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INTERVJU / INTERVIEW
GENERALNI DIREKTOR HEMOFARM GRUPE
HEMOFARM CEO

Ronald Seeliger

INTERVJU / INTERVIEW
SPECIJALISTA ZA POZICIONIRANJE OIE ZA JUGOISTOČNU EVROPU U THE NATURE CONSERVACY

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GLAVNI I ODGOVORNI UREDNIK
Olivera Krstić
EDITOR IN CHIEF

Zelena tranzicija

Green Transition

REČ UREDNIKA

Dragi čitaoci,

Sa velikim zadovoljstvom vam predstavljamo julski broj magazina Green News, posvećen obnovljivim izvorima energije i zaštiti životne sredine. U ovom izdanju, istražujemo najnovije inovacije i projekte koji doprinose stvaranju održivije budućnosti za sve nas.

Kako svet sve više prelazi na čiste energetske alternative, važno je da ostanemo informisani o dešavanjima i mogućnostima koje nas okružuju. Na stranicama ovog broja, možete pronaći inspirativne priče, stručne analize i korisne savete koji će vam pomoći da bolje razumete i doprinesete ovoj globalnoj tranziciji.

Pozivamo vas da redovno pratite naš portal www.greennews.rs, gde svakodnevno ažuriramo vesti i članke o najnovijim dešavanjima iz oblasti obnovljivih izvora energije, kako u zemlji, tako i u inostranstvu. Budite deo zajednice koja se zalaže za očuvanje naše planete i informišite se o najnovijim dostignućima i inicijativama koje oblikuju budućnost energetike.

Hvala vam što ste deo naše zelene misije.

S poštovanjem,
Olivera Krstić

EDITOR WORDS

Dear readers,

It is with great pleasure that we present the July issue of Green News magazine, dedicated to renewable energy sources and environmental protection. In this edition, we explore the latest innovations and projects that contribute to creating a more sustainable future for all of us.

As the world increasingly shifts to clean energy alternatives, it is essential to stay informed about the developments and opportunities around us. Within these pages, you will find inspiring stories, expert analyses, and practical advice to help you better understand and contribute to this global transition.

We invite you to regularly visit our portal www.greennews.rs. where we update news and articles on the latest happenings in the field of renewable energy, both domestically and internationally. Be part of the community that strives to preserve our planet and stay informed about the latest achievements and initiatives shaping the future of energy.

Thank you for being part of our green mission.

Sincerely,
Olivera Krstić

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Ronald Zeliger

GENERALNI DIREKTOR HEMOFARM GRUPE

Veliki izazov uvek počinje malim koracima

Održali smo veliki broj edukativnih obuka i komunicirali sa našim ljudima, tako da oni razumeju zašto nam je važno da postanemo održiva organizacija

Za Hemofarm je održivi razvoj bio samo teorija 2011. godine, kada smo počeli da gradimo svoj održivi način života. A danas, 13 godina kasnije ili bolje rečeno 12 izveštaja o održivom razvoju kasnije, nema sumnje da su svi naši poslovni rezultati svedočanstvo naše potpune posvećenosti održivom razvoju, kaže u ekskluzivnom intervjuu za naš magazin generalni direktor Hemofarm grupe Ronald Zeliger.

GN ***Mnogo ljudi je čulo za pojmove poput ESG-a i održivog razvoja, ali mnogi od njih ne znaju baš najpreciznije kako oni funkcionišu u praksi - da li možete da ih malo pojasnite kroz primer Hemofarma?***

- Počeli smo skoro kao pokret. Prvo smo se fokusirali na E – na ekološku stranu, jer smo želeli da budemo sigurni da nećemo uzaludno trošiti energiju. Kada je reč o G, to je nešto u čemu Hemofarm ima dugu tradiciju. Radeći u društvu, važno nam je, kako interno tako i eksterno, da budemo prisutni i proaktivni u podršci razvoju zemlje u kojoj radimo. S je posvećen ljudima – kako unutar tako i izvan naše organizacije – i mi negujemo našu ambiciju da budemo magnet za talente. Kao TOP Poslodavac u Srbiji imamo i dokaz za to, ali na kraju dana nije reč samo o sertifikatima, već o stvarnom zadovoljstvu ljudi. Pomno osluškujemo potrebe, želje i ideje naših zaposlenih.

Za Hemofarm je održivi razvoj bio samo teorija 2011. godine, kada smo počeli da gradimo svoj održivi način života. A danas, 13 godina kasnije ili bolje rečeno 12 izveštaja o održivom razvoju kasnije, nema sumnje da su svi naši poslovni rezultati svedočanstvo naše potpune posvećenosti održivom razvoju – na primer, iz godine u godinu obaramo rekorde u proizvodnji, uz stalno smanjenje potrošnje resursa; žene su većina zaposlenih; naša ambalaža je od recikliranog kartona, zahvaljujući čemu smo sačuvali šume koje bi mogle da pokriju površinu od 350 fudbalskih terena... Mislim da je očigledno da živimo i radimo održivo.

GN ***Hemofarm se smatra jednim od lidera kad je održivo poslovanje u pitanju. Možete li da pojasnite na koje ste sve načine uveli održivost i ekološku odgovornost u poslovanje kompanije?***

- Za nas je to bilo lako jer su naši inženjeri i tehničari bili veoma otvoreni da to prihvate. Kompetitivni, inovativni i preduzetnički način razmišljanja naših ljudi je u tome mnogo pomogao. Održali smo veliki broj edukativnih obuka i komunicirali sa našim ljudima, tako da oni razumeju zašto nam je važno da postanemo održiva organizacija. I na kraju, ali ne i najmanje važno, uvek podržavamo i slavimo naše izveštavanje o održivosti. I iako je to samo izveštaj, on akumulira sve informacije i podatke, s jedne strane, i dok prolazite kroz njega možete videti koliko je sveobuhvatan izazov biti u toku sa ESG-om, ali i gde smo stigli, a gde još uvek nismo. Za mene veliki izazov uvek počinje malim koracima, a ti ključni pokazatelji učinka (KPI's) i izveštavanje su mali koraci. Mnogo nam je pomoglo eksterno, ali gledajući od eksternog ka internom, vidim da mnogi naši ljudi objavljuju na društvenim mrežama i podržavaju ono što Hemofarm radi na održivosti. Uključivanje zaposlenih je prava vrednost koja dugoročno donosi rezultate.

GN ***Napomenuli ste da je oko 83 odsto Hemofarmovih proizvoda 2021. godine bilo u ambalaži od recikliranog kartona. Postoji li mogućnost da ova brojka dostigne 100 odsto?***

- Naša ambicija od kada smo počeli da pratimo ovaj parametar bila je 100%, ali teško je dostići 100% jer industrija u kojoj smo aktivni podleže veoma strogim propisima. Na primer, u nekim zemljama u koje izvozimo zakon ne prepoznaje mogućnost pakovanja u ambalažu od recikliranog kartona. Ipak, ponovo moram da istaknem da reciklirana ambalaža predstavlja sekundarno pakovanje farmaceutskog proizvoda i da ni na koji način ne ugrožava kvalitet i bezbednost proizvoda, što se opet prati kroz druge stroge farmaceutske standarde. Ova tema nije tako

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Ronald Seeliger

HEMOFARM CEO

Big challenge always starts with little steps

We did a lot of education and communication with our people, so they do understand why it is important for us to become sustainable organizatio

For Hemofarm, sustainable development was just a theory in 2011, when we began to build our sustainable way of life. And today, 13 years later, or more precisely, 12 sustainability reports later, there is no doubt that all our business results are a testament to our complete commitment to sustainable development, says Hemofarm's CEO Ronald Zeliger in an exclusive interview for our magazine.

Many people have heard of concepts like ESG and sustainable development, but many of them do not know exactly how they work in practice - can you explain them a little through the example of Hemofarm?

- We started almost as a grassroot movement. First, we focused on E – on the ecological side, as we wanted to be sure not to waste any energy. When it comes to G, it is something where Hemofarm has a long tradition. Working in the society, it is important to us, both internally and externally, to be present and proactive in support of the development of the country we are working in. The S is dedicated to people – both inside and outside our organization – and we are growing our ambition to be magnet for talents. As the TOP Employer in Serbia we have proof for that, but in the end it's not about certification, it's about real satisfaction of the people. We are very much listening to the needs and desires and ideas of our employees.

For Hemofarm, sustainable development was only a theory back in 2011, when we started to build our sustainable way of life. And now, 13 years later or rather 12 reports on sustainable development later, there is no doubt that all our business results are a testimony of our total commitment to sustainable development - for example, year after year we break production records, while constantly reducing resource consumption; women are the majority of employees; our packaging is made from recycled cardboard, thanks to which we saved forests that could cover the area of 350 football pitches... I think it's obvious that we live and work sustainably.

Hemofarm is considered one of the leaders when it comes to sustainable business. Can you explain in what ways you have introduced sustainability and environmental responsibility into the company's operations?

