškove održavanja ogromne stanice.

KOJI SU IZAZOVI?

Izgradnja solarnog energetska sistema u svemiru je izazovna. Iako je savremen tehnološki napredak učinio ovu ideju ostvarljivijom, postoji više razloga zašto je ona i dalje neostvarena. Jedan od najsloženijih i najizazovnijih problema je kako sastaviti, lansirati i rasporediti tako veliku strukturu u svemiru. Ovaj složeni proces zahteva rešavanje brojnih tehnoloških problema koji uključuju, ne samo dizajniranje energetske stanice, već i dizajn termalnih, bežičnih sistema prenosa energije i kontrolnih sistema.



This would allow a SSP-station to continuously generate an enormous amount of electricity. Indeed, it is estimated that space-based solar panels can generate up to 2,000 gigawatts of power constantly, nearly 40 times more energy than a solar panel would generate on Earth annually. SSP is not only considered more efficient than ground-based solar stations but it is also immaculately clean, infinitely available, and it has no impact on landscapes as it does not require any land use.

While the advantages of solar energy are numerous, a few flaws in the concept of SSP remain. The biggest disadvantage of a space-based solar power station is the cost of its launch. Looking at the current price for sending rockets into space, experts estimate that the launch cost for a 20-foot by 20-foot (1.2 by 1.2 meters) solar panel would be around USD\$ 1.56 million, and this is without taking into account the launch of other required parts such as a transmitter, satellite housing, and internal electronics. Another potential risk factor is the unknown safety hazards that may arise during the lifetime of a SSP-system. These, however, are impossible to predict in advance. Potential scenarios may include space debris that could damage solar arrays and a faster degradation of the panels as they are exposed to more intense solar radiations. As scientists cannot exactly predict if and when such events will occur, it is also difficult to estimate the maintenance costs of the massive station.

WHAT ARE THE MANUFACTURING CHALLENGES?

Building a solar power system in space does not come without challenges. While modern technological advances have made this prospect more achievable, there is a reason why a space-based solar power station is still not a reality. Not surprisingly, one of the most complex and challenging drawbacks is how to assemble, launch, and deploy such a large structure in space. This complicated process requires solving a number of technological bottlenecks that involve not only the manufacturing of the power station, but also the design of thermal, wireless power transmission, and control systems.

Despite nothing of this size has ever been sent to space before, scientists are not easily discouraged and many believe that there are ways to get around it. In 2017, researchers at the California Institute of Technology designed a modular power station. The idea is to produce thousands of smaller satellites that can be launched separately and that will come together once they are in space to form a single large solar power station. Simultaneously, scientists at the University of Liverpool are looking at ways to embed photovoltaic (PV) cells on a foldable and extremely lightweight solar sail. The sail, capable of harnessing the sun's radiation pressure to propel a spacecraft forward fuel-free, could represent an affordable solution to create a large, space-based solar power station powered by the same source of energy it captures.



Iako do sada ništa ovakve veličine nije lansirano u svemir, naučnici se ne obeshrabuju lako, a mnogi veruju da postoje načini da se problemi prevaziđu. Godine 2017. istraživači sa Kalifornijskog instituta za tehnologiju dizajnirali su modularnu energetska stanicu. Ideja je bila da se proizvede hiljade manjih satelita koji se mogu lansirati odvojeno, a koji će se spojiti kada budu u svemiru i formirati jednu veliku solarnu energetska stanicu. Istovremeno, naučnici sa Univerziteta u Liverpulu proučavaju načine kako da integrišu fotonaponske (PV) ćelije na preklopivo i izuzetno lagano solarno jedro. Ovo jedro, koje koristi sunčev pritisak za pogon svemirskog broda bez goriva, može predstavljati pristupačno rešenje za stvaranje velike solarno-energetske stanice u svemiru, koja bi se napajala istim izvorom energije koju hvata. Konačno, kako bi odgovorili na pitanje kako sistem može preneti apsorbovanu energiju nazad na Zemlju, istraživači iz Japanske agencije za istraživanje svemira proučavaju metod pretvaranja električne energije iz solarnih ćelija u energetske talase i njihov prenos putem elektromagnetnih polja do antene na Zemlji.

DA LI ĆE OVAKVE STANICE ZAISTA ZAŽIVETI U STVARNOSTI?

U 2020. godini Evropska svemirska agencija (ESA) pokrenula je kampanju za prikupljanje novih inovativnih ideja o tehnologijama koje bi povećale izvodljivost pokretanja solarnog energetskeg sistema u svemiru a već se i razmatra finansiranje nekih od tih projekata. U međuvremenu, neki prototipovi su već u razvoju u pojedinim zemljama.

Na primer, Ujedinjeno Kraljevstvo razmatra sprovođenje projekta vrednog 21 milion dolara za izgradnju solarnog energetskeg sistema u svemiru kao deo vladinog plana sa ciljem da Ujedinjeno Kraljevstvo postigne neto nultu emisiju do 2050. U Sjedinjenim Američkim Državama, „Projekat solarnog energetskeg sistema u svemiru” radi na razvijanju visokoefikasnih solarnih ćelija, zajedno sa sistemom konverzije i prenosa energije u svemiru. Američka vojna istraživačka laboratorija već je testirala solarni modul i sistem konverzije energije u svemiru 2020. godine.

Imajući u vidu izuzetno visoke početne troškove, vlade će za sprovođenje nekih od ovih projekata tražiti finansijsku podršku privatnih kompanija. Uprkos izazovima, svemirske elektrane su tehnologija vredna ulaganja. Još važnije, one bi mogle da odigraju ključnu ulogu u globalnom snabdevanju energijom iz obnovljivih izvora.



Finally, to answer the question of how the system could transmit the power it absorbs back to Earth, researchers from the Japan Aerospace Exploration Agency studied a method to convert electricity from the solar cells into energy waves and transfer it to a ground antenna using electromagnetic fields.

IS THIS EVER GOING TO HAPPEN?

In 2020 European Space Agency (ESA) launched a campaign to collect new innovative ideas for technologies to increase the feasibility of space-based solar power to support the provision of clean energy and is now looking to fund some of these projects. Meanwhile, some prototypes are already underway in some countries.

The United Kingdom, for example, is considering undertaking a USD\$ 21 million project to build a solar power station in space as part of the government's Net Zero Innovation Portfolio to help the UK achieve net zero by 2050. In the United States, the Space Solar Power Project is working on high-efficiency solar cells along with a conversion and transmission system optimised for use in space, while the US Naval Research Laboratory tested a solar module and power conversion system in space in 2020. Considering the extremely high initial costs, governments will require the financial support of private companies for the implementation of some of these projects. Despite the challenges, space-based solar power is an innovative technology worth investing into and it opens the door to the possibility of a future in which renewables play a key role in the global energy supply.



Štednjom do zdravijeg sveta

Tokom globalne energetske krize, svi pokušavamo da pronađemo inovativne načine da smanjimo potrošnju energije. Ako obratimo pažnju na korišćenje struje, možemo i da uštedimo novac. Nekoliko zemalja je tokom zime odredilo gornju granicu za potrošnju energije. Međutim, sam potez nije bio dovoljan da se ublaži pritisk sa kojim su se suočavala mnoga domaćinstva širom Evrope i sveta. Prema preporukama Ministarstva rudarstva i energetike, praktikanjem ovih stvari, ušteda energije je neizbežna, a samim tim će i računi za električnu energiju biti manji.

UŠTEDA ENERGIJE KOD PRIPREME HRANE

- Treba kuvati u poklopljenoj posudi jer se tako štedi do 20% energije, takođe treba koristiti posude koje su veličinom srazmerne grejnoj površini kako bi se izbegao gubitak od 20% energije;
- Kada voda proključa, jačinu grejanja posude treba smanjiti na najnižu moguću temperaturu pri kojoj će voda da nastavi da ključa. Na ovaj način može se uštedeti i do 60% energije;
- Najekonomičnije kuvanje obavlja se u ekspres loncu, kojim se vreme kuvanja i utrošena električna energija smanjuju za dva do tri puta;
- Isključivanjem rerne 10 minuta pre kraja pečenja može se uštedeti do 20% energije;
- Prilikom korišćenja rerne, poželjno je što manje je otvarati jer se pri svakom otvaranju vrata rerne izgubi 20% toplote.

Kako da smanjite potrošnju energije i uštedite novac

Saving for a Healthier World

During the global energy crisis, we are all trying to find innovative ways to reduce energy consumption. By paying attention to electricity usage, we can also save money. Several countries have set upper limits for energy consumption during the winter. However, this measure alone was not enough to alleviate the pressure faced by many households across Europe and the world. According to the recommendations of the Ministry of Mining and Energy, practicing these things will inevitably lead to energy savings, resulting in lower electricity bills.

Ways to Reduce Energy Consumption and Save Money

ENERGY SAVINGS IN FOOD PREPARATION

- Cook with covered pots and pans to save up to 20% of energy; use appropriately sized cookware to avoid a 20% energy loss.
- Once water boils, reduce the heat to the lowest temperature at which the water continues to boil. This can save up to 60% of energy.
- The most economical way of cooking is with a pressure cooker, which reduces cooking time and energy consumption by two to three times.
- Turn off the oven 10 minutes before the cooking time ends to save up to 20% of energy.
- Minimize opening the oven door as each time it's opened, 20% of the heat is lost.

UŠTEDA NA TOPLOJ VODI

- Korišćenje bojlera za pripremu tople vode samo kada je potrebna, termostat bojlera podesiti na temperaturu zagrevanja do 60°C;



HOT WATER SAVINGS

- Use a water heater only when necessary and set the thermostat to a heating temperature of up to 60°C.

UŠTEDE NA RASHLADNIM I GREJNIM UREĐAJIMA



- Postavljanje frižidera na 4°C, a zamrzivača na -18°C kako bi se obezbedio optimum u potrošnji;
- Razumno korišćenje grejnih uređaja u svom domu;
- U toku dana koristiti sunce što više za osvetljenje, kao i za zagrevanje prostora u grejnoj sezoni, a tokom noći spustiti roletne;
- Ne pokrivati grejne elemente i uređaje nameštajem ili odećom jer na taj način emituju manje toplote.

UŠTEDE KOD MAŠINA ZA PRANJE VEŠA I SUĐA

- Koristiti mašinu za pranje sudova i veša tek kada je puna, jer je energetska mnogo efikasnije;
- Izbegavati sušenje veša u sušilicama, već veš sušiti na vazduhu;
- Treba koristiti program na nižim temperaturama pranja jer se tako može uštedeti značajna količina energije.



UŠTEDA ENERGIJE KOD RASVETE

- Gasiti svetla u sobama u kojima se ne boravi;
- Velike uštede mogu se ostvariti zamenom običnih sijalica sa užarenim vlaknom LED metal-halogenim sijalicama. Ove sijalice troše i do 10 puta manje energije od običnih;
- Isključiti računar nakon završetka rada na njemu;
- Isključiti punjače baterija iz utičnica;
- Redovno menjati filtere na grejnim uređajima;
- Isključiti dekorativnu rasvetu na stambenim zgradama i porodičnim kućama.



ZAGREVANJE PROSTORA

- Za slučaj da se sedi i duže boravi ova temperatura treba da bude od 20 do 21°C,
- Za prostor u kome spavamo 18°C,
- Za prostorije u kojima zbog odlaska na posao i školu tokom dana niko ne boravi 16°C, a u slučaju dužeg odsustva 10°C.