- It was easy because our engineers and technicians very much embraced this. The competitive, innovative, and entrepreneurial mindset of our people has helped in this a lot. We did a lot of education and communication with our people, so they do understand why it is important for us to become sustainable organization. And last but not the least, always cheering on and celebrating our Sustainability Reporting. And although it is just reporting, it cumulates all the information and data, on one hand, and while you go through it you can see how comprehensive challenge is to be up to date on ESG, but also where we are and where we are not yet. For me, big challenge starts always with little steps, and those KPI's and Reporting are little steps. It helped us a lot externally, but reflecting from external to internal, I see a lot of our people posting on social media and cheering about what Hemofarm is doing in sustainability. The inclusion of employees is a real value that brings results in the long run.

You mentioned that, for example, 83 percent of Hemofarm's products in 2021 were packaged in recycled cardboard. Is there a possibility that this number will reach 100 percent?

- Our ambition since we started monitoring this parameter was 100%, but it is hard to go to 100% as the industry in which we are active is subject to very strict regulations. For example, in some countries to which we export, the law does not recognize the possibility of packaging in recycled cardboard packaging. Now, I must point out again that recycled

Ronald Zeliger

GENERALNI DIREKTOR HEMOFARM GRUPE

Danas imate proizvođače ambalaže koji su proces pravljenja kutija od nerecikliranog kartona učinili zelenijim od onih koji proizvode reciklirane. Zbog toga i težimo da uvek pratimo sva aktuelna dešavanja na tržištu i da unapređujemo našu ambalažu u pravcu zelenijih rešenja

jednostavna, ali je za nas važna i izazovna. Danas imate proizvođače ambalaže koji su proces pravljenja kutija od nerecikliranog kartona učinili zelenijim od onih koji proizvode reciklirane. Zbog toga i težimo da uvek pratimo sva aktuelna dešavanja na tržištu i da unapređujemo našu ambalažu u pravcu zelenijih rešenja.

Kad govorimo o održivom razvoju, koji su dalji planovi Hemofarma na ovom polju, koje projekte planirate i na šta ćete staviti naglasak?

- To su svakako objekti sa ugljenično neutralnim otiskom i mi ka tome težimo, ali biće potrebno vreme da se to postigne. Takođe, nastavićemo dalje da radimo na optimizaciji našeg portfolija u pravcu održivih proizvoda, a ambalaža je jedan od naših prioriteta, i u skladu sa 5R pristupom u održivom razvoju proizvoda.

Digitalizacija je nesumnjivo i jedan od ključnih pravaca u kojem idemo; zamislite da je svako uputstvo o upotrebi leka zapravo QR kod, koliko bi drveća i energije uštedeli, smanjili veličinu pakovanja, a samim tim i težinu, i otpremili manje kamiona našim partnerima i potrošačima, uz značajno smanjenje emisije CO2; a zatim da taj QR kod ponudi mogućnost interakcije sa lekarom ili farmaceutom preko mobilne aplikacije... nebo je granica.

A tu je i naša stalna težnja da pratimo probleme u društvu i da kroz rad naše Hemofarm fondacije pomognemo u smanjenju pritiska na javni zdravstveni sistem; s tim u vezi, nastavićemo sa kampanjom koja promoviše doniranje organa.

Kao jedan od pionira u održivom poslovanju na ovim prostorima, kompanija je prošle godine u Vršcu predstavila jedan od svojih najvažnijih projekata – STADA EXPO, multimedijalnu mobilnu platformu. Koji je cilj ove platforme i šta ona tačno predstavlja?

- Baveći se održivim razvojem, shvatili smo da se o ovoj temi kako u Srbiji tako i u svetu najviše priča, a da je malo prilika da se ESG doživi na delu. Projektom STADA EXPO želeli smo da posetiocima pružimo konkretno ESG iskustvo. Kreirali smo i otvorili STADA EXPO da bi široj publici preneli poruku održivosti kako bi na jedan slikovitiji način videli šta je Hemofarm već uradio, šta oni mogu da urade i šta planiramo da radimo u budućnosti.

Sa STADA EXPO, priču o održivom razvoju iz sfere teorije prenosimo u sferu stvarnosti. Budimo fer, ljudi ne čitaju uvek tekstove, ali vole jasne slike i animacije. A ako se ljudi igraju sa ovim, mnogo im je lakše da održivost sprovedu u delo u svom svakodnevnom životu. Verujem da je STADA EXPO dobra polazna tačka u formiranju saveza kompanija, budući da je to naša obaveza jer smo važan deo društva, a ako se lideri ne pokrenu i preuzmu odgovornost, ništa se neće promeniti.

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Ronald Seeliger

HEMOFARM CEO

With STADA EXPO project, we wanted to provide visitors with a concrete ESG experience. We created and opened STADA EXPO to bring the message of sustainability to wider audience so they can see in a more illustrative way what Hemofarm did already, what they can do and what we are planning to do

packaging represents the secondary packaging of a pharmaceutical product and that it does not in any way threaten the quality and safety of the product, which is again monitored through other strict pharmaceutical standards. This topic is not so simple, but it is important and challenging for us. Today you have packaging manufacturers who have made the process of creating boxes from non-recycled cardboard greener than those who produce recycled ones. Therefore, our aspiration is to always follow all current events on the market and to improve our packaging in the direction of greener solutions.

When we talk about sustainable development, what are Hemofarm's further plans in this field, what projects are you planning and what will you emphasize?

- For certainly, it is carbon neutral facilities, and we are aiming towards this, but it will take time to accomplish this. We will also further work on the optimization of our portfolio in the direction of sustainable products and packaging is one of our priorities, and in accordance with the 5R approach in sustainable product development.

Digitalization is undoubtedly also one of the key directions in which we are going; imagine if every leaflet with instructions on the use of the drug was actually a QR code, how many trees and energy we would save, reduce the size of the packaging, and thus the weight, and ship fewer trucks to our partners and consumers, with a significant reduction in CO2 emissions; and then for that QR code to offer the option of interacting with a doctor or pharmacist through a mobile application... the sky is the limit.

And there is also our constant aspiration to monitor problems in society and to help reduce the pressure on the public health system through the work of our foundation; in this regard, we will continue with the campaign that promotes organ donation.

As one of the pioneers in sustainable business in this area, the company presented one of its most important projects in Vršac last year - STADA EXPO, a multimedia mobile platform. What is the purpose of this platform and what exactly does it represent?

- Dealing with sustainable development, we realized that this topic is mostly talked about in Serbia and the world, and that there are few opportunities to experience ESG in action. With STADA EXPO project, we wanted to provide visitors with a concrete ESG experience. We created and opened STADA EXPO to bring the message of sustainability to wider audience so they can see in a more illustrative way what Hemofarm did already, what they can do and what we are planning to do. With STADA EXPO, we bring the story of sustainability from a dry to a livable thing. Let's be fair, people don't always read texts, but they love clear pictures and animations. And if people play with this, it's much easier for them to put sustainability into action in their daily lives. I believe that STADA EXPO is good starting point in forming alliance of companies, because it is our obligation as we are an important part of the society, and if leaders don't step up to take their responsibility, nothing is going to change.

You stated that Hemofarm „takes great care of the origin of the raw materials it uses and the degree of sustainable development of our suppliers". How important are these standards for product quality and the overall picture related to the application of sustainable development in practice?

- The pharmaceutical industry is one of the most strictly regulated branches, and by nature it seeks to have high standards of quality. The responsibility of pharmaceutical manufacturers must be much greater than in other branches because we directly and indirectly affect people's health. In our industry, apart from strict rules regarding quality, there is another key control factor, and that is – pharmacovigilance. It is a legal obligation of everyone who manufactures and places pharmaceutical products on the market, and it is globally integrated into a unique monitoring system for suspected adverse drug effects. Our pharmacovigilance system constantly monitors the market and promptly responds to any doubt or information of interest to product and user safety.

You say you implement state-of-the-art ESG platforms for supplier evaluation - can you explain this process a bit?

- Assessment of ESG performance of suppliers is nothing new and we have been doing it for years through the assessment of business-social compliance. This topic is becoming more and more important today because it is becoming a legal obligation, at least for companies that have ties to the EU (whether they market their products there or are principally from the EU). I can highlight the latest EU regulation in the field of ESG - CSRD (Corporate Sustainability Reporting Directive), which expect companies to know what real ESG impacts are in the supply chain.

Today STADA and Hemofarm evaluate their suppliers through the EcoVadis platform, within which ESG parameters are monitored, and during the past year around 800 suppliers have already been evaluated; the point of this system is not only to eliminate those who have not progressed far enough in their own ESG

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Ronald Zeliger

GENERALNI DIREKTOR HEMOFARM GRUPE

Projektom STADA EXPO želeli smo da posetiocima pružimo konkretno ESG iskustvo. Kreirali smo i otvorili STADA EXPO da bi široj publici preneli poruku održivosti kako bi na jedan slikovitiji način videli šta je Hemofarm već uradio, šta oni mogu da urade i šta planiramo da radimo u budućnosti

Izjavili ste da Hemofarm „veoma vodi računa o poreklu sirovina koje koristi i o stepenu održivog razvoja naših dobavljača". Koliko su ovi standardni bitni za kvalitet proizvoda i celokupnu sliku vezanu primenu održivog razvoja u praksi?