KUPOVINA UREĐAJA

- Prilikom kupovine električnih uređaja za domaćinstvo treba obratiti pažnju na energetske oznake. Energetske oznake govore nam o energetske efikasnosti i potrošnji energije. Treba kupovati uređaje sa najvećom klasom energetske efikasnosti. Na svakoj oznaci može se videti oznaka energetske efikasnosti uređaja u odnosu na maksimalnu energetske efikasnost koju takva vrsta uređaja može potrošiti;



INVESTIRANJE U ENERGETSKU EFIKASNOST

- Investiranje u poboljšanje energetske efikasnosti u smislu zamene energetske efikasnim prozorima, poboljšanje izolacije, poboljšanje energetske efikasnosti sistema grejanja i hlađenja;
- Postavljanje solarnih panela i solarnih kolektora na krovove objekata koji su u vlasništvu, odnosno koje koriste domaćinstva.

SAVINGS ON COOLING AND HEATING DEVICES

- Set the refrigerator temperature to 4°C and the freezer temperature to -18°C to ensure optimal consumption.
- Use heating devices in your home economically.
- Utilize sunlight during the day for lighting and space heating in the heating season, and lower blinds and draw curtains at night.
- Do not cover heating elements and appliances with furniture or clothing as it reduces heat emission.

SAVINGS WITH WASHING MACHINES AND DISHWASHERS

- Use the dishwasher and washing machine only when they are full, as it is more energy efficient.
- Avoid using dryers and instead air-dry clothes.
- Use lower temperature washing programs to save significant amounts of energy.

LIGHTING ENERGY SAVINGS

- Turn off lights in unoccupied rooms.
- Significant savings can be achieved by replacing conventional incandescent bulbs with LED and metal-halide bulbs. These bulbs consume up to 10 times less energy.
- Turn off the computer after finishing work.
- Unplug battery chargers from sockets.
- Regularly clean filters in heating devices.
- Turn off decorative lighting on residential buildings and houses.

SPACE HEATING

- For areas where people sit and stay for a longer time, the temperature should be set at 20-21°C.
- For sleeping areas, 18°C is recommended.
- For rooms where nobody stays during the day due to work or school, 16°C is sufficient, and in the case of extended absence, 10°C.

APPLIANCE PURCHASING

- When buying household electrical appliances, pay attention to energy labels. Energy labels indicate energy efficiency and energy consumption. Choose appliances with the highest energy efficiency class. Each label shows the device's energy efficiency rating compared to the maximum energy efficiency that type of device can consume.

INVESTING IN ENERGY EFFICIENCY

- Invest in improving energy efficiency by replacing windows with energy-efficient ones, enhancing insulation, and improving the energy efficiency of heating and cooling systems.
- Install solar panels and solar collectors on the roofs of properties owned or used by households.

SOLARNA ENERGIJA

SVE ŠTO BI TREBALO DA ZNATE



Solarna energija je obnovljivi izvor energije koji može generisati čistu i održivu električnu struju bez emitovanja toksičnog zagađenja ili gasova staklene bašte koji doprinose zagrevanju planete. Prelazak na eksploataciju solarne energije je sada važnije nego ikad, posebno u okvirima nastojanja da se globalno povećanje temperature na godišnjem nivou spusti na ispod 1,5°C. Ovo su 14 činjenica o solarnoj energiji koje bi trebalo da znate.

Iako se solarna energija koristila još 700. godine pre nove ere, ona je tek pre četrdesetak godina komercijalizovana i prihvaćena kao čista i efikasna alternativa fosilnim gorivima. Zemlje u razvoju imaju prednost što se nalaze u regionima gde imaju optimalan pristup sunčevim zracima, ali nedostatak investicija i ekološki dug uticale su na to da je eksploatacija solarne energije u tim regionima nerazvijena. S druge strane, razvijene zemlje poput Amerike, Australije i, u poslednje vreme, Kine, postale su lideri u proizvodnji ovog tipa obnovljive energije.



SOLAR ENERGY

ALL YOU NEED TO KNOW



Solar energy is a renewable energy source in which it can generate clean and sustainable electricity without producing planet-warming greenhouse gas emission or toxic pollution in the process. As time is ticking before the world crosses the tipping point to limit global temperature increase under 1.5C, switching to renewable energy such as solar is now more crucial than ever. Here are 14 solar energy facts to help make the argument.

While solar energy can be dated all the way back in 700BC, it was not widely commercialised until about 40 years ago and accepted as a clean and effective alternative to fossil fuels. Though developing countries enjoy the advantage of being located in regions where they have optimal access to the sun's rays, the lack of investment and climate debt means solar energy has been slow to grow in the region. Meanwhile, developed countries such as America, Australia, and more recently, China, have become the leaders in solar power generation.

Solarna energija je najobilniji izvor energije na Zemlji

Pod solarnom energijom podrazumeva se svetlosno i toplotno zračenje sa Sunca koje se koristi za proizvodnju električne energije. Dok širom sveta povećavamo upotrebu tehnologija za korišćenje solarnog potencijala, Zemlja već u izobilju prima tu energiju. Sat i po vrednosti solarne energije koja doseže površinu planete ima dovoljno snage da zadovolji ukupnu energetske potrošnje čovečanstva tokom cele godine. Budući da Sunce neće skoro nestati, sve više razvijamo tehnologiju da se u potpunosti oslonimo na solarnu energiju i okončamo globalnu upotrebu i potrošnju fosilnih goriva.

Solarna energija je najbrže rastući vid električne energije

U 2010. godini, solarna energija je predstavljala samo 0,06% globalne energetske proizvodnje. U roku od devet godina, njena

proizvodnja je porasla na 1,11%. Ona takođe čini najveći udeo u rastu proizvodnje obnovljive energije, gde je porasla sa 0,8% u 2010. godini, na 10,3% u 2019. godini. Kapacitet solarnih elektrana takođe rapidno raste, što znači da se povećava količina električne energije koju mogu ovakva postrojenja da generišu. Korišćenje solarne energije je poraslo za 22% u 2020. godini. Zahvaljujući generisanju energije iz sunčeve svetlosti i vetra, proizvodnja iz obnovljivih izvora se više nego udvostručila od 2015. godine.

Minimalne emisije gasova staklene bašte se generišu tokom ciklusa proizvodnje solarne energije

Iako proces generisanja solarne energije ne uključuje emitovanje nikakvih gasova staklene bašte, tokom šireg procesa proizvodnje ove energije dolazi do određene, ali minimalne emisije. Emisija nastaje tokom proizvodnje materijala za solarne ćelije i panele - koji se uglavnom sastoje od monokristalnog, polikristalnog ili tankog sloja („amorfne“) silicijuma - transport, instalaciju, održavanje, dekomisiju i rastavljanje.

Solar is the Most Abundant Energy Source on Earth

Solar energy refers to light and heat radiation from the sun that is harnessed to generate electricity. While we scale up technologies across the globe to capture and convert solar energy, the Earth already receives it in spades. An hour and half's worth of solar energy that reaches to the surface of the planet has enough power to meet all of humanity's energy consumption for an entire year. Since the sun is not going away anytime soon, we have the ability and technology to depend on solar energy entirely and end the global use and consumption of fossil fuels.

Solar is the Fastest and Most Popular Form of New Electricity Generation

In 2010, solar energy represented only 0.06% of the global energy mix. Within nine years, solar rose up to 1.11%. Solar also makes up the largest proportion of growth in the renewable energy mix, where it grew from 0.8% in 2010 to 10.3% in 2019. Solar power

capacity is rapidly growing at the same time, meaning the amount of electricity it can generate from energy it captures. Global solar power rose by 22% in 2020 as installations have experienced a boom. Together with wind power, renewable output has more than doubled since 2015.

Minimal Greenhouse Gas Emissions are Generated in a Solar Life Cycle

While the process of solar power generation does not emit any greenhouse gases, other stages of the life cycle do produce some, but minimal, emissions. This include the manufacture of solar cell and panel materials - primarily made of monocrystalline, polycrystalline, or thin film („amorphous“) silicon - transportation, installation, maintenance, and decommissioning and dismantlement. Most estimates of life-cycle emissions for photovoltaic (PV) solar cell systems are between 0.07 and 0.18 pounds of carbon dioxide equivalent per kilowatt-hour.



Fotonaponska solarna energija čini 3% globalne proizvodnje električne energije

Proizvodnja električne energije iz fotonaponskih solarnih sistema je u 2020. godini porasla rekordnih 156 TWh, dostižući 921 TWh, što je rast od 23% u odnosu na 2019. godinu i čini 3,1% globalne proizvodnje električne energije. Kina, kao jedan od najvećih emitera gasova staklene bašte u svetu, povećala je instalaciju fotonaponskih solarnih sistema za 75% od 2019. do 2020. godine.

Solarna postrojenja mogu trajati i duže od 40 godina

Pored fotonaponskih solarnih sistema, energija se može generisati i putem solarnih elektrana, gde paneli unutar infrastrukture mogu trajati najmanje 40 godina. Paneli se lako mogu zameniti i unaprediti novim i efikasnijim modulima po relativno niskim troškovima, obezbeđujući njihov dug vek trajanja.

Solarna energetska postrojenja utiču na ekosisteme

Prema Nacionalnoj laboratoriji za obnovljivu energiju (NREL), da bi solarna elektrana obezbedila električnu energiju za 1.000 domaćinstava, potrebno je 32 hektara zemljišta. Drugim rečima, da bi se zadovoljile potrebe za potrošnjom energije u SAD, za solarna postrojenja bilo bi potrebno 18.734.500 hektara zemljišta, što je ekvivalentno 0,8% površine čitave zemlje. Pored korišćenja zemljišta, solarna termalna postrojenja zahtevaju upotrebu vode, a rizični materijali mogu biti opasni ako se ne odlažu na pravilan način.

Solarna energija će postati 35% jeftinija do 2024. godine

Jedna od najznačajnijih činjenica o solarnoj energiji je da će cene solarnih sistema značajno pasti u narednim godinama. Stručnjaci predviđaju da će se broj solarnih instalacija u SAD udvostručiti na četiri miliona do 2023. godine, dok se očekuje da će globalna upotreba solarnih sistema skočiti jer se sve više zemalja okreće ovakvoj energiji, kako bi ispunile svoje

klimate ciljeve. U 2021. godini, Australija je instalirala rekordnih preko 3.000 MW solarnih panela na krovovima, pri čemu gotovo jedna trećina australijskih domaćinstava ima solarne panele - najveći procenat u svetu. Pozitivan trend rasta će omogućiti pad cene solarnih sistema zbog njihove dostupnosti. Očekuje se da će cene do 2024. godine opasti u proseku za 15% do 35%.

Solarna energija je 2020. bila najjeftinija električna energija u istoriji

Prema izveštaju Međunarodne agencije za obnovljivu energiju (IRENA) iz 2020. godine, solarna energija je sada najjeftinija električna energija u istoriji. U većini većih zemalja, solarna tehnologija je takođe jeftinija od uglja i gasa.



Solar PV Accounts for 3% of Global Electricity Generation

Power generation from solar PV in 2020 grew by a record 156 TWh to reach 921 TWh, marking 23% growth from 2019, and accounts for 3.1% of global electricity generation. China, one of the world's top greenhouse gas emitters, alone was responsible for 75% of the increase in annual solar PV installations from 2019 to 2020.