- Farmaceutska industrija je jedna od najstrože regulisanih grana i po prirodi nastoji da ima visoke standarde kvaliteta. Odgovornost proizvođača lekova mora biti mnogo veća nego u drugim granama jer mi direktno i indirektno utičemo na zdravlje ljudi. U našoj industriji, osim strogih pravila o kvalitetu, postoji još jedan ključni faktor kontrole, a to je – farmakovigilanca. To je zakonska obaveza svakog ko proizvodi i plasira farmaceutske proizvode na tržište, a globalno je integrisan u jedinstveni sistem praćenja sumnjivih neželjenih dejstava lekova. Naš sistem farmakovigilance stalno prati tržište i blagovremeno reaguje na svaku sumnju ili informaciju od interesa za bezbednost proizvoda i korisnika.

Kažete da primenjujete najsavremenije ESG platforme za ocenu dobavljača - možete li da nam malo pojasnite ovaj proces?

- Procena ESG učinka dobavljača nije ništa novo i mi to radimo godinama kroz procenu poslovno-društvene usklađenosti. Ova tema danas postaje sve važnija jer postaje zakonska obaveza, barem za kompanije koje su povezane sa EU (bilo da tamo plasiraju svoje proizvode ili su suštinski iz EU). Mogu da istaknem najnoviju regulativu EU u oblasti ESG - CSRD (Corporate Sustainabilty Reporting Directive - Direktiva o izveštavanju o korporativnoj održivosti), koja od kompanija očekuje da znaju koji su stvarni ESG uticaji u lancu snabdevanja.

STADA i Hemofarm danas ocenjuju svoje dobavljače preko EcoVadis platforme, u okviru koje se prate ESG parametri, a tokom protekle godine je već ocenjeno oko 800 dobavljača.

Poenta ovog sistema nije samo da eliminiše one koji nisu dovoljno napredovali u sopstvenom razvoju ESG-a, već da preferira one koji su ESG bolji, a da pomogne drugima da unaprede sopstveni održivi razvoj.

Kako ocenjujete situaciju sa održivim razvojem u Srbiji, da li je napredak uočljiv i na kojim bi aspektima još trebalo da se poradi?

- Srbija ima odlične primere u oblasti održivog razvoja i brojne kompanije sa kojima Hemofarm promoviše ovu temu, uglavnom kroz aktivnosti UN Globalnog dogovora. Dakle, napredak je primetan u korporativnom svetu, i to je sada činjenica. U malim i srednjim preduzećima još uvek ima prostora za napredak i zato je važno imati razvojne programe da ova lokalna preduzeća nauče kako da ulažu u ESG. A ako nisu dovoljno profitabilni ili nemaju dodatni budžet, rešenje bi moglo biti da se država uključi i pomogne.

Zaista verujem da će se mlade generacije mnogo više zalagati za održivost, kako sa strane zapošljavanja, što već možemo i da vidimo, tako i sa strane potrošača. Na kraju krajeva, potrošači diktiraju mnogo, a ako im nije stalo do održivosti, onda imamo problem. Kao društvo imamo mnogo prostora za napredak i zato će Hemofarm nastaviti da ulaže u održivi razvoj i da slušamo ljude, jer održivost nije predavanje, već saradnja. Kako bih vam to slikovito objasnio, nedavno smo lansirali naš novi brend One Two Three, liniju proizvoda zasnovanu upravo na potrebama potrošača. A održivi razvoj nam je bio u velikoj meri u mislima kada smo kreirali naš novi brend, posebno sa aktivnim supstancama koje su najvišeg kvaliteta i omogućavaju visok stepen bioraspoloživosti i upotrebljivosti u telu, ali i sa upotrebom reciklirane ambalaže. Na kraju krajeva, naša misija i jeste da omogućimo svim korisnicima zdraviji i aktivniji život.

Mnogi su skeptični kad je u pitanju i ESG i održivi razvoj, a posebno ekološka slika planete u budućnosti. Da li su primeri poput Hemofarma i drugih velikih kompanija koje savesno posluju nešto čemu bi svi trebali da teže u procesu stvaranja održive budućnosti i „pročišćavanja" životnog okruženja? I da li ovo može da bude dovoljno da bi se obezbedila svetlija i zdravija budućnost?

- Pitanja govore sama za sebe – ne, nije dovoljno. Ali, ako mi nešto ne preduzmemo sada, onda od svega ovoga neće biti ništa. Naša je dužnost da kao odgovorni ljudi radimo na održivosti i nećemo prestati da verujemo da naša deca i njihova deca zaslužuju bolju budućnost, a iskreno, kao ljudi, do sada nismo bili baš dobri u tome. Dakle, hajde da napravimo promenu sada. U budućnosti će nam se suditi po onome što smo sada uradili. Oni koji zatvaraju oči pred onim što se dešava našoj planeti neodgovorni su prema sebi i budućim generacijama. Nećemo biti deo toga. Ali, ako sada počnete da radite na održivosti, to će dati mnogo više vremena sledećim generacijama. Ovo je moje čvrsto uverenje. Volimo ovu planetu, ona nam je jedini dom i moramo da ulažemo u održivost. To je naša javna dužnost kao ljudi, i ne radi se samo o tome da budemo na pravoj strani istorije zarad istorije, već zbog našeg opstanka.

Ronald Seeliger

HEMOFARM CEO

development, but to prefer those who are ESG better, and to help the others to improve their own sustainable development.

How do you assess the situation with sustainable development in Serbia, is progress noticeable and what aspects should still be worked on?

- Serbia has excellent examples in the field of sustainable development and great companies, with which Hemofarm promotes this topic, mainly through the activities of the UN Global Compact. So, progress is noticeable in the corporate world, and it is a matter of fact now. In the small and medium enterprises we still have a way to go, and that is why it is important to have development programs for these local businesses to learn how to invest into ESG. And if they are not profitable enough or don't have additional budget, the solution could be for a state to step in and help.

I fully trust that the young generations will much more push for sustainability, both from the employment side, which we can see, but also from the consumer side. In the end, the consumers dictate a lot, and if they don't care about this, then we have a problem. As a society we have a lot of room for improvement and that is why Hemofarm will continue to invest and listen to people, because sustainability is not about lecturing, it's about collaboration. To give you an example, just recently we launched our new brand One Two Three, a product line based on consumer needs. And sustainable development was very much in our minds when we created our brand, especially with active substances that are of the highest quality and enable a high degree of bioavailability and usability in the body, but also with recycled packaging. In the end, our mission is to enable all users to live healthier and more active lives.

Many are skeptical when it comes to ESG and sustainable development, and especially the environmental picture of the planet in the future. Are examples like Hemofarm and other large companies that operate conscientiously something that everyone should strive for in the process of creating a sustainable future and „purifying" the living environment? And can this be enough to ensure a brighter and healthier future?

- The questions speak for itself – no, it is not enough. But, if not us, then nothing will come out of this. It is our duty as responsible people to work on sustainability and we will not stop believing that our kids and their kids deserve a better future and frankly, as humans, we haven't been quite good in providing it so far. So, let's make the change now. In the future, we will be judged by what we did. The once that are closing their eyes to what is happening to our planet are irresponsible to themselves and to the future generations. We shall not be part of this. But, if you start now to work on sustainability, it will give next generations much more time in the future. This is my firm belief. We love this planet, it's our only one, and we need to invest into sustainability. It is our public duty as people, and it is not only just to be on the right side of the history for the history books, but because of our survival.

Solarni panel sa rekordnom efikasnošću

Kineski proizvođač solarnih ćelija i panela Aiko Solar predstavio je svoju Generation 3 Comet seriju solarnih panela sa svetskim rekordom u efikasnosti pretvaranja energije od 25,2 odsto

Kineski proizvođač panela sa zadnjim kontaktom rekao je da se njihovi novi proizvodi oslanjaju na tehnologiju ćelija sa potpunim zadnjim kontaktom (ABC) i karakterišu se temperaturnim koeficijentom od -0,26% po °C.

Na Intersolar sajmu u Minhenu 2024, kineski proizvođač solarnih ćelija i panela Aiko Solar predstavio je svoju Generation 3 Comet seriju solarnih panela sa svetskim rekordom u efikasnosti pretvaranja energije od 25,2 odsto.

ĆELIJE SA ZADNJIM KONTAKTOM

„Novi proizvodi se oslanjaju na našu tehnologiju solarnih ćelija sa potpunim zadnjim kontaktom (ABC),” rekao je Klaudio Godino, direktor servisa za Evropu u Aiko Solar. „Comet Generation 3 solarni panel će biti dostupan u četvrtom kvartalu 2024. godine. Panel će se proizvoditi u njihovim postrojenjima kapaciteta 10 GW i 14 GW.”

Godino je istakao da paneli koriste samo bakar u svojim solarnim ćelijama sa zadnje strane. Kompanija je navela da mogu koristiti bakar, koji obično zahteva deblje sabirne šine, delimično zato što su te veze premestili na zadnju stranu modula.

PET VERZIJA SERIJE

Pet verzija nove serije panela će biti dostupno, sa izlaznom snagom od 625 W do 650 W i efikasnošću od 24,2 odsto do 25,2 odsto. Napon otvorenog kola je između 54,49 V i 54,99 V, a struja kratkog spoja je između 14,60 A i 15,00 A. Dimenzije su 2.278 mm x 1.134 mm x 30 mm, a težina 27 kg.

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Solar Modules with Record Efficiency

Chinese solar cell and module manufacturer Aiko Solar showed its Generation 3 Comet series of solar panels with a world record power conversion efficiency of 25.2 percent

The Chinese back contact module manufacturer said its new products rely on all-back-contact (ABC) cell technology and feature a temperature coefficient of -0.26% per °C.

At Intersolar Munich 2024, Chinese solar cell and module manufacturer Aiko Solar showed its Generation 3 Comet series of solar panels with a world record power conversion efficiency of 25.2 percent.

ALL-BACK-CONTACT CELLS

„The new products rely on our proprietary all-back-contact (ABC) solar cell technology,” said Claudio Godinho, Europe Service director at Aiko Solar. „The Comet Generation 3 solar module will be available in the fourth quarter of 2024. The module will be manufactured at their 10 GW and 14 GW facilities.”

Godino pointed out that the modules use only copper in their backside located solar cell connections. The company said they can use copper, which typically requires thicker busbars, partially because they have moved those connections to the backside of the module.

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Panel će se proizvoditi u njihovim postrojenjima kapaciteta 10 GW i 14 G i koristiće samo bakar u svojim solarnim ćelijama sa zadnje strane

PROIZVOD OD KALJENOG STAKLA

Svi proizvodi su izrađeni sa kaljenim staklom od 3,2 mm sa anti-reflektivnim premazom i aluminijumskim okvirima. Takođe imaju IP68 kućište i maksimalni sistemski napon od 1.500 V. Paneli imaju temperaturni koeficijent od -0,26%/°C i radnu temperaturu u rasponu od -40°C do 85°C.

Aiko Solar pruža 30-godišnju garanciju na performanse, sa navedenim degradacijom od 1 odsto u prvoj godini i garantovanom krajnjom izlaznom snagom od najmanje 88,85 odsto od nominalne snage nakon 30 godina.

Modul sadrži solarne ćelije koje se preklapaju za oko 0,3 mm. Ovo navodno generiše više električne energije unutar iste površine - dodajući približno 0,5 odsto više silicijuma okrenutog ka suncu. Premeštanjem svih veza stringova - ABC tehnologija - na zadnju stranu modula povećava se površina za apsorpciju svetlosti za 1,1%, prema proizvođaču.

Aiko navodi da približno 93,5 odsto površine solarnih modula čine solarne ćelije. Premjštanje veza solarnih ćelija na zadnju stranu panela smanjuje bifacijalnost proizvoda na 70 odsto. Zadnji kontakti takođe daju panelu prednosti u situacijama sa delimičnom senkom.

The module will be manufactured at their 10 GW and 14 GW facilities and will be used only copper in their backside located solar cell connections

FIVE VERSIONS OF THE SERIES

Five versions of the new module series will be available, with power output from 625 W to 650 W and efficiency from 24.2 percent to 25.2 percent. The open circuit voltage is between 54.49 V and 54.99 V and the short circuit current is between 14.60 A and 15.00 A. The dimensions are 2278 mm x 1134 mm x 30 mm and the weight is 27 kg.

TEMPERED GLASS PRODUCT

All products are made with 3.2 mm tempered glass with anti-reflective coating and aluminum frames. They also have an IP68 enclosure and a maximum system voltage of 1,500 V. The panels have a temperature coefficient of -0.26%/°C and an operational temperature range of -40°C to 85°C.

Aiko Solar provides a 30-year performance guarantee, with a stated degradation of 1 percent in the first year and a guaranteed final power output of at least 88.85 percent of rated power after 30 years.

The module contains solar cells that overlap by about 0.3 mm. This reportedly generates more electricity within the same area - adding approximately 0.5 percent more sun-facing silicon. By moving all the string connectors – the ABC technology - to the backside of the module, the light absorption area is increased by 1.1%, according to the manufacturer.

Aiko says that approximately 93.5 percent of the solar module's surface area is solar cells. Moving the solar cell interconnections to the backside of the solar panel reduces the bifaciality of the product to 70 percent. The backside contacts also give the module advantages in partial shade situations.

Mate Zec

SPECIJALISTA ZA POZICIONIRANJE OIE ZA JUGOISTOČNU EVROPU U THE NATURE CONSERVACY

Izazov sa kojim se suočavamo je i ozbiljan i složen

Iako je ponekad teško ne podleći defetizmu, verujem da je naša odgovornost kao ekologa da ostanemo optimisti

Nakon uspeha pilot studije u obližnjoj Hrvatskoj, koja je u jednoj županiji odredila zemljište sa niskim uticajem za ostvarivanje polovine ukupnog nacionalnog cilja za solarnom energijom i energijom vetra do 2030. godine, sproveli smo sličnu procenu solarnog potencijala širom Srbije. Radimo sa stručnjacima iz Srbije koji poznaju lokalne prilike, uključujući energetski sistem, prioritete očuvanja, kulturne vrednosti i dostupne izvore podataka. Glavni deo analize uradili su stručnjaci Srpske akademije nauka i umetnosti uz podršku tima za jugoistočnu Evropu i tima za globalnu zaštitu okena, zemljišta i voda organizacije the Nature Conservancy, kaže u intervjuu za Green News Mate Zec, specijalista za pozicioniranje održivih izvora energije za jugoistočnu Evropu u The Nature conservacy.

GN ***Vi ste deo projekta izrade mape 100 najpogodnijih lokacija za razvoj solarnih fotonaponskih elektrana u Srbiji. Možete li detaljnije da objasnite kako ste radili na ovom projektu i koji su osnovni kriterijumi prilikom izrade ovakve mape?***

- Nakon uspeha pilot studije u obližnjoj Hrvatskoj, koja je u jednoj županiji odredila zemljište sa niskim uticajem za ostvarivanje polovine ukupnog nacionalnog cilja za solarnom energijom i energijom vetra do 2030. godine, sproveli smo sličnu procenu solarnog potencijala širom Srbije. Studiju je pokrenula organizacija the Nature Conservancy (Očuvanje prirode) blisko sarađujući sa zainteresovanim stranama na terenu. Radimo sa stručnjacima iz Srbije koji poznaju lokalne prilike, uključujući energetski sistem, prioritete očuvanja, kulturne vrednosti i dostupne izvore podataka. Glavni deo analize uradili su stručnjaci Srpske akademije nauka i umetnosti (Bata Bjelić, Institut tehničkih nauka, Dejan Doljak, Geografski institut), uz podršku tima za jugoistočnu Evropu i tima za globalnu zaštitu okena, zemljišta i voda (Global Protect Oceans, Lands and Waters) organizacije the Nature Conservancy.

Pristup koji promovišemo je da utvrdimo oblasti sa visokim potencijalom za razvoj obnovljive energije za koje postoji najmanja verovatnoća da će biti u sukobu sa biodiverzitetom i društvenim vrednostima. Važno je naglasiti da razvojni potencijal uključuje dostupnost resursa, kao što je sunčevo zračenje, i druga razmatranja koja utiču na izvodljivost projekta, kao što je blizina puteva i električnih mreža. Što se tiče sukoba, trudimo se da umanjimo sve uticaje na vredne vrste i staništa, kao i na prirodne resurse, kao što su šumarstvo i poljoprivreda. Takođe želimo da izbegnemo bilo kakve sukobe sa društvenim i kulturnim vrednostima – kao što su verski lokaliteti, rekreativna područja ili vredni predeli. Efikasno balansiranje svih ovih faktora predstavlja pravi izazov. To rešavamo uključivanjem zainteresovanih nacionalnih i regionalnih strana i njihovim aktivnim doprinosom.

GN ***Da li ste posetili lokacije navedene na mapi?***

- Sa stanovišta prostorne analize i mapiranja, projekat u Srbiji je uglavnom bio „desktop“ studija koja nije podrazumevala direktno prikupljanje bilo kakvih ulaznih podataka na terenu. Dakle, žao mi je što moram da kažem da za sada nismo posetili prelepa i biodiverzitetom bogata mesta u Srbiji. Ono što smo prikupili na terenu bilo je lokalno znanje: u okviru studije, organizovali smo seriju radionica sa zainteresovanim stranama, uključujući opštinska odeljenja, agencije i nevladine organizacije iz severne, zapadne i jugoistočne Srbije.