Solar Power Plants Can Last 40 Years or More

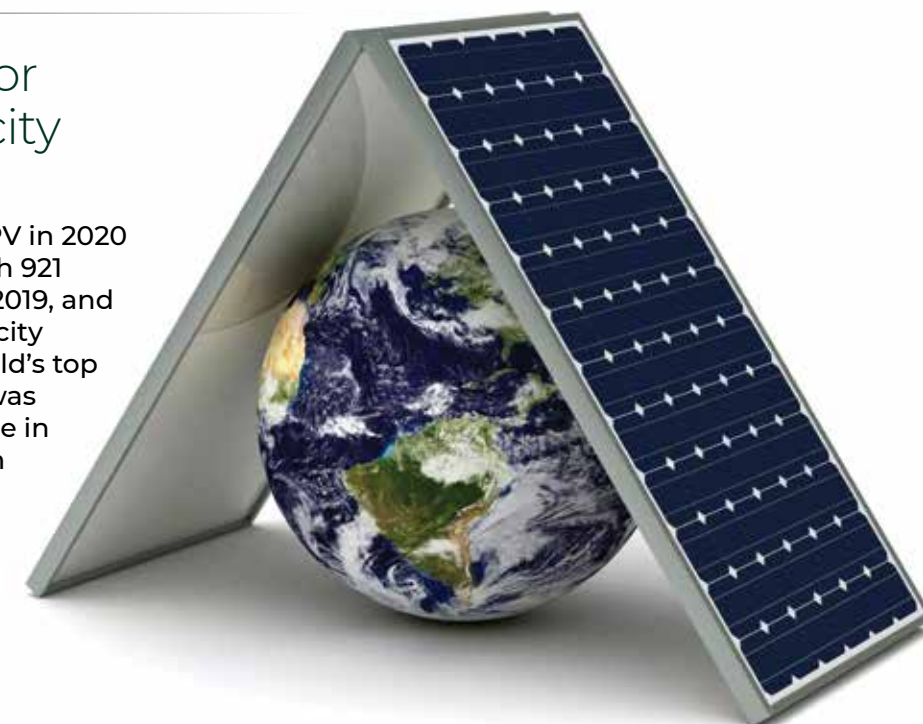
Aside from solar PV cell systems, energy can be generated with solar power plants where panels within an infrastructure can last at least 40 years. Panels can be easily replaced and updated with new and more efficient modules at relatively low costs, ensuring a long lifespan of these power plants.

Solar Power Plants Does Have Some Environmental Impacts

According to the National Renewable Energy Laboratory (NREL), for a solar power plant to provide electricity for 1,000 homes, the facility would require 32 acres of land. In other words, to meet the energy consumption needs of the US, the plant would require 18,734,500 acres to be used for solar plants, which is equivalent to 0.8% of the entire country. Aside from land use, solar thermal power plants require water use and hazardous materials can be dangerous if not disposed of correctly.

Solar Will Become 35% Cheaper By 2024

One of the most notable solar energy facts is that solar costs will drop significantly within the next few years. Industry experts have predicted that the US will double its solar installations to four million by 2023 while global uptake is projected to soar as more countries turn to solar to help meet their climate goals. In 2021, Australia installed a record more than 3,000MW of rooftop solar panels, where almost one-third



of Australian households have solar panels – the highest rate in the world. A positive uptake trend will allow solar costs to drop thanks to its accessibility. Some expect it decline by 15% to 35% by 2024, spurring further growth over the second half of the decade.

Solar Power in 2020 was the Cheapest Electricity in History

According to a 2020 report by the International Renewable Energy Agency (IRENA), solar power is now the cheapest electricity in history. In most major countries, solar technology is also cheaper than coal and gas.

China's Solar Power Capacity is the Fastest Growing in the World

China installed the most new renewable energy capacity in 2021 and is expected to reach 1,200GW of wind and solar capacity in 2026, four years earlier than its target. By 2024, China will also likely register the largest installed residential solar capacity in the world. This growing trend contributes to China's pledge to carbon peak by 2030 and to reach carbon neutrality by 2060. Unfortunately, the nation has also been increasing its coal use at the same time due to a recent energy crisis.



Indija želi da postane globalni lider u solarnoj energiji

Kao deo strategije Indije za postizanje nultih emisija do 2070. godine, premijer Indije Narendra Modi je obećao da će do kraja 2030. godine povećati udeo energije iz obnovljivih izvora na 50%. Jedan od ciljeva je instalacija 100 GW solarnih elektrana povezanih na mrežu do 2022. godine. Još jedan opšti cilj je decentralizacija solarnih elektrana i njihova široka distribucija radi zadovoljenja potreba za kuvanjem, osvetljenjem i drugim energetskim potrebama u zemlji. Međutim, pandemijske blokade i problemi sa lancem snabdevanja poremetili su mnoge projekte, što je rezultiralo instalacijom manjom od 4 GW kapaciteta solarnih PV sistema u 2020. godini, što je skoro 60% manje nego u 2019. godini.

Nedavni problemi u sistemu transporta omeli su rast solarnog sektora

Pandemija COVID-19 je ozbiljno uticala na globalnu ekonomiju na mnoge načine, a očekuje se da će solarna energetska industrija doživeti pad zbog porasta troškova sirovina kao što su čelik i aluminijum i povećanih troškova transporta zbog putnih ograničenja širom sveta. Ako se ovaj trend nastavi, to bi moglo predstavljati udarac za zemlje koje žele da povećaju proizvodnju i kapacitet solarnih elektrana, primoravajući ih da i dalje zavise od fosilnih goriva poput uglja i prirodnog gasa.

Solarne elektrane u Kini imaju najbrži rastući kapacitet na svetu

Kina je u 2021. godini instalirala najveći broj novih kapaciteta obnovljive energije i očekuje se da će do 2026. godine dostići 1.200 GW kapaciteta vetra i solarnih elektrana, četiri godine pre nego što je planirano. Do 2024. godine, Kina će najverovatnije registrovati najveći instalirani kapacitet solarnih elektrana za kućnu upotrebu na svetu. Ovaj rastući trend doprinosi kineskom obećanju da dostigne vrhunac emisije ugljenika do 2030. godine i da postigne neutralnost u emisiji ugljenika do 2060. godine. Nažalost, istovremeno, zemlja je povećala i upotrebu uglja zbog nedavne energetske krize.

Solarna tehnologija postaje efikasnija

Prema Ronu Rešu, predsedniku Udruženja industrije solarnih energetika (SEIA), globalni sektor fotonaponskih (PV) sistema je rastao prosečnom stopom od preko 40% u poslednjih osam godina, a značajni napreci u automatizaciji, proizvodnji i protoku su značajno unapredili ovu tehnologiju. Većina panela danas ima efikasnost između 15% i 20%, što znači da mogu pretvoriti 15% do 20% količine apsorbiranog sunčevog svetla u električnu energiju. Efikasnost panela se konstantno poboljšava poslednjih deset godina, što je obećavajući faktor koji doprinosi daljem smanjenju troškova. Osim toga, njihova otpornost na ekstremne vremenske uslove je značajno poboljšana, što im omogućava prosečnu trajnost od oko tri decenije sa minimalnim gubitkom efikasnosti.



India Aims to be a Global Leader in Solar Energy

As part of the country's 2070 net zero emissions strategy, the Prime Minister of India Narendra Modi pledged to increase its energy from renewable sources up to 50% by the end of 2030. One aim is to install 100GW of grid-connected solar power plants by 2022. Another overarching goal is to decentralise solar power and to widely distribute to meet the country's cooking, lighting and other energy needs. However, pandemic lockdowns and supply chain issues have disrupted many project constructions, resulting in only less than 4GW of solar PV capacity being installed in 2020, almost 60% less than in 2019.

Recent Supply Chain Issues Could Hinder Solar Energy Growth

The COVID-19 pandemic has severely impacted the global economy in many ways, and the solar energy industry is expected to experience decline in growth due to rising costs in raw materials such as steel and

aluminium, global supply chain bottlenecks, and elevated shipping costs from travel restrictions worldwide. Should this trend persists, this could deal a blow for countries to scale up solar energy production and capacity, forcing many to remain relying on fossil fuels such as coal and natural gas.

Solar Technologies Are Getting More Efficient

According to Rhone Resch, President of the Solar Energy Industries Association (SEIA), the global PV sector has been growing at an average of over 40% in the last eight years and major advances in automation, manufacturing, and throughput have considerably improved this technology. Most panels today are between 15% and 20% efficient, meaning that they are able to convert 15% to 20% of the amount of sunlight they absorb into electricity. Panels' efficiency has improved consistently over the past decade, a promising factor and one that contributes to continued cost reduction. Furthermore, their resistance to extreme weather has been drastically improved, bringing their average durability to about three decades with little to no loss in efficiency.



Noćni solarni paneli

KAKO FUNKCIONIŠU?



Specijalne solarne ćelije funkcionišu isto kao i njihovi dnevni parnjaci – samo u suprotnom smeru.

Specijalno dizajnirani paneli možda mogu da reše trenutni problem solarne energije, tako što će generisati struju i kada Sunce zađe.

Ovi paneli stvoreni su 2020. godine, kada su naučnici sa Dejvis Univerziteta u Kaliforniji došli do mejnstrim statusa.

Stvorene od strane profesora Džeremija Madija i nazvane „anti-solarne ćelije“, ovo rešenje omogućuje nam da generišemo struju i tokom noći. Istraživanje sprovedeno ove godine potvrdilo je da ovi noćni solarni paneli mogu da proizvedu dovoljno struje da se napuni mobilni telefon.

Originalna studija sprovedena je na Stanford Univerzitetu gde je istraživački tim dodao termoelektrični generator – uređaj koji proizvodi struju pomoću temperaturnih razlika – na jedan od ovih solarnih panela.

Oni funkcionišu tako što koriste toplotu ili infracrveno zračenje zadržano na površini solarnog panela.

- Ispostavilo se da je solarni panel izuzetno

efikasan toplotni radijator – rekao je glavni naučnik Šenhui Fan i dodao:

- Noću, solarni paneli zapravo mogu da dosegnu temperaturu nižu od sobne temperature, a to predstavlja nesvakidašnju mogućnost za prikupljanje električne energije.

Problem tradicionalnih solarnih panela, odnosno fotonaponskih ćelija, jeste efekat promena godišnjih doba i činjenice da ne funkcionišu noću. Od oblačnog vremena do skraćene obdanice, nije samo zalazak Sunca ono što sprečava ove sisteme da budu održivi izvori obnovljive energije za ljude u mnogim krajevima sveta.

Noćne solarne ćelije rade na isti način kao njihovi dnevni parnjaci, ali u suprotnom smeru. Svake noći, temperatura izlazi iz zemlje u vidu infracrvenog zračenja sa ciljem da temperatura planete ostane konstantna.

U izjavi objavljenoj na sajtu Dejvis Univerziteta u Kaliforniji prošle godine, Mandi je objasnio – u ovim novim uređajima svetlost se emituje i struja i napon idu u suprotnom smeru, ali i dalje možete da generišete energiju.



Night Solar Panels

HOW DO THEY WORK?



The special solar cells work the same as their daytime counterparts - but in reverse.

Specially designed panels could help solve the current problems with solar energy, by generating power once the sun has gone down.

The panels were discovered in 2020, when scientists at the University of California Davis, US, hit the mainstream.

Created by Professor Jeremy Munday and coined 'anti-solar cells', the solution allows us to harvest electricity from the night sky. Research conducted this year now confirms these nighttime solar panels produce enough energy to charge a mobile phone.

The original study was conducted at Stanford University where a research team added a thermoelectric generator - a device that produces currents from temperature differences - to one of these particular solar panels.

They work by using the heat or infrared light radiated from the surface of the solar panel into space on clear nights.

- The solar panel turned out to be a very

efficient thermal radiator - says lead scientist Shanhui Fan.

- So, at night, the solar panel can actually reach a temperature that's below the ambient air temperature, and that's a rather unusual opportunity for power harvesting.

Traditionally solar panels, or photovoltaic cells, have suffered from the effects of changeable seasons and the fact that they don't work at night. From cloudy weather to dwindling day length, it's not just the dusk that stops them from providing a viable renewable energy source for people in many parts of the world.

The nighttime solar cells essentially work the same way as their daylight counterparts but in reverse. Every night, heat escapes the earth in the form of infrared radiation in order to keep the planet at a constant temperature.