GN ***Kako bi se realizovala izgradnja solarnih elektrana, o čemu bi trebalo najviše voditi računa, i koji su najveći izazovi kada su ovakvi projekti u pitanju?***

- Fotonaponske solarne ćelije predstavljaju fantastičnu tehnologiju zbog svoje isplativosti u različitim razmerama, od pojedinačnih krovova do prostranih površina koje pokrivaju stotine hektara. Iako je davanje prioriteta solarnoj integraciji unutar

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Mate Zec

SPECIALIST FOR RENEWABLE ENERGY POSITIONING FOR SOUTHEASTERN EUROPE AT THE NATURE CONSERVANCY

The challenge we face is both serious and complex

While it may sometimes be hard not to succumb to defeatism, I believe it's our responsibility as environmentalists to remain optimistic

Following the success of the pilot study in nearby Croatia, which identified low-impact land in one county to achieve half of the total national goal for solar and wind energy by 2030, we conducted a similar solar potential assessment across Serbia. We are working with experts from Serbia who are familiar with local conditions, including the energy system, conservation priorities, cultural values, and available data sources. The main part of the analysis was carried out by experts from the Serbian Academy of Sciences and Arts with the support of the Southeastern Europe team and the global protection team for oceans, lands, and waters of The Nature Conservancy, says Mate Zec, Specialist for Renewable Energy Positioning for Southeastern Europe at The Nature Conservancy, in an interview for Green News.

GN ***You are part of the project to create a map of the 100 most suitable locations for the development of solar photovoltaic power plants in Serbia. Can you explain in more detail how you worked on this project and what the basic criteria are when creating such a map?***

- Following the success of a pilot study in nearby Croatia, which identified in one county enough low-impact land to meet half of Croatia's total national 2030 target for solar and wind power, we conducted a similar assessment of solar potential across Serbia. The study was initiated by The Nature Conservancy in close collaboration with stakeholders on the ground. We work with national experts knowledgeable about the local context, including energy system, conservation priorities, cultural values and available data sources. The main part of the analysis was performed by experts from the Serbian Academy of Sciences and Arts (Batas Bjelić, Institute of Technical Sciences, Dejan Doljak, Geographical Institute), with support from TNC's Southeast Europe team and TNC's Global Protect Oceans, Lands and Waters team.

The approach we promote is to identify areas with a high potential for developing renewable energy that are least likely to create conflicts with biodiversity and social values. It's important to stress that development potential includes resource availability, such as solar irradiation, and other considerations affecting project feasibility, such as the proximity of roads and electrical grids. On the conflict side, we try to minimize any impacts on valuable species and habitats as well as conflicts with natural resources such as forestry and agriculture. We also want to avoid any conflicts with social and cultural values – such as religious sites, recreational areas or valued landscapes. Balancing all these factors effectively presents a real challenge. We address thisby implementing a robust stakeholder process and actively seeking input from national and regional stakeholders.

GN ***Did you physically visit the locations listed on the map?***

- From a spatial analysis and mapping point of view, the project in Serbia was mainly a "desktop" study that didn't involve directly collecting any input data in the field. So, I'm sorry to say we haven't visited the beautiful and biodiversity-rich places in Serbia for now. What we did collect in the field was local knowledge: in the scope of the study, we organized a series of workshops with stakeholders including municipal departments, agencies, and NGOs across the North, West, and Southeast of Serbia.

GN ***How would the construction of solar power plants be implemented, what should be taken into account the most, and what are the biggest challenges when it comes to such projects?***

- Photovoltaic solar cells represent a fantastic technology due to their cost-effectiveness across various scales, from individual rooftops to expansive areas covering hundreds of hectares.

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Mate Zec

SPECIJALISTA ZA POZICIONIRANJE OIE ZA JUGOISTOČNU EVROPU U THE NATURE CONSERVACY

izgrađenog okruženja od suštinskog značaja, takođe moramo priznati da postizanje neophodne solarne ekspanzije za borbu protiv klimatskih promena zahteva razvoj velikih solarnih farmi. Uprkos neizbežnom uticaju na životnu sredinu u vezi sa solarnim instalacijama, naš izazov leži u smanjivanju njihovog uticaja, uz poštovanje prirode i prilagođavanje raznovrsnog korišćenja zemljišta oko njih. Jedan pristup koji obećava veliki solarni razvoj su takozvane braunfild lokacije kao što su bivši otvoreni kopovi i područja koja su već na neki način degradirana. Pored toga, optimizacija solarnog razvoja znači da ide u tandemu sa drugim korišćenjem, na primer u poljoprivredi. Ali samo u slučajevima kada prava dvostruka upotreba ima smisla – na primer, u nekim slučajevima delimično senčenje od solarnih panela može zapravo povećati prinos ili kvalitet useva, ili ih zaštititi od ekstremnih vremenskih uslova.

Mogu li projekti poput ovih imati negativan uticaj na lokalni biodiverzitet, zaštićene vrste i druge specifične karakteristike lokalnog regiona?

- Čak i uz najbolju tehnologiju, postoje nedostaci i negativni uticaji. Kao opšti princip, fotonaponska (PV) solarna energija ima manji uticaj na životnu sredinu u poređenju sa mnogim drugim načinima proizvodnje električne energije. Međutim, ne možemo zanemariti činjenicu da fotonaponske solarne instalacije imaju značajan direktan uticaj, što znači menjanje staništa ili postavljanje sjajnih crnih predmeta u prirodi. U zavisnosti od toga koliko je neki predeo važan za ljude i koliko je stanište važno za lokalne vrste, njihovo postavljanje na pogrešno mesto može biti zaista loše. Zato moramo da budemo pametni u vezi sa strateškim plasmanom i razmislimo kako da smanjimo negativne uticaje na nivou prirode.

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Mate Zec

SPECIALIST FOR RENEWABLE ENERGY POSITIONING FOR SOUTHEASTERN EUROPE AT THE NATURE CONSERVANCY

From a spatial analysis and mapping point of view, the project in Serbia was mainly a “desktop” study that didn’t involve directly collecting any input data in the field

While prioritizing solar integration within the built environment is essential, we must also recognize that achieving the necessary solar expansion to combat climate change requires the development of large utility-scale solar farms. While prioritizing solar integration within the built environment is essential, we must also recognize that achieving the necessary solar expansion to combat climate change requires the development of large utility-scale solar farms. Despite the unavoidable environmental footprint associated with solar installations, our challenge lies in minimizing their impact while respecting nature and accommodating diverse land use around them. One promising approach for large solar development are so-called brownfield sites such as former open-pit mines and areas that are already degraded in some way. Additionally, optimizing solar development is to put it in tandem with other uses, such as agriculture. But only in cases where true dual use makes sense – for example, in some cases partial shading from solar panels can actually increase the yield or quality of the crops, or protect them from extreme weather.

Can projects like these have a negative impact on local biodiversity, protected species, and other specific features of the local region?

- Even with the best technology, there remain downsides and negative impacts. As a general principle, photovoltaic (PV) solar has a smaller environmental footprint compared to many other methods of electricity production. However, we can’t ignore the fact that PV solar installations have a significant direct impact, which means converting habitats or putting shiny black things in a landscape. Depending on how important the landscape is to people and how important the habitat is to local species, putting them in the wrong place can be really bad. That’s why we need to be smart about strategic placement and think how to minimize adverse impacts at a landscape level.

How do you assess Serbia’s potential in terms of sustainable energy compared to European and global trends?

- Serbia, like other countries in the region, has an abundance of resources, yet faces challenges due to underdeveloped grid infrastructure and an outdated regulatory framework. When it comes to energy permitting and environmental assessments these factors play a crucial role. So, while the potential for energy projects is huge, even if you look purely from the point of view of the investor and developer, the real challenge is not in finding areas with a sufficient number of sunny days, but rather in finding places where projects can seamlessly connect to the grid. Additionally streaming the permitting process and mitigating environmental conflicts are essential to avoid project delays during late stages of development.

In this study we mapped the entire territory of Serbia. However, we deliberately limited the total potential to 1 GW of installed capacity, corresponding to the 100 optimal locations presented in the results. Our goal was to enhance understanding and relevance at the national level. Although, the total solar potential is considerably higher, even in just the likely low conflict areas identified in this study, it’s important for us as TNC not to come across as advocating for developing every bit of feasible low-conflict land. Instead, we prioritize smart utilisation of our limited space, balancing the needs of people and regional conservation priorities.

Many are skeptical when it comes to the idea that sustainable energy could significantly replace fossil sources – what are your assessments, and what is needed for „green” energy sources to become more widespread and effective?

- The green energy transition is complex and presents some tough challenges that go beyond just replacing fossil fuels with renewables megawatt for megawatt. We certainly need to upgrade our electrical grids and interconnections, develop better energy storage solutions that rely less on critical minerals, create more robust and flexible energy markets and streamline more agile permitting processes. And we have very little time to get all of these to scale. This will require rethinking of the way we think about energy. The transition will impact our lives, livelihoods, and the environment around us to an extent. That being said, I’m fully convinced that we can overcome these challenges and still come out ahead of the frankly quite awful status quo, which is to heat up the planet to an unlivable level while slowly poisoning ourselves. The energy transition can be fair, equitable and inclusive of nature. Numerous existing projects already prove this beyond any doubt.

You have been involved in environmental protection projects for a long time. In addition to working on improving energy infrastructure, you have led a data analysis program and advocated for better enforcement of laws against illegal hunting and trade of wild birds, including protected species. Can you tell us something about that part of your engagement?

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Mate Zec

SPECIJALISTA ZA POZICIONIRANJE OIE ZA JUGOISTOČNU EVROPU U THE NATURE CONSERVACY

Fotonaponske solarne ćelije predstavljaju fantastičnu tehnologiju zbog svoje isplativosti u različitim razmerama, od pojedinačnih krovova do prostranih površina koje pokrivaju stotine hektara

Kako ocenjujete potencijal Srbije u pogledu održive energije u poređenju sa evropskim i svetskim trendovima?

- Srbija, kao i druge zemlje u regionu, ima obilje resursa, ali se suočava sa izazovima zbog nerazvijene mrežne infrastrukture i zastarelog regulatornog okvira. Kada je reč o energetskim dozvolama i ekološkim procenama, ovi faktori igraju ključnu ulogu. Dakle, dok je potencijal za energetske projekte ogroman, čak i ako posmatrate čisto iz ugla investitora i graditelja, pravi izazov nije u pronalaženju područja sa dovoljnim brojem sunčanih dana, već u pronalaženju mesta gde projekti mogu da se bez problema povežu na mrežu. Pored toga, proces izdavanja dozvola i ublažavanje ekoloških sukoba su od suštinskog značaja da bi se izbegla kašnjenja projekta tokom kasnijih faza razvoja.

U ovoj studiji smo mapirali celu teritoriju Srbije. Međutim, namerno smo ograničili ukupan potencijal na 1 GW instaliranog kapaciteta, što odgovara 100 optimalnih lokacija predstavljenih u rezultatima. Naš cilj je bio da poboljšamo razumevanje i relevantnost na nacionalnom nivou. Iako je ukupan solarni potencijal znatno veći, čak i samo u oblastima sa niskim nivoom sukoba identifikovanim u ovoj studiji, važno je za nas kao organizaciju da ne zagovaramo razvoj svakog dela izvodljivog zemljišta sa niskim nivoom sukoba. Umesto toga, dajemo prioritet pametnom korišćenju našeg ograničenog prostora, balansirajući između potreba ljudi i regionalnih prioriteta očuvanja.

Mnogi su skeptični kada je u pitanju ideja da bi održiva energija mogla značajno da zameni fosilne izvore – kakve su vaše procene i šta je potrebno da bi „zeleni" izvori energije postali rasprostranjeniji i efikasniji?

- Prelazak na zelenu energiju je složen i predstavlja neke teške izazove koji prevazilaze samo zamenu fosilnih goriva obnovljivim izvorima energije megavat za megavat. Svakako moramo da nadogradimo naše električne mreže i interkonekcije, da razvijemo bolja rešenja za skladištenje energije koja se manje oslanjaju na kritične minerale, da stvorimo jača i fleksibilnija tržišta energije i da pojednostavimo procese izdavanja dozvola. I imamo vrlo malo vremena da sve ovo ostvarimo. Ovo će zahtevati preispitivanje načina na koji razmišljamo o energiji. Tranzicija će donekle uticati na naše živote, sredstva za život i okruženje oko nas. Imajući to u vidu, potpuno sam uveren da možemo da prevaziđemo ove izazove i da ipak izađemo iz, iskreno rečeno, prilično užasnog statusa kvo stanja, a to je da zagrevamo planetu do nivoa koji nije pogodan za život dok se polako trujemo. Energetska tranzicija može biti fer, pravična i da uključuje prirodu. Brojni postojeći projekti to već dokazuju van svake sumnje.

Dugo ste uključeni u projekte zaštite životne sredine. Pored rada na poboljšanju energetske infrastrukture, vodili ste program analize podataka i zalagali se za bolju primenu zakona protiv nelegalnog lova i trgovine divljim pticama, uključujući zaštićene vrste. Možete li nam reći nešto o tom delu vašeg angažmana?

- Moja prethodna pozicija bila je u Biomu, nacionalnoj partnerskoj organizaciji BirdLife u Hrvatskoj. Biom je bio ispred mnogih nacionalnih organizacija za zaštitu prirode prepoznavši da čak i u tako maloj zemlji kao što je Hrvatska, efikasna zaštita zahteva obradu ogromnih količina podataka i eksplicitno stavljanje toga u njihov program rada. Takođe sam radio na pitanjima letnih puteva ptica na nacionalnom nivou, uključujući ilegalno ubijanje ptica. Ovo je iznenađujuće rasprostranjeno pitanje na Mediteranu i predstavlja značajne izazove. Efikasno rešavanje zahteva usaglašene napore na celom letnom putu – zaštita ptica na njihovom mestu zimovanja neće pomoći populaciji ako su njihova mesta za razmnožavanje uništena, i obrnuto. Slično tome, uticaj energetske infrastrukture na ptice treba razmotriti na nivou letnog puta, pošto su one posebno podložne sudarima ili strujnim udarima na infrastrukturi tokom migracije.

Posvećeni ste projektima koji se odnose na očuvanje životne sredine, pa moram da vas pitam: kako ocenjujete budućnost planete u smislu klimatskih promena i ukupnog zagađenja – ima li nade za nas?

- Slažem se sa Ketrin Hejhou (Katharine Hayhoe), našim glavnim naučnikom u TNC (the Nature Conservancy). Prema njenoj oceni, porazni stavovi „prekasno je" i „to se ne može popraviti" samo su različiti izrazi klimatskog poricanja. Izazov sa kojim se suočavamo je i ozbiljan i složen. Iako je ponekad teško ne podleći defetizmu, verujem da je naša odgovornost kao ekologa da ostanemo optimisti. Koliko god to zvučalo kao kliše, ne bih se bavio ovim poslom da ne mislim da je vredno truda. Tehnologija i poslovni model za rešavanje naših problema već postoje, a mi imamo dokaz da ih možemo primeniti na pravičan način. Kao što ne možemo dozvoliti da nas zastarela tehnologija i nepravedne strukture moći sputavaju, ne možemo dozvoliti i da defetizam učini isto. Od nas zavisi kretanje ovim nezgodnim putem, ali uveren sam da možemo to da uradimo ako se udružimo u pronalaženju rešenja.

Mate Zec

SPECIALIST FOR RENEWABLE ENERGY POSITIONING FOR SOUTHEASTERN EUROPE AT THE NATURE CONSERVANCY

Photovoltaic solar cells represent a fantastic technology due to their cost-effectiveness across various scales, from individual rooftops to expansive areas covering hundreds of hectares

- My previous position was with Biom, the national BirdLife partner organization in Croatia. Biom was ahead of a lot of national conservation organizations by recognising that even in a country as small as Croatia, effective conservation requires chewing through massive amounts of data and putting this explicitly into their program of work. I also worked on flyway-level issues at the national level, including the illegal killing of birds. This is a surprisingly widespread issue in the Mediterranean and poses significant challenges. Addressing it effectively requires a concerted effort across the entire flyway – protecting birds on their wintering site won't help the population if their breeding sites are destroyed, and vice versa. Similarly, the impact of energy infrastructure on birds needs to be considered at a flyway level, as they are particularly vulnerable to collision or electrocution on infrastructure while migrating.

You are committed to projects related to environmental preservation, so I have to ask: how do you assess the future of the planet in terms of climate change and overall pollution – is there hope for us?

- I tend to agree with Katharine Hayhoe, our chief scientist at TNC. In her assessment, the defeatist stances of "it's too late" and "it can't be fixed" are just different flavours of climate denial. The challenge we face is both serious and complex. While it may sometimes be hard not to succumb to defeatism, I believe it's our responsibility as environmentalists to remain optimistic. As cliché as it may sound, I wouldn't be doing this work if I didn't think it was worthwhile. The technology and the business case to solve our problems already exist, and we have proof that we can apply them in an equitable way. Just as we cannot allow outdated technology and unjust power structures hold us back, we cannot let defeatism do the same. It's up to us to navigate this tricky road, but I'm confident that by putting our heads together, we can do it.

TOP 10

Najveće solarne farme na svetu

Od Kine do Dubaija, istražujemo deset najvećih solarnih farmi na svetu, procenjujući njihov kapacitet i investicije. Kako raste potreba za čistom energijom, primena solarne energije je naglo porasla - solarna fotonaponska energija je sada najpopularniji oblik nove proizvodnje električne energije.

Sa imperativom da globalnu temperature zadržimo ispod 1.5°C, masovna implementacija čistih izvora energije kao što je solarna energija ne može doći u značajnijem trenutku.

The World Largest Solar Farms

From China to Dubai, we explore the top ten largest solar farms in the world, assessing their capacity and investment. As the need for clean energy grows, the deployment of solar energy has skyrocketed—solar photovoltaics are now the most popular form of new electricity generation.

With the imperative to keep global temperatures below 1.5°C, the mass implementation of a clean energy source like solar could not come at a more significant time.

10 Kurnool Ultra Mega Solar Park

Smešten u okrugu Kurnool, Andhra Pradesh, južna Indija, sa operativnim kapacitetom od 1GW (1000 MW) energije godišnje, što predstavlja značajan deo ukupnog instaliranog kapaciteta električne energije u Indiji od preko 350GW, solarni park štedi procenjenih 1,892,160 tona CO2 emisija. Solarni park je kombinacija partnerstva države i centralne vlade.