In a statement posted on the University of California Davis website last year, Munday explained, „in these new devices light is instead emitted and the current and voltage go in the opposite direction but you still generate power.”





- Noćni uređaji mogu da generišu i do 50 vati struje po kvadratnom metru, četvrtinu u odnosu na konvencionalni panel u dnevnim uslovima. Oni mogu da funkcionišu i danju, ali svetlost mora da bude blokirana ili da sam panel bude okrenut tako da sunčevi zraci ne dodiruju direktno njihovu površinu.

Neka istraživanja čak sugerišu da bi ovi uređaji mogli da iskoriste toplotu, koja nastaje kao nuspojava rada mašina. - Možete koristiti drugačije materijale, ali fizika je ista – objasnio je Mandi.

Ideja noćnih solarnih panela dolazi od jednostavne stvari koju svi mi radimo svakodnevno.

Daleko od ove ideje, ljudi su stotinama godina koristili sličnu tehnologiju kako bi se aktiviralo noćno hlađenje. Kada otvorite svoje prozore i vrata nakon vrelog dana kako biste ohladili dom, koristite istu teoriju. U suštini, ovaj oblik pasivnog hlađenja koristi noćno nebo kao ogromni lavabo, koji odvlači zemljinu toplotu kada padne mrak.

- Lep aspekt ovog pristupa jeste u tome što u suštini noću imamo direktan izvor energije koji ne zahteva baterijsko skladištenje – dodao je Fan.

Godine 2021. projekat Stanford Univerziteta uvideo je da naučnici na sličan način pokušavaju da iskoriste razlike između dnevnih i noćnih temperatura, kako bi generisali struju.

Oni su uspeli da dokažu da ta tehnologija funkcioniše, ali da je veliki put pred njima po pitanju efikasnosti i učinkovitosti. Ovi solarni paneli u suprotnom smeru možda jesu prototipi, ali slična tehnologija bi mogla da danonoćno proizvodi električnu energiju na mestima nestabilnih vremenskih uslova i niskog nivoa osvetljenja. Noćne solarne ćelije imaju potencijal da budu korisne na nepristupačnim lokacijama za određene zadatke koji ne zahtevaju visoke nivoe snage, ali malo je verovatno da će promeniti postojeću energetska infrastrukturu. Ipak, Fan i njegov tim tvrde da bi sistem mogao da se unapredi tako da proizvodi više snage.



- The nocturnal devices are able to generate up to 50 watts of power per square metre, a quarter of what conventional panels can generate in the daytime. They also work in the daytime if the light is blocked or if they are pointed away from the sun.

Some research even suggests that they could be used to harness the waste heat generated by machinery. „You have to use different materials but the physics is the same,” Munday explains.

The idea for night solar panels comes from a simple practice we all do every day

Far from a new idea, people have been using similar technology to achieve nighttime cooling for hundreds of years. When you open your windows and doors after a hot day to cool down your house, you are using the same theory. Essentially this form of passive cooling uses the night sky as a massive heat sink, drawing warmth away from the earth once it gets dark.

„The nice aspect about this approach is that you essentially have a direct power source at night that does not require any battery storage,” added Fan.

In 2021, a project at Stanford University saw scientists similarly try to use the differences in day and night temperatures to generate electricity.

They managed to prove that the technology did work but there is a long way to go when it comes to efficiency and performance. These reverse solar panels may only be prototypes but a similar idea could operate around the clock providing energy in places with changeable weather conditions and low light levels. The nighttime solar cells have the potential to be useful in off-grid locations for certain low-power tasks, but they are unlikely to replace existing energy infrastructure. However, Fan and his team say the set-up could be improved to generate more power.



СИГУРНИ У СВОЈУ СНАГУ

Најчвршће везе почивају на подршци, поверењу и сигурности.

Тако заједно чувамо оно највредније, једни друге.

BURGERI NA BILJNOJ BAZI „održivija” verzija mesa



Smatra se da je mesna industrija, a pre svega uzgoj stoke, odgovorna za 18 odsto emisija štetnih gasova u atmosferu



PLANT-BASED BURGERS

a more „sustainable” version of meat

It is considered that the meat industry, and above all livestock farming, is responsible for 18% of emissions of harmful gases into the atmosphere



U SAD je još 60-ih godina postojala potreba da se uvedu pljeskavice koje nisu mesne, međutim, nije osmišljeno ništa dovoljno dobro da zadovolji ukus probirljivih potrošača. Najbolje što se moglo naći u lokalnim radnjama zdrave hrane bile su pljeskavice sačinjene od sočiva, crvenog pasulja, kukuruza ili pšenice.

Ipak, te imitacije nikoga nisu prevarile. I niko nikada nije pokušao da ih sprema na roštilju - barem ne dva puta.

Ali, ako se „ubrzamo” pola veka napred, jasno je da industrija biljnih proizvoda doživljava bum i vredi više od 40 milijardi dolara, prema podacima iz 2022. Danas postoje više alternativa siru, mleku, mesu, puteru i jajima - nego ikada ranije, a neki čak imaju ukus i performanse skoro ili jednako dobro kao njihovi „rivali”.

Takođe, zanimljivo je da su se u mnogim zajednicama nametnuli kao mejnstrim, a ne alternativa. Osim burgera, možete pronaći i viršle i kobasice na biljnoj bazi, i sve više restorana i lanaca brze hrane uključuje te proizvode u svoje jelovnike.

Ali, da li je to pozitivan trend? Koje su prednosti i mane biljnih zamena za meso? Da li su zaista zdravi, ili samo još jedan način za razvoj srčanih bolesti i gojaznosti?

Dva trenutno najpopularnija burgera na biljnoj osnovi su „Impossible Burger” (kompanija „Impossible Foods”) i „Beyond Burger” („Beyond Meat”). Potražnja za ovim „uverljivim” pljeskavicama raste eksponencijalno, kao i profit.

„Beyond Meat” je u proleće 2019. izašao na berzu, sa cenom od 25 dolara po akciji. Do početka leta iste godine, deonicama se trgovalo po ceni od 168 dolara. Impossible Foods je negde u isto vreme prijavio nedostatak zaliha, jer su se borili da održe korak sa potražnjom potrošača za ovim pljeskavicama.

Neke od prednosti takve vrste burgera su:

Većina hamburgera na bazi graška nije GMO, a osim toga grašak ima brojne zdravstvene prednosti. Istraživanja pokazuju da je bogat fitonutrijentima, antioksidansima, i važnim mikronutrijentima poput selena, folata i vlakana.

Pljeskavice od sojinih proteina nude priličnu količinu gvožđa. U stvari, navodi se da „Impossible Burger” pruža 25% više gvožđa - što je više od goveđeg hamburgera.

Mnogi burgeri sadrže isključivo organske namirnice.

Neke od mana takve vrste burgera su:

Izolovani protein graška ekstrahovan u fabrici ne zadržava mnoge zdrave kvalitete originalnog graška. Pljeskavice sa proteinima graška često



Back in the 1960s, there was a need to introduce non-meat burgers in the US. However, nothing was devised well enough to satisfy the taste of discerning consumers. The best that could be found at local health food stores were burgers made from lentils, red beans, corn or wheat.

However, those imitations did not fool anyone. And no one has ever tried grilling them - at least not twice.

But if we „speed up” half a century forward, it is clear that the plant-based industry is booming and is worth more than \$40 billion, according to data from 2022. Today there are more alternatives to cheese, milk, meat, butter, and eggs than ever before, and some even have taste and performances almost or just as good as their „rivals”.

It is also interesting that in many communities they have imposed themselves as the mainstream rather than an alternative. In addition to burgers, you can also find plant-based hot dogs and sausages, and more and more restaurants and fast food chains include these products on their menus.

But is it a positive trend? What are the pros and cons of eating plant-based meat alternatives? Are they really healthy, or just another way to develop heart disease and obesity?

Two of the most popular plant-based burgers right now are Impossible Burger (Impossible Foods) and Beyond Burger (Beyond Meat). The demand for these „believable” burgers is growing exponentially, as well as profits.

Beyond Meat went public in the spring of 2019, priced at \$25 per share. By early summer of the same year, the stock was trading at \$168. Impossible Foods reported stock shortage at the same time as they struggled to keep up with consumer demand for these burgers.

Some of the advantages of this type of burger are:

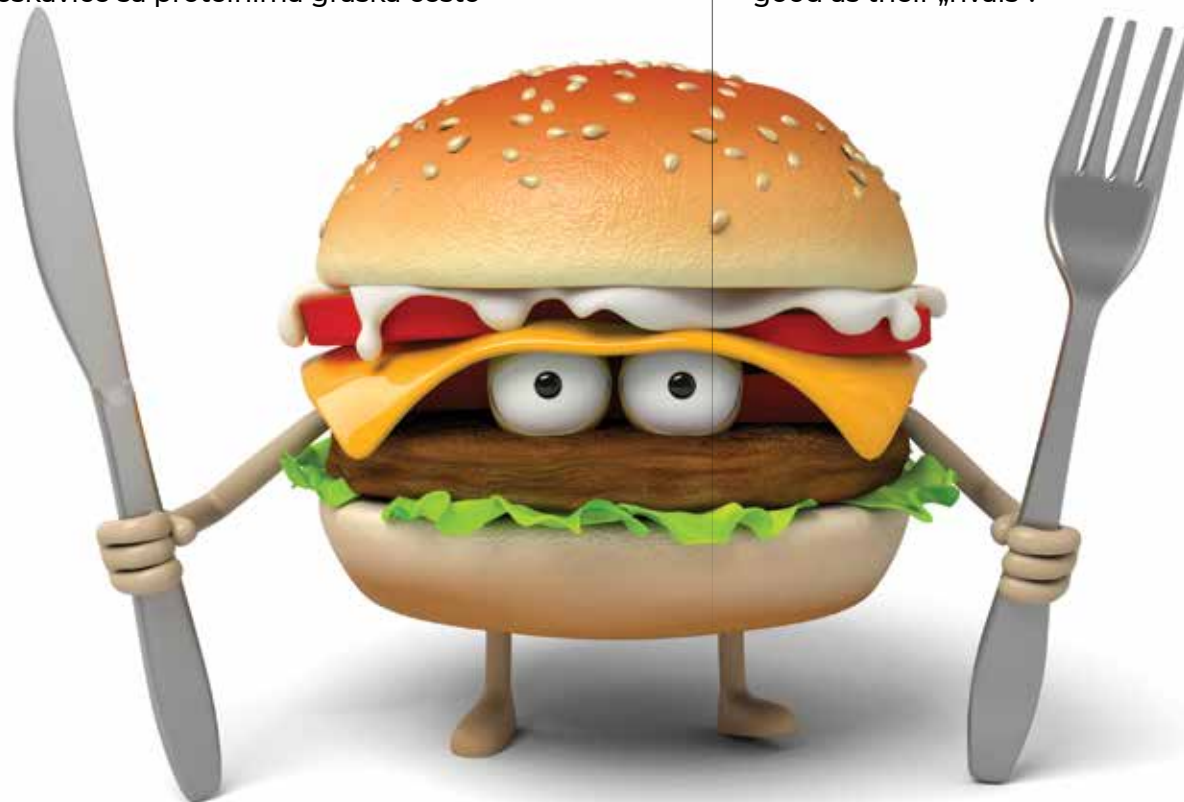
Most pea-based burgers are non-GMO, and in addition, peas have numerous health benefits. Research shows that it is rich in phytonutrients, antioxidants, and important micronutrients like selenium, folate, and fiber.

Soy protein burgers offer a fair amount of iron. In fact, Impossible Burger is said to provide 25% more iron — more than a beef burger.

Many burgers contain only organic ingredients.

Some of the disadvantages of this type of burger are:

Factory-extracted pea protein isolate does not retain many of the healthy qualities of the original pea. Pea protein burgers often contain





sadrže i neke manje zdrave sastojke, kao što su rafinisana ulja.

Budući da je velika većina soje koja se danas uzgaja genetski modifikovana, moguće je da ovi hamburgeri sadrže GMO. „Impossible Burger” je svojevremeno promenio recept tako da koristi GMO soju i zapravo je test pokazao da u njemu ima 11 puta više glifosata nego što ga ima „Beyond Burger”.

Proteini iz mesa ne mogu biti zamenjeni ovakvim alternativama.

S druge strane, i one kompanije koje ostaju verne svojim mesnim specijalitetima, pronalaze načine da smanje zagađenje. Tako je Burger King 2020. objavio da će kravama ubuduće dodavati limunovu travu u ishranu, koja bi trebalo da utiče na bolje varenje, a samim tim i na smanjenje gasova.

Smatra se da je mesna industrija, a pre svega uzgoj stoke, odgovorna za 18 odsto emisija štetnih gasova u atmosferi. Dodatni problem je što metan ima efekat zadržavanja toplote 23 puta veći od ugljenika, dok oksid azota zadržava čak 296 puta više toplote od ugljenika.



some less healthy ingredients, such as refined oils.

Since the vast majority of soybeans grown today are genetically modified, it is possible that these hamburgers contain GMOs. Impossible Burger once changed the recipe so as to use GMO soybeans, and in fact a test showed that it had 11 times more glyphosate than Beyond Burger.

Meat proteins cannot be replaced by these alternatives.

On the other hand, even those companies that remain faithful to their meat specialties are finding ways to reduce pollution. Thus, in 2020, Burger King announced that it would add lemon grass to the cows' diet in the future, which should have an effect on better digestion, and therefore, on the reduction of gas.

It is considered that the meat industry, and primarily cattle breeding, is responsible for 18 percent of the emissions of harmful gases into the atmosphere. An additional problem is that methane has a heat retention effect 23 times greater than carbon, while nitrous oxide retains as much as 296 times more heat than carbon.

Elegancija

inspirisana prirodom.



Kao jedan od najbrže rastućih brendova na regionalnom tržištu kućnih aparata, Tesla nudi elegantne i kvalitetne uređaje koji olakšavaju živote, pružaju razne mogućnosti zabave, i omogućuju efikasniju i jednostavniju svakodnevnicu.

Istražite ceo Tesla asortiman na tesla.info. Dobro došli u svet u kojem tehnologija pripada svima.

Tehnologija svima

TESLA

Automobili na struju

Electric cars

Zašto su električni automobili bolji od konvencionalnih za životnu sredinu?

Why are electric cars better than conventional cars for the environment?



Mnogi stručnjaci se slažu da će elektrifikacija transportnog sektora biti od vitalnog značaja u naporima da se zaustave klimatske promene. Električna vozila (EV) postoje već dugi niz godina, ali zahvaljujući neverovatnim tehnološkim inovacijama i napretku poslednjih godina, industrija raste brzinom bez presedana. Istraživanja i razvoj doneli su značajna poboljšanja u trajanju baterije i smanjili ukupne troškove proizvodnje i kupovine. Sa sve više električnih vozila na putu, razmatramo zašto su električni automobili bolji za životnu sredinu od onih na gas.

Nekoliko država postavilo je prelazak na električne automobile kao prioritet u

planovima za postizanje klimatskih ciljeva. Do sada je 17 zemalja najavilo ciljeve za potpuni prelazak na vozila sa 100 odsto nultom emisijom ili postepeno ukidanje vozila sa motorima sa unutrašnjim sagorevanjem do 2050. godine. Najmoćnije svetske ekonomije, SAD i Kina, utrkuju se jedna protiv druge da postanu lideri na tržištu električnih vozila, s tim da je Kina napravila izuzetan napredak u širenju industrije. Od 2020. godine Kina je prodala više od tri miliona putničkih električnih vozila, što je duplo više od broja prodanih električnih automobila u SAD. Kina takođe ima preko 400 registrovanih brendova u industriji novih energetske vozila (NEV) i



Many experts agree that the electrification of the transport sector will be vital in efforts to stop climate change. Electric vehicles (EVs) have been around for many years, but thanks to incredible technological innovations and advancements in recent years, the industry is growing at an unprecedented rate. Research and development have brought significant improvements in battery life and reduced overall manufacturing and purchasing costs. With more electric vehicles on the road, we take a look at why electric cars are better for the environment than gas-powered ones.

Several countries have made the transition to electric cars a priority in their plans to

meet climate goals. So far, 17 countries have announced targets for a complete transition to 100 percent zero-emission vehicles or a phase-out of vehicles with internal combustion engines by 2050. The world's most powerful economies, the US and China, are racing against each other to become leaders in the electric vehicle market, with China making remarkable progress in expanding the industry. As of 2020, China has sold more than three million passenger electric vehicles, which is double the number of electric cars sold in the US. China also has over 400 registered brands in the New Energy Vehicle (NEV) industry and over 500,000 electric buses, accounting for incredible 98 percent of the



preko 500.000 električnih autobusa, što čini neverovatnih 98 odsto globalne brojke. Ali budućnost ovog sektora izgleda podjednako obećavajuće u SAD. U Americi je prodaja električnih automobila porasla za više od 40 odsto godišnje od 2016. godine i očekuje se da će se taj broj povećati, jer plan predsednika Džoa Bajdena da postigne karbonsku neutralnost uključuje osiguranje da polovina svih prodaja novih vozila u zemlji bude sa nultom emisijom. Vlada povećava poreske kredite za potrošače za kupovinu novog električnog vozila na 12.500 dolara, sa sadašnjih 7.500, i finansira nove javne infrastrukture za punjenje. Američke države takođe preduzimaju mere usvajanjem kreditnih programa i strožijim standardima u pogledu emisije štetnih gasova. U Kaliforniji je potražnja za gorivom za električna vozila pokrenula trku za proizvodnju 1,2 miliona punjača do 2030. godine, jer Kalifornijska komisija za energiju predviđa da će do tada na putevima biti oko 7,5 miliona električnih vozila.

Velika Britanija je najavila zabranu prodaje novih automobila na benzin i dizel nakon 2030. godine u pokušaju da dostignu nultu emisiju do 2050. godine. Da bi podstakla tranziciju, vlada će uložiti skoro 12 milijardi funti (14 milijardi dolara) za uvođenje punjača za električna vozila širom zemlje, za podsticanje masovne proizvodnje EV baterija, kao i za podršku kupovini potrošača grantovima

Velika Britanija je najavila zabranu prodaje novih automobila na benzin i dizel nakon 2030. godine

koji će im omogućiti da uštede do 42 odsto. Slično tome, izvršna direktorka Hong Konga Keri Lam najavila je povećanje upotrebe električnih vozila kao deo gradskog plana za karbonsku neutralnost do 2050. godine. Procenjuje se da bi, ako bi svako vozilo bilo električno, ukupni karbonski otisak Hong Konga pao na 1,4 miliona tona sa sadašnjih 7,4 miliona tona.

Među najuspešnijim zemljama u tranziciji EV je Norveška. Evropska nacija je 2021. doživela neverovatan bum u prodaji, gde su EV vozila činila skoro 80% prodaje novih automobila. Ova zemlja takođe nastoji da bude prva u svetu koja će okončati prodaju motora sa unutrašnjim sagorevanjem do 2025. godine. Dok Norveška prednjači, druge evropske zemlje sustižu korak. Ako tržište u Evropi raste prema tržišnim predviđanjima - neverovatnih 1,697 odsto do 2030. godine - studije procenjuju da bi kontinent mogao da uštedi emisije ekvivalentne sadnji jedne milijarde stabala (ili šuma veća od Belgije) kao i da utiče na smanjenje nivoa mora za 2,19 milimetara.

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global figure. But the future of the sector looks equally promising in the US. In America, sales of electric cars have grown by more than 40 percent annually since 2016, and that number is expected to increase as President Joe Biden's plan to achieve carbon neutrality includes ensuring that half of all new vehicle sales in the country are zero-emissions. The government is increasing tax credits for consumers to buy a new electric vehicle to \$12,500, from the current \$7,500, and funding new public charging infrastructure. US states are also taking action by adopting credit programs and stricter emissions standards. In California, demand for electric vehicle fuel has sparked a race to produce 1.2 million chargers by 2030, as the California Energy Commission predicts there will be about 7.5 million electric vehicles on the road by then.

The UK has announced a ban on the sale of new petrol and diesel cars after 2030 in an attempt to reach zero emissions by 2050. To encourage the transition, the Government will invest nearly £12 billion (\$14 billion) to roll out electric vehicle chargers across the country, encourage mass production of EV batteries, and support consumer purchases with grants that will allow them to save up to 42 percent. Similarly, Hong Kong Chief Executive Carrie Lam has announced an increase in the use of electric vehicles as part of the city's plan to be carbon

neutral by 2050. It is estimated that if every vehicle were electric, Hong Kong's total carbon footprint would drop to 1.4 million tons from the current 7.4 million tons.

Norway is among the most successful countries in EV transition. The European nation experienced an incredible sales boom in 2021, with EVs accounting for nearly 80% of new car sales. The country also aims to be the first in the world to end sales of internal combustion engines by 2025. While Norway leads the way, other European countries are catching up. If the market in Europe grows according to market predictions - a whopping 1,697 percent by 2030 - studies estimate that the continent could save emissions equivalent to planting one billion trees (or a forest larger than Belgium) and affect sea level lowering by 2.19 millimeters.

In general, switching to EVs is undoubtedly a good strategy to stop global warming. Indeed, if all cars on the road went electric, we could cut almost one-fifth of global emissions. The benefits of expanding the electricity sector go beyond just that we could enjoy cleaner air. We would also be less dependent on oil price spikes caused by wars and have more peaceful cities. But it is not just about cars. A silent revolution is

Great Britain has announced a ban on the sale of new gasoline and diesel cars after 2030.