Located in the Kurnool district, Andhra Pradesh, south India, with an operational capacity of 1GW (1000MW) of energy annually, representing a significant portion of India's total installed electricity capacity of over 350GW, the solar park saves an estimated 1,892,160 tonnes of CO2 emissions. The solar park is a combination of a state and central government partnership.

9 Jichuan Solar Park

Almost all of Jinchuan in China's Gansu province is covered with solar power plants. Another cluster of projects is located in the south, and the solar park occupies almost 90km² of semi-desert west of the city. The solar park now has 15 power plants, with a total capacity of just over 1GW. The largest power plant in Jinchuan has more than 200MW of capacity.

Almost all of Jinchuan in China's Gansu province is covered with solar power plants. Another cluster of projects is located in the south, and the solar park occupies almost 90km² of semi-desert west of the city. The solar park now has 15 power plants, with a total capacity of just over 1GW. The largest power plant in Jinchuan has more than 200MW of capacity.

8 Datong Solar Power Top Runner Base

Smešten u Šandži, Kina, Datong je solarni fotonaponski projekat kapaciteta 3 GW. Pusten je u rad 2016. godine, a projekat je koštao 138 miliona dolara i razvijen je od strane China Power International Development i China Three Gorges. Projekat je trenutno u vlasništvu China Power International Development sa 100 odsto udela. Elektrana će moći da proizvede 3.2 milijarde kilovat-sati solarne energije za 25 godina i smanji emisiju CO2 za 2.74 miliona tona.

Located in Shanxi, China, Datong is a 3 GW solar PV power project. Commissioned in 2016, the project cost $138 million and was developed by China Power International Development and China Three Gorges. The project is currently owned by China Power International Development with a stake of 100 percent. The power plant will be able to produce 3.2 billion kilowatt-hours of solar energy in 25 years and reduce CO2 emissions by 2.74 million tons.

TOP 10

7 Noor Abu Dhabi Solar Power Project

Najveća svetska jedinstvena elektrana, Noor Abu Dhabi, obezbeđuje energiju za otprilike 90.000 domova sa 1.17GW. Ima 3.2 miliona solarnih panela i prostire se na 8km². Elektrana generiše približno 1.2GW električne energije, smanjujući oslanjanje na prirodni gas za proizvodnju električne energije i smanjujući ugljenični otisak zemlje za 1 milion metričkih tona godišnje – dovoljno da se eliminiše 200.000 vozila sa puteva. Abu Dhabi National Energy Company poseduje 60 odsto projekta, dok Marubeni Corporation i JinkoPower imaju po 20 odsto.

The world's largest single-site power plant, Noor Abu Dhabi, provides power for approximately 90,000 homes with 1.17GW. It has 3.2 million solar panels and covers 8km². The plant generates approximately 1.2GW of electricity, reducing reliance on natural gas for power generation and reducing the country's carbon footprint by 1 million metric tons per year – enough to eliminate 200,000 vehicles from the road. Abu Dhabi National Energy Company owns 60 percent of the project with Marubeni Corporation and JinkoPower each holding 20 percent.

6 Tengger Desert Solar Park

Tengger Desert Solar Park trenutno napaja oko 600.000 domova sa svojih 43km² solarnih panela koji obezbeđuju izlaz od 1.51GW. Kapacitet prve faze projekta će biti 1 milion kilovata. Kada baza bude potpuno operativna, njen godišnji energetski rezultat će biti 5.78 milijardi kilovata, što je ekvivalent uštedi od 1.92 miliona tona standardnog uglja svake godine. Ovo je značajno za zemlju koja se u velikoj meri oslanja na ugalj za energiju.

The Tengger Desert Solar Park currently powers around 600,000 homes with its 43km² of solar panels providing an output of 1.51GW. The capacity of the project's first phase will be 1 million kilowatts. When the base is fully operational, its annual energy output will be 5.78 billion kilowatts, which is equivalent to saving 1.92 million tons of standard coal each year. This is significant for a country that relies heavily on coal for energy.

5 Benban Solar Park

Koštajući 4 milijarde dolara, Benban Solar Park je najveća solarna farma u Africi, sa ogromnim solarnim potencijalom od 6.3kWh/m² dnevno. Ovo iznosi 41 solarnu elektranu u ukupnom broju. Projekat od 1.8GW upravlja New and Renewable Energy Authority (NREA), koja je u vlasništvu države. Uključuje brojne male solarne elektrane koje grade različite kompanije. Projekat je deo Strategije održive energije Egipta 2030.

Costing $4 billion, Benban Solar Park is the largest solar farm in Africa, with a massive solar potential of 6.3kWh/m² per day. This amounts to 41 solar power plants in total. The 1.8GW project is managed by the state-owned New and Renewable Energy Authority (NREA). It includes numerous small solar power plants built by various companies. The project is part of Egypt's Sustainable Energy Strategy 2030.

TOP 10

4 Mohammed Bin Rashid Al Maktoum Solar Park

Pustinjska nacija UAE je dom za 76km² solarni park, najveći na svetu, sa trenutnim kapacitetom od 1.63GW. Planira se povećanje na 5GW do 2030. godine. Solarni park obezbeđuje energiju za 270.000 domova, smanjujući ukupno 1.4 miliona tona ugljen-dioksida. Razvijen i upravljan od strane Dubai Electricity & Water Authority, solarni park je jedan od ključnih inicijativa u Dubai Clean Energy Strategy 2050 – da proizvodi 75 odsto energetskih potreba grada iz čistih izvora do 2050.

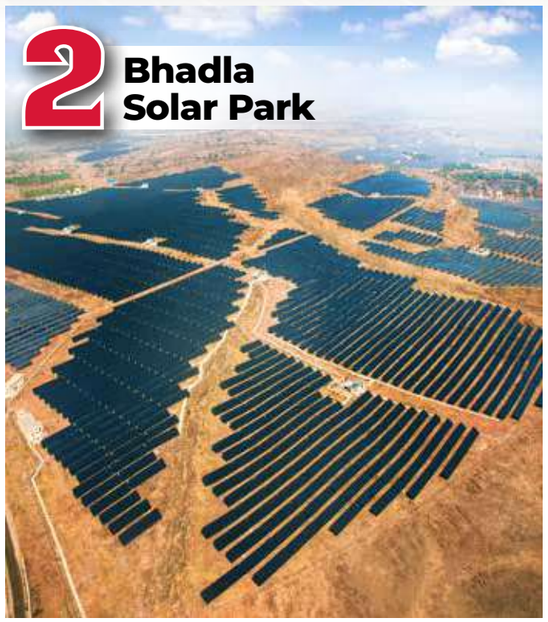
The desert nation of the UAE is home to a 76km² solar park, the largest in the world, with a current capacity of 1.63GW. It is planned to grow to 5GW by 2030. The solar park provides energy for 270,000 homes, reducing a total of 1.4 million tons of carbon dioxide. Developed and managed by the Dubai Electricity & Water Authority, the solar park is one of the key initiatives in the Dubai Clean Energy Strategy 2050 – to produce 75 percent of the city's energy requirements from clean sources by 2050.

3 Pavagada Solar Park

Raspoređen na 13.000 hektara, Pavagada Solar Park obezbeđuje 2.05GW građanima Indije. Koštajući 2 milijarde dolara, solarni park je razvijen od strane Karnataka Solar Power Development Corporation (KSPDCL), zajedničkog poduhvata između Karnataka Renewable Energy Development (KREDL) i Solar Energy Corporation of India Limited (SECI) formiranog u martu 2015. godine. Karnataka, država u kojoj se nalazi ovaj solarni park, ima najveći instalirani solarni kapacitet među indijskim državama, nakon čega slede Rajasthan i Tamil Nadu.

Spread over 13,000 hectares, Pavagada Solar Park provides 2.05GW to the citizens of India. Costing $2 billion, the solar park was developed by Karnataka Solar Power Development Corporation (KSPDCL), a joint venture between Karnataka Renewable Energy Development (KREDL) and Solar Energy Corporation of India Limited (SECI) formed in March 2015. Karnataka, the state where this solar park is located, has the highest installed solar capacity among Indian states, followed by Rajasthan and Tamil Nadu.

2 Bhadla Solar Park



Bhadla Solar Park, koji upija sunce u indijskoj pustinji Thar, sastoji se od 14.000 hektara zajedničkih solarnih elektrana, sa stalnom proizvodnjom od 2.25GW (Bhadla sada ukupno ima oko 2.7GW kapaciteta od nedavnih dodataka). Park koristi gotovo savršene uslove, pri čemu region Rajasthan prima prosečno 5.72kWh/m² solarne iradijacije dnevno. Pored toga, solarna farma koristi 300 sunčanih dana godišnje. Bhadla, kao i neke druge velike solarne farme na ovoj listi, naručene su od strane više preduzeća koja aukcijski nude određene količine solarnog kapaciteta. Na primer, Solar Energy Corporation of India je održala aukciju za kapacitet od 25 MW, a 27 preduzeća je dalo ponude.