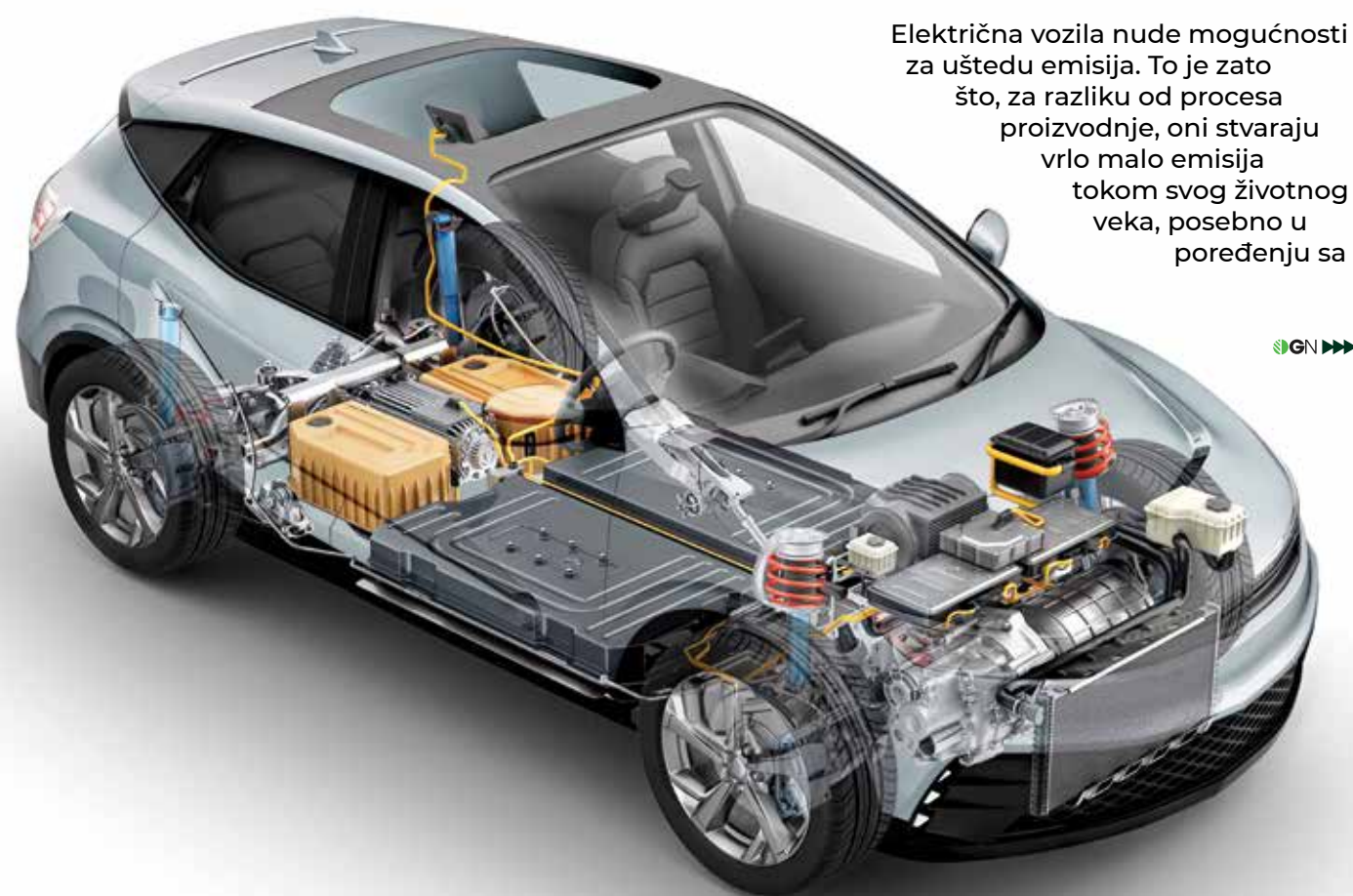
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Uopšteno govoreći, prelazak na EV nesumnjivo predstavlja dobru strategiju za zaustavljanje globalnog zagrevanja. Zaista, kada bi svi automobili na putu postali električni, mogli bismo da smanjimo skoro jednu petinu globalnih emisija. Prednosti širenja električnog sektora ne prevazilaze samo to što bismo mogli da uživamo u čistijem vazduhu, već bismo bili i manje zavisni od skokova cena nafte izazvanih ratovima i imali bismo mirnije gradove. Ali ne radi se samo o automobilima. U globalnom transportnom sektoru se dešava tiha revolucija, elektrifikacija bicikala, motocikala, autobusa, teretnih vozova, traktora, teških kamiona raste neverovatnom brzinom. Inovacije u ovoj oblasti, kao i pad troškova čiste energije, pri čemu solarna energija postaje najjeftiniji oblik energije koji trenutno imamo, dovode do nižih troškova proizvodnje EV baterija, a time i do nižih nabavnih cena. Iako nema sumnje da će električna vozila biti važna u borbi protiv klimatske krize, podjednako je važno odgovoriti na ključno pitanje: da li su električni automobili zaista bolji za životnu sredinu od onih sa motorima sa unutrašnjim sagorevanjem?

Kina je 2019. godine odredila odgovornost proizvođača za reciklažu istrošenih baterija



OTISAK EV BATERIJA

Kada analizirate da li su električni automobili bolji za životnu sredinu, važno je razmisliti o otisku koji stvaraju EV baterije. Poznato je da je početni uticaj na životnu sredinu od trenutne proizvodnje električnih vozila veći od proizvodnje motora sa unutrašnjim sagorevanjem, posebno od proizvodnje baterija za električne automobile.

Litijum-jonske baterije – najčešći tip EV baterija – sadrže dve energetski guste sirovine: litijum i kobalt. Da bi se zadovoljila naglo rastuća potražnja, proizvodni kapacitet je dostigao rekordne nivoe, kao i rudarstvo za ova dva metala. Međutim, nije pitanje da li svet ima dovoljno litijuma. Uprkos očekivanjima da će potražnja porasti sa otprilike pola miliona metričkih tona u 2021. na oko 3 miliona metričkih tona u 2030. godini, stručnjaci veruju da postoji dovoljno proizvoda za snabdevanje industrije litijum-jonskih baterija.

Kako tehnologije baterija nastavljaju da se poboljšavaju, troškovi kao i emisije koje proizilaze iz proizvodnje EV baterija prilično padaju. Što je još važnije, emisije proizvedene tokom proizvodnje su visoko kompenzovane tokom životnog veka električnih automobila.

KOLIKO ELEKTRIČNA VOZILA EMITUJU ŠTETNIH GASOVA KADA SU NA PUTU?

Električna vozila nude mogućnosti za uštedu emisija. To je zato što, za razliku od procesa proizvodnje, oni stvaraju vrlo malo emisija tokom svog životnog veka, posebno u poređenju sa



In 2019, China established manufacturer responsibility for the disposal and recycling of used batteries.



taking place in the global transport sector - the electrification of bicycles, motorcycles, buses, freight trains, tractors, heavy trucks is growing at an incredible speed. Innovations in this area, as well as falling costs of clean energy, with solar energy becoming the cheapest form of energy we currently have, are leading to lower production costs for EV batteries and thus lower purchase prices. While there is no doubt that electric vehicles will be important in the fight against the climate crisis, it is equally important to answer a key question: are electric cars really better for the environment than those with internal combustion engines?

FOOTPRINT OF EV BATTERIES

When analyzing whether electric cars are better for the environment, it is important to think about the footprint created by EV batteries. It is known that the initial environmental impact of the current production of electric vehicles is greater than the production of internal combustion engines, especially the production of batteries for electric cars.

Lithium-ion batteries – the most common

type of EV battery – contain two energy-dense raw materials: lithium and cobalt. To meet the skyrocketing demand, production capacity has reached record levels, as has mining for these two metals. However, the question is not whether the world has enough lithium. Despite demand expected to grow from roughly half a million metric tons in 2021 to about 3 million metric tons in 2030, experts believe there is enough product to supply the lithium-ion battery industry.

As battery technologies continue to improve, the costs as well as the emissions resulting from the production of EV batteries are dropping considerably. More importantly, the emissions produced during production are highly offset during the lifetime of electric cars.

HOW MUCH HARMFUL GASES DO ELECTRIC VEHICLES EMIT WHEN THEY ARE ON THE ROAD?

Electric vehicles offer opportunities to save emissions. This is because, unlike the manufacturing process, they generate very few emissions during their lifetime, especially





konvencionalnim vozilima. Motori sa unutrašnjim sagorevanjem (IC) koji rade na fosilno gorivo proizvode oko 10% svetske emisije gasova staklene bašte. Kao i litijum za baterije, benzin za pogon neelektričnih automobila mora da se kopa. U ovom slučaju, za većinu emisija koje se sastoje samo od gasova staklene bašte, ali i metana i azot-dioksida, odgovoran je proces rafinacije nakon što je sirova nafta izvađena. I dok se često iznosi argument da će se nafta vaditi za druge svrhe bez obzira da li prelazimo na električna vozila ili ne, neosporno je da će postepeno ukidanje vozila na benzin smanjiti potražnju, a samim tim i emisije štetnih gasova.

Dok su emisije iz izduvnih cevi električnih vozila ravne nuli, koliko zagađuju zavisi i od tipa vozila. Električna vozila imaju veliki potencijal za smanjenje emisije gasova sa efektom staklene bašte. Međutim, u mnogim zemljama kao što su SAD, struja i dalje potiče iz elektrana na uglj. Shodno tome, vožnja električnih automobila u ovim regionima i dalje ima veći uticaj od vožnje u oblastima sa čistim izvorima energije. Ipak, kako se obnovljivi izvori energije šire neverovatnom brzinom širom sveta, zabrinutost oko emisije električnih vozila tokom njihovog životnog veka značajno se smanjuje.

ŠTA JE SA EMISIJAMA BATERIJE NA KRAJU ŽIVOTNOG VEKA?

Poslednji aspekt koji se mora uzeti u obzir kada pokušavate da razumete da li su električni automobili bolji za životnu sredinu od vozila sa motorom sa unutrašnjim sagorevanjem ima veze sa odlaganjem EV baterija. Kako industrija raste, raste i broj korišćenih baterija. Činjenica da se ne recikliraju ili adekvatno skladište postaje sve problematičnija.

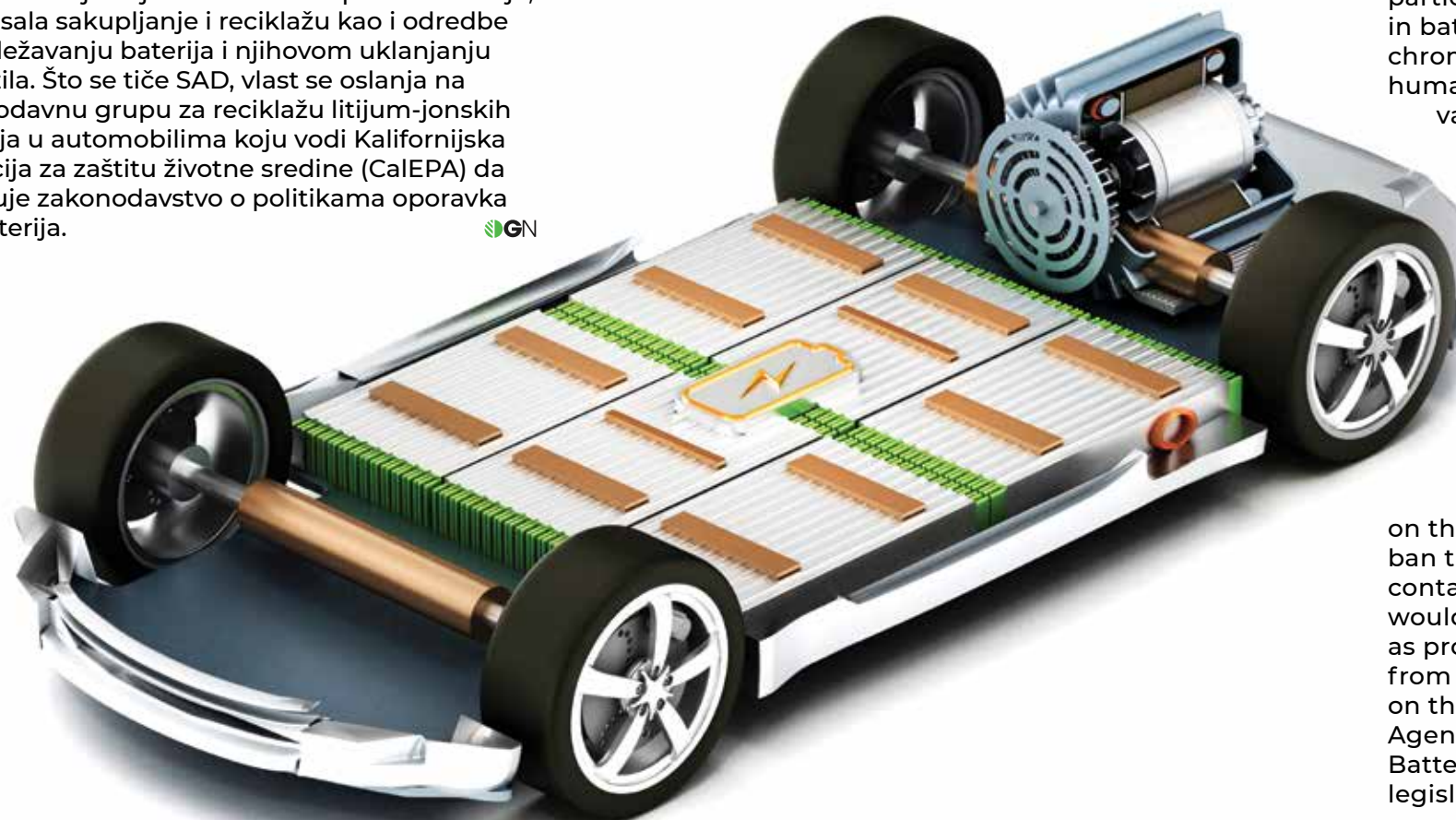
Prema IEA, obim baterija za električna vozila koje će biti povučene do 2030. godine je skoro jednak trenutnoj godišnjoj proizvodnji baterija. Da bi se sprečilo da iskorišćene baterije postanu značajno opterećenje za životnu sredinu, industrija treba da smisli efikasne mere za njihovo recikliranje. Samo 5 odsto litijum-jonskih baterija se reciklira, pokazala je analiza podataka iz 2021. godine, što je veoma alarmantno, s obzirom da se više

od 90 odsto kobalta i nikla može lako ukloniti.

Štaviše, neki od metala sadržanih u EV baterijama su veoma štetni čak i u malim količinama. Pošto se većina njih odlaze na deponije, curenja zagađivača životne sredine su prilično česta. Često ova curenja dovode do podzemnih požara, koji posledično ispuštaju više zagađivača u atmosferu. Kada čestice opasnih metala sadržanih u baterijama – poput arsena, kadmijuma, hroma, kobalta i bakra – uđu u ljudski respiratorni sistem, mogu izazvati razne zdravstvene probleme. Slično tome, ovi toksični metali mogu kontaminirati izvore vode, ugrožavajući ne samo ljude već i biodiverzitet životinja. S obzirom na probleme povezane sa prestankom veka trajanja baterija, neki od ključnih svetskih regiona traže načine da razviju svoju politiku kako bi regulisali sakupljanje i recikliranje baterija. Na primer, Kina je 2019. godine odredila odgovornost proizvođača za odlaganje i reciklažu istrošenih baterija.

Slično, Evropska unija radi na Direktivi o baterijama koja bi zabranila stavljanje u promet baterija koje sadrže neke opasne materije, regulisala sakupljanje i reciklažu kao i odredbe o obeležavanju baterija i njihovom uklanjanju sa vozila. Što se tiče SAD, vlast se oslanja na Savetodavnu grupu za reciklažu litijum-jonskih baterija u automobilima koju vodi Kalifornijska agencija za zaštitu životne sredine (CalEPA) da savetuje zakonodavstvo o politikama oporavka EV baterija.

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compared to conventional vehicles. Internal combustion (IC) engines running on fossil fuel produce about 10% of the world's greenhouse gas emissions. Like lithium for batteries, gasoline to power non-electric cars must be mined. In this case, however, the refining process after the crude oil has been extracted is responsible for most of the emissions, which consist not only of greenhouse gases, but also of methane and nitrogen dioxide. And while the argument is often made that oil will be extracted for other purposes regardless of whether we switch to electric vehicles or not, it is undeniable that phasing out gasoline-powered vehicles will reduce demand, and thus emissions.

While exhaust pipe emissions of electric vehicles are zero, how much they pollute depends on the type of vehicle. Electric vehicles have great potential for reducing greenhouse gas emissions. However, in many countries such as the US, electricity still comes from coal-fired power plants. Consequently, driving electric cars in these regions still has a higher impact than driving in clean energy areas. However, as renewable energy sources spread at an incredible rate around the world, concerns about electric vehicles emissions during their lifetime are decreasing significantly.

WHAT ABOUT END-OF-LIFE BATTERY EMISSIONS?

A final aspect that must be considered when trying to understand whether electric cars are better for the environment than vehicles with an internal combustion engine has to do with the disposal of EV batteries. As the industry grows, so does the number of batteries used. The fact that they are not recycled or adequately stored is becoming more and more problematic.

According to the IEA, the volume of batteries for electric vehicles that will be withdrawn by 2030 is almost equal to the current annual production of batteries. To prevent used batteries from becoming a significant burden on the environment, the industry needs to come up with effective measures for their recycling. Only 5 percent of lithium-ion batteries are recycled, an analysis of data from 2021 showed, which is very alarming, considering that more than 90 percent of cobalt and nickel can be easily removed.

Moreover, some of the metals contained in EV batteries are very harmful even in small amounts. Since most of them are disposed of in landfills, the leakage of environmental pollutants is quite common. Often it leads to underground fires, which in turn releases more pollutants into the atmosphere. When particles of dangerous metals contained in batteries - such as arsenic, cadmium, chromium, cobalt and copper - enter the human respiratory system, they can cause various health problems. Similarly, these toxic metals can contaminate water sources, endangering not only humans but also animal biodiversity.

Considering the problems associated with end-of-life batteries, some of the world's key regions are looking for ways to develop their policies to regulate battery collection and recycling. For example, in 2019, China mandated manufacturer responsibility for the disposal and recycling of used batteries.

Similarly, the European Union is working on the Directive on batteries that would ban the placing on the market of batteries containing certain hazardous substances. It would regulate collection and recycling as well as provide battery labeling and their removal from vehicles. In the US, the Government relies on the California Environmental Protection Agency's (CalEPA) Lithium-Ion Automotive Battery Recycling Advisory Group to advise the legislature on EV battery recovery policies.

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NAJBOLJE mesto za život

Koncepti pametnih gradova se sve više usvajaju kao način da gradovi i urbana sredina smanje svoj karbonski otisak, potrošnju energije i zagađenje

The best place to live



ЕЛЕКТРОДИСТРИБУЦИЈА
СРБИЈЕ



Pametani grad je koncept koji predviđa usvajanje pametnih tehnologija za razmenu podataka, uključujući Internet inteligentnih uređaja (IOT) i informaciono-komunikacione tehnologije (ICT) kako bi se poboljšala energetska efikasnost, smanjile emisije gasova staklene bašte i poboljšao kvalitet života stanovnika u gradovima.

Ekonomski komisija Ujedinjenih nacija za Evropu (UNECE) i Međunarodna unija za telekomunikacije (ITU) zajednički su dale definiciju pametnih gradova. Oni su definisali da je pametan održivi grad „inovativni grad koji koristi informaciono-komunikacione tehnologije (IKT) i druga sredstva za poboljšanje kvaliteta života, efikasnosti gradskog poslovanja i usluga i konkurentnosti, istovremeno zadovoljavajući potrebe sadašnjih i budućih generacija. u pogledu ekonomskih, društvenih, ekoloških i kulturnih aspekata.”

Svima nam je poznat pojam informacione tehnologije (IT), koji se odnosi na upotrebu tehnoloških infrastruktura za skladištenje, preuzimanje i slanje informacija. Ali, kada govorimo o pametnim gradovima i informacionoj tehnologiji, spominje se termin IKT, koji je više od običnog prikupljanja i prenosa informacija, već uključuje i razmenu informacija između zainteresovanih strana kroz komunikaciju uz pomoć tehnologije.

Drugim rečima, pametani grad ima za cilj da stvori mesto u kome su informacije skoro pa savršene. Veruje se da savršene informacije, koje se u ekonomiji često smatraju nerealističnom teorijom, značajno poboljšavaju kvalitet života. Na primer, ako svi potrošači i proizvođači znaju sve informacije o tržištu, uključujući cenu, kvalitet i karbonski otisak svakog pojedinačnog proizvoda, onda mogu bolje da odluče šta bi trebalo da kupe, a proizvođači moraju da se takmiče po ceni ili kvalitetu, što će sveukupno dovesti do boljih proizvoda na tržištu.

Koncepti pametnih gradova se sve više usvajaju kao način da gradovi i urbana sredina smanje svoj karbonski otisak, potrošnju energije i zagađenje. Dakle, da bi grad bio ekološki prihvatljiv, moramo prvo prikupiti podatke o životnoj sredini. Na primer, posedovanje senzora za merenje kvaliteta vazduha u gradu može pružiti informacije koje su nam potrebne da bismo identifikovali uzroke i posledice zagađenja vazduha. Sledeći korak je analiza podataka kako bi se došlo do praktičnih rešenja i procenili akcioni planovi.

Smart city concepts are increasingly being adopted as a way for cities and urban environments to reduce their carbon footprint, energy consumption and pollution



A smart city is a concept that envisages the adoption of smart data exchange technologies, including the Internet of Intelligent Devices (IOT) and Information and Communication Technologies (ICT) to improve energy efficiency, reduce greenhouse gas emissions and improve the quality of life of city citizens.

The United Nations Economic Commission for Europe (UNECE) and the International Telecommunication Union (ITU) have jointly defined smart cities. They defined that a smart sustainable city is „an innovative city that uses information and communication technologies (ICT) and other means to improve the quality of life, efficiency of city business and services and competitiveness, while meeting the needs of current and future generations „in terms of economic, social, environmental and cultural aspects.”

We are all familiar with the term information technology (IT), which refers to the use of technological infrastructures for storing, retrieving and sending information. But when we talk about smart cities and information technology, the term ICT comes to mind, which is more than the simple collection and transfer of information, it also includes the exchange of information between interested parties through communication with the help of technology.

In other words, a smart city aims to create a place where information is almost perfect. Perfect information, often considered an unrealistic theory in economics, is believed to significantly improve the quality of life. For example, if all consumers and producers know all information about the market, including the price, quality, and carbon footprint of each individual product, consumers can better decide what they should buy, and producers must compete on price or quality, which overall lead to better products on the market.

Smart city concepts are increasingly being adopted as a way for cities and urban environments to reduce their carbon footprint, energy consumption and pollution. So, to make a city environmentally friendly, we must first collect environmental data. For example, having sensors to measure air quality in a city can provide the information we need to identify the causes and effects of air pollution. The next step is to analyze the data to arrive at practical solutions and evaluate action plans.

In the past, evaluating the effects of



U prošlosti je procena efekata rešenja mogla biti skupa i dugotrajna. Ako rezultat nije zadovoljavajući, moralo bi se izmeniti rešenje i proći kroz isti proces sve dok se ne ispune ciljevi. Međutim, sa pojavom velikih podataka, stvari postaju mnogo jednostavnije jer se evaluacija može obaviti simulacijom, što može u velikoj meri smanjiti upotrebu resursa i vremena. Na primer, oslanjanje na geografske podatke može biti daleko jednostavnije za odlučivanje o najprikladnijoj i efikasnijoj obnovljivoj energiji za grad i pronalaženje najboljeg mesta za njeno korišćenje.

Podaci povezani sa okruženjem nisu ograničeni samo na objekte, već se odnose i na ljude. Planiranje grada može biti mnogo efikasnije ako se pronađu i ispituju podaci o ponašanju građana. Na primer, transportna preduzeća mogu da menjaju svoje rasporede, kao što su rute i broj smena na osnovu potreba građana. Sa takvim podacima možemo efikasno alocirati resurse i sprečiti značajne količine otpada. Procenjuje se da će svaka osoba generisati 10 do 15 odsto manje gasova staklene bašte, 30 do 130 kilograma manje čvrstog otpada godišnje i trošiti 25 do 80 litara manje vode dnevno optimizacijom korišćenja energije i praćenjem karbonskog otiska.

Na kraju, koliko bi grad trebalo da bude pametan? Ovo je pitanje na koje moramo odgovoriti. Na Zapadu, gde su društva više kapitalistička i individualistička po prirodi, slobodan pristup i deljenje poverljivih informacija koje se odnose na privatnost pojedinaca i korporacija, prilično je stran koncept



solutions could be expensive and time-consuming. If the result is not satisfactory, one would have to modify the solution and go through the same process until the objectives are met. However, with the advent of big data, things become much simpler because the evaluation can be done through simulation, which can greatly reduce the use of resources and time. For example, relying on geographic data can make it far simpler to decide on the most appropriate and efficient renewable energy for a city and find the best place to use it.