Bhadla Solar Park, soaking up the sun in India's Thar Desert, consists of 14,000 acres of co-located solar power plants, with a consistent generation of 2.25GW (Bhadla now has a total of about 2.7GW of capacity from recent additions). The park takes advantage of near-perfect conditions, with the Rajasthan region receiving an average of 5.72kWh/m² of solar irradiation per day. In addition, the solar farm benefits from 300 sunny days per year. Bhadla, like some of the other large solar farms on this list, was ordered by a number of companies to auction off specific amounts of solar capacity. For example, the Solar Energy Corporation of India held an auction for 25 MW of capacity, and 27 companies submitted bids.

TOP 10

Sa instaliranim kapacitetom od 2.8GW, Golmud Solar Park u kineskoj provinciji Qinghai, smešta ukupno 80 solarnih elektrana - dovoljno da napaja preko milion kuća.

With an installed capacity of 2.8GW, Golmud Solar Park in China's Qinghai Province houses a total of 80 solar power plants - enough to power over a million homes. Costing a total of $587.22 million, the project was developed by China Longyuan Power Group and is currently owned by SDIC Huajing Power Holdings, with a stake of 100 percent. The construction of Golmud Solar Park began in 2011 and was completed in 2019.

Koštajući ukupno 587.22 miliona dolara, projekat je razvijen od strane China Longyuan Power Group i trenutno je u vlasništvu SDIC Huajing Power Holdings, sa 100 odsto udela. Izgradnja Golmud Solar Parka započela je 2011. godine i završena je 2019. godine. Solarni park koristi fotonaponsku (PV) tehnologiju, sa preko 7.2 miliona instaliranih solarnih panela za generisanje električne energije. Park je povezan sa mrežom za prenos energije State Grid Corporation of China, što omogućava distribuciju proizvedene električne energije širom zemlje.

1 Golmud Solar Park

The solar park uses photovoltaic (PV) technology, with over 7.2 million installed solar panels to generate electricity. The park is connected to the power transmission network of the State Grid Corporation of China, which enables the distribution of generated electricity throughout the country.

Najveća solarna elektrana na svetu puštena u rad u Kini

China Green Development Group je pustila u rad solarni projekat Midong od 3,5 GW u Urumqiju, region Xinjiang u Kini. Projekat je zahtevao investiciju od 15,45 milijardi jena (2,13 milijardi dolara)

中国绿发投资集团有限公司
CHINA GREEN DEVELOPMENT INVESTMENT GROUP CO.,LTD.

Fotonaponska elektrana je trenutno najveća solarna elektrana na svetu. Pre puštanja u rad, kineska državna elektroprivreda Huanghe Hydropower Development je u oktobru 2020. godine počela sa izgradnjom najveće solarne elektrane na svetu, postrojenje kapaciteta 2,2 GW.

China Construction Eighth Engineering Division Corp i Power Construction Corporation of China (PowerChina) su izveli izgradnju projekta Midong u fazama. Instalacija je zahtevala investiciju od 15,45 milijardi jena. Sadrži više od 5,26 miliona monokristalnih bifacijalnih dvostrukih staklenih PV panela od 650 W koje je isporučio neimenovani proizvođač.

Opsežna infrastruktura projekta uključuje postavljanje 1,23 miliona potpornih stubova, pet pojačavajućih stanica od 220 kV i više od 208 km dalekovoda koji povezuju niz sa mrežom preko trafostanice od 750 kV.

China Green Development Group (CGDG), osnovana u decembru 2020. godine, glavni je energetski investicioni entitet pod centralnom kineskom vladom, naslednica bivše Luneng Group u vlasništvu State Grida. Direktno upravljana od strane Komisije za nadzor i upravljanje državnom imovinom Državnog saveta (SASAC), CGDG se fokusira na investiranje, izgradnju i upravljanje projektima obnovljive energije. Grupa ima za cilj da postigne više od 20 GW instalacija obnovljive energije do kraja 2024. godine.

GN

The world’s largest solar power plant has been put online in China

China Green Development Group has switched on the 3.5 GW Midong Solar Project in Urumqi, China’s Xinjiang region. The project required an investment of CNY 15.45 billion ($2.13 billion)

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CHINA GREEN DEVELOPMENT INVESTMENT GROUP CO.,LTD.

The photovoltaic power plant is currently the largest solar power plant in the world. Prior to commissioning, China’s state-owned utility Huanghe Hydropower Development began construction of the world’s largest solar power plant, a 2.2 GW facility, in October 2020.

China Construction Eighth Engineering Division Corp and Power Construction Corporation of China (PowerChina) carried out the construction of the Midong project in phases. The installation required an investment of CNY15.45 billion. It features more than 5.26 million 650W monocrystalline bifacial double glass PV panels supplied by an unnamed manufacturer.

The project’s extensive infrastructure includes the installation of 1.23 million supporting poles, five 220 kV booster stations, and more than 208 km of transmission lines connecting the array to the grid via a 750 kV substation.

China Green Development Group (CGDG), established in December 2020, is a major energy investment entity under the central Chinese government, the successor to the former State Grid-owned Luneng Group. Managed directly by the State Assets Supervision and Administration Commission of the State Council (SASAC), CGDG focuses on the investment, construction, and management of renewable energy projects. The group aims to achieve more than 20 GW of renewable energy installations by the end of 2024.

GN

Švajcarska kompanija našla način da razgradi PFAS

Kompanija Oxyle otkrila je način da drastično očisti vodu kontaminiranu PFAS-om, dok smanjuje troškove

Per- i polifluoralkil supstance (PFAS) nas truju, ali njihovo uništavanje je i dalje teško i skupo. Jedan švajcarski startap možda ima rešenje.

Toksične hemikalije su stigle čak do Arktičkog okeana, a nedavno su pronađene na evropskim obalama kao deo morskog prskanja, što njihovo uklanjanje iz životne sredine čini još hitnijim.

Do sada je sanacija per- ili Polifluoralkil supstance (PFAS) bila puna prepreka. U Velikoj Britaniji bi moglo koštati 21 milijardu funti (oko 25 milijardi evra) da se uklone sve štetne hemikalije samo iz našeg kanalizacionog sistema, prema istraživanju UK Water Industry Research (UKWIR).

Čak i ako bismo platili tu cenu, još uvek postoji pitanje efikasnosti dostupne tehnologije.

Međutim, kompanija Oxyle, sa sedištem u Švajcarskoj, otkrila je način da drastično očisti vodu kontaminiranu PFAS-om, dok smanjuje troškove.

„Mnogo flaširane vode sadrži PFAS“, kaže Fajer Muštak, suosnivač Oxyle-a. „Nakon našeg tretmana, nivo PFAS-a je čak niži od flaširane vode.“

Tehnologija se oslanja na Muštakovu doktorsku tezu na ETH Cirih, gde je razvila nanomaterijale koji mogu oksidirati i uništiti PFAS. Odrasla je u Delhiju, a njeno istraživanje je inspirisano vodnom krizom u gradu.

„Nemogućnost pristupa vodi kad god sam želela ili njeno racionalisanje tokom letnjih meseci, ostavlja trag na vama“, kaže ona. „Od detinjstva sam znala da je voda zaista važan resurs koji treba ceniti i šta se dešava kada se ne brinete o njoj.“

ZAŠTO JE UKLANJANJE PFAS-A TOLIKO TEŠKO

Otpornost PFAS-a na toplotu i vodu čini ih atraktivnim materijalima za trajne potrošačke proizvode (kao što su neljepljive posude, vodootporna odeća i tkanine otporne na mrlje), ali ih takođe čini teškim za uništavanje.

Kada peremo odeću koja sadrži ove hemikalije, nesvesno ih šaljemo u naše vodotokove kroz otpadne vode. PFAS su takođe prisutni u nekim pesticidima i vatrogasnoj peni.

Precizni efekti koje PFAS mogu imati na naše zdravlje još uvek se istražuju, ali studije su povezale hemikalije sa nekim vrstama raka (uključujući rak bubrega i prostate), smanjenim imunološkim sistemom, hormonalnim promenama i visokim krvnim pritiskom.

Njihovo ispuštanje u životnu sredinu je endemično, i sa nekim PFAS-ima koji treba više od 1.000 godina da se razgrade, akumulirali su se u ogromnim količinama. Njihova sveprisutnost predstavlja skup problem.

„Nazivaju ih ‚večnim hemikalijama’ sa razlogom“, kaže Karina Džoržes, koja je koautor UKWIR izveštaja o

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A Swiss Company Has Found a Way to Break Down PFAS

The Oxyle company has discovered a way to dramatically clear PFAS-contaminated water while keeping costs down

Per- and poly- fluoroalkyl substances (PFAS) are poisoning us, but destroying them is still difficult and expensive. One Swiss start-up may have a solution.

Toxic chemicals have travelled as far as the Arctic Ocean and have recently been found on European shores as part of sea spray, making their removal from the environment even more urgent.

So far, the remediation of per- or poly-fluoroalkyl substances (PFAS) has been full of obstacles. In the UK, it could cost £21bn (around €25bn) to