Data related to the environment is not only limited to objects, but also refers to people. City planning can be much more effective if data on citizen behavior is found and examined. For example, transportation companies can change their schedules, such as routes and number of shifts, based on the needs of citizens. With such data, we can efficiently allocate resources and prevent significant amounts of waste. It is estimated that each person will generate 10 to 15 percent less greenhouse gases, 30 to 130 kilograms less solid waste per year and consume 25 to 80 liters less water per day by optimizing energy use and monitoring the carbon footprint.

After all, how smart should a city be? This is the question we must answer. In the West, where societies are more capitalistic and individualistic in nature, the free access and sharing of confidential information related to the privacy of individuals and corporations is in many ways at odds with the concept.



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Otapanje leda na Antartiku

Melting of Ice in Antarctica



Kolaps cirkulacije okeana, kažu stručnjaci, imaće razorne i dugoročne posledice na vremenske prilike, nivo mora i morske ekosisteme

The collapse of ocean circulation, experts say, will have devastating and long-term consequences on weather patterns, sea levels, and marine ecosystems



Brzo otapanje antarktičkog leda dovešće do usporavanja dubokih okeanskih struja, što dalje dovodi do ubrzanja porasta nivoa mora i promena u svetskoj klimi koje će se osećati vekovima, upozoravaju australijski naučnici.

Meridionalna preokretna cirkulacija okeana je komponenta cirkulacije koju pokreće kretanje hladnije, gušće vode prema morskom dnu u blizini Antarktika. Ove cirkulacije pomažu u isporuci toplote, ugljenika, kiseonika i neophodnih nutritivnih materija širom sveta. Međutim, kako se slatka voda iz ledene kape topi, slanost i gustina morske vode se smanjuju, usporavajući kretanje dubokih struja.

Prema novoj istraživačkoj studiji, objavljenoj u naučnom časopisu Nature, duboki tokovi okeanske vode sa Antarktika mogli bi da se uspore za 40 odsto za tri decenije ako se nastavi trenutna stopa emisije gasova staklene bašte. Kolaps cirkulacije okeana, kažu stručnjaci, imaće

razorne i dugoročne posledice na vremenske prilike, nivo mora i morske ekosisteme i trajno će uticati na sposobnost okeana da apsorbuje ugljen-dioksid.

Prethodna istraživanja sugerišu da bi usporavanje Severnoatlantske struje, čiji je Gofjska struja deo, moglo da izazove veliko zahlađenje u Evropi. Ove dubokomorske struje, ili „prevrtanje” vode, na severnoj i južnoj hemisferi bile su relativno stabilne milenijumima, ali ih sada remeti globalno zagrevanje, kažu naučnici.

- Naši modeli pokazuju, da ako emisije ugljenika nastave da rastu trenutnom brzinom, onda će antarktička struja usporiti za 40 odsto u narednih 30 godina, što može dovesti do kolapsa okeanskih struja - kaže vođa studije profesor Metju Inland.

Dr Adel Morison objasnila je da kako okeanske struje usporavaju, voda na površini brzo dostiže svoj kapacitet da apsorbuje ugljenik, ali se



Rapid melting of Antarctic ice will lead to a slowdown of deep ocean currents, which in turn will accelerate sea-level rise and bring about long-lasting climate changes that will be felt for centuries, warn Australian scientists.

The Atlantic Meridional Overturning Circulation of the ocean is a component of circulation driven by the movement of colder, denser water towards the seafloor near Antarctica. These circulations help deliver heat, carbon, oxygen, and essential nutrients around the world. However, as freshwater from the ice cap melts, the salinity and density of seawater decrease, slowing down the movement of deep currents.

According to a new research study published in the scientific journal Nature, deep ocean currents from Antarctica could slow down by 40 percent within three decades if the current rate of greenhouse gas emissions continues. The collapse of ocean circulation, experts say, will

have devastating and long-term consequences on weather patterns, sea levels, and marine ecosystems, and will permanently impact the ocean's ability to absorb carbon dioxide.

Previous research suggests that a slowdown of the North Atlantic Current, of which the Gulf Stream is a part, could potentially trigger a significant cooling in Europe. These deep-sea currents, or „overturning” of water, in the northern and southern hemispheres have been relatively stable for millennia, but they are now being disrupted by global warming, say scientists.

„Our modelling shows that if global carbon emissions continue at the current rate, then the Antarctic overturning will slow by more than 40 per cent in the next 30 year” says study lead author Professor Matthew England.

Dr. Adel Morrison explained that as ocean currents slow down, surface water quickly reaches its capacity to absorb carbon but is then



onda ne zamenjuje vodom iz dubokog mora sa dezasićenom ugljenikom. Atlas studija je 2018. godine otkrila da je sistem cirkulacije vode u Atlantskom okeanu sada slabiji nego što je bio u bilo kom trenutku u proteklih 1.000 godina i da se značajno promenio u poslednjih 150 godina. Studija je takođe sugerisala da bi Atlantska meridionalna preokretna cirkulacija (AMOC), čiji je deo topla Gofrska struja, mogla da ohladi okean i severozapadnu Evropu i utiče na morski ekosistem.

Ipak, dr Morison kaže da bi usporavanje Južne struje imalo veći uticaj na morski ekosistem i Antarktiku.

- Morske struje donose na površinu važne hranljive materije koje tonu na dno kada organizmi uginu, čime se obnavljaju zalihe hranljivih materija za globalni ekosistem i za riblji fond. Druga velika implikacija koju bi ovo moglo imati je ubrzano topljenje Antarktiku u budućnosti. Naime, time se otvara put toplijim vodama koje mogu da ubrzaju otapanje, što u okean unosi još ređu, otopljenu vodu, što još više usporava cirkulaciju - kaže dr Morison.

Trenutna stopa globalnog zagrevanja je mnogo viša od 1,5 stepeni Celzijusa godišnje koliko je

utvrđeno Pariskim sporazumom, za koji naučnici kažu da je jedina šansa da izbegnemo najgore uticaje klimatskih promena. Zaista, prevazilaženje ove stope rizikuje da se pređe nekoliko prelomnih tačaka klimatskih promena, kritičnih pragova u sistemu koji, kada se prekorače, mogu dovesti do nepovratnih promena.

Oko 10 odsto svetske kopnene površine trenutno je prekriveno glečerima, koji čuvaju 70 odsto slatke vode na Zemlji. Otapanje glečera značajno doprinosi porastu nivoa mora, ugrožava snabdevanje vodom do dve milijarde ljudi i povećava rizik od prirodnih opasnosti i ekstremnih vremenskih pojava kao što su poplave.

Prema studiji objavljenoj u januaru, 68 odsto svetskih glečera će nestati po trenutnoj stopi globalnog zagrevanja, a najmanje polovina gubitaka će se desiti u narednih 30 godina. Do 2100. centralna Evropa, zapadna Kanada i SAD neće imati više glečera. Čak i pod najoptimističnijim scenarijem globalnog zagrevanja od 1,5 stepeni Celzijusa, 49 odsto glečera na planeti, ne uključujući ledene pokrivače Grenlanda i Arktika, i dalje bi se potpuno otopilo.



not replenished by deep water with depleted carbon. The Atlas of the study, published in 2018, revealed that the water circulation system in the Atlantic Ocean is now weaker than at any time in the past 1,000 years and has significantly changed in the last 150 years.

The study also suggested that the Atlantic Meridional Overturning Circulation (AMOC), of which the warm Gulf Stream is a part, could cool the ocean and northwest Europe and affect the marine ecosystem.

However, Dr. Morrison states that a slowdown of the Southern Current would have a greater impact on the marine ecosystem and Antarctica.

„Overturning brings up nutrients that have sunk down to the bottom when organisms die... to resupply nutrients for the global ecosystem and fisheries. The other larger implication that it could have is a feedback on how much of Antarctica melts in the future. It opens a pathway for warmer waters which could cause increased melt, which would be a further feedback, putting more meltwater into the ocean and slowing down circulation even more” says Dr. Morrison. The current rate of global warming is much higher than the 1.5

degrees Celsius per year established by the Paris Agreement, which scientists say is the only chance to avoid the worst impacts of climate change. Indeed, surpassing this rate risks crossing several climate change tipping points, critical thresholds in the system that, when exceeded, can lead to irreversible changes.

About 10 percent of the world's land surface is currently covered by glaciers, which store 70 percent of Earth's freshwater. Glacier melting significantly contributes to sea-level rise, jeopardizes water supply for up to 2 billion people, and increases the risk of natural hazards and extreme weather events such as floods.

According to a study published in January, 68 percent of the world's glaciers will disappear at the current rate of global warming, with at least half of the losses occurring within the next 30 years. By 2100, central Europe, western Canada, and the United States will no longer have glaciers. Even under the most optimistic scenario of global warming limited to 1.5 degrees Celsius, 49 percent of the world's glaciers, excluding the ice caps of Greenland and the Arctic, would still completely melt.





Vetroturbine spasavaju život pticama

Oslikavanje vetroturbin crno-belim prugama moglo bi da spreči sudar morskih ptica sa njima, sugerišu izveštaji.

Ovo nije prvi put da istraživači razmišljaju o tome da se vetroturbine učine vidljivijim. Norveška studija je 2020. godine otkrila da farbanje jednog sečiva u crno može smanjiti udare ptica do 70 odsto.

Profesor Grejem Martin, ornitolog specijalizovan za senzorni svet ptica, i Aleks Banks, specijalista za ornitologiju u Natural England, istraživali su ptičju percepciju, a studija je objavljena u časopisu „Global Ecology and Conservation journal“.

Oni tvrde da bi povećanje unutrašnjeg vizuelnog kontrasta vetroturbin korišćenjem ahromatskih šablona (što ih čini prugastim, drugim rečima) trebalo da učini nebo bezbednijim za ptice.

Ornitolozi su davno приметili da je „kljun ptica vođen okom“. Njihovu percepciju pokreće potreba za ishranom i otkrivanjem predatora.

Na isti način na koji su ljudi ranjivi na saobraćajne nesreće - kretanje „izvan evoluiranih granica naše percepcije“ - ptice su podložne novim preprekama, posebno na otvorenom prostoru.

Veće ptice, poput orlova i lešinara, imaju najveću prostornu rezoluciju od bilo koje životinje, što znači da mogu da primećuju neverovatno male detalje izdaleka. Ali oni su posebno podložni sudarima sa vetroturbinama, jer su im oči uperene nadole na plen.



Wind turbines save life of birds

Painting wind turbines with black and white stripes could prevent seabirds from colliding with them, reports suggest.

This is not the first time that researchers have thought about making wind turbines more visible. In 2020, a Norwegian study found that painting a single blade black can reduce bird strikes by up to 70 percent.

Professor Graham Martin, an ornithologist specializing in the sensory world of birds, and Alex Banks, a specialist in ornithology at Natural England, investigated bird perception, and the study was published in the Global Ecology and Conservation journal.

They argue that increasing the internal visual contrast of wind turbines by using achromatic patterns (making them striped, in other words) should make the skies safer for birds.

Ornithologists noted long ago that „the beak of a bird is guided by the eye.“ Their perception is driven by the need to feed and detect predators. In the same way that humans are vulnerable to traffic accidents - moving „beyond the evolved limits of our perception“ - birds are vulnerable to new obstacles, especially in open space.

Larger birds, such as eagles and vultures, have the highest spatial resolution of any animal, meaning they can see incredibly small details from afar. But they are particularly vulnerable to collisions with wind turbines, because their eyes are focused downwards on their prey.



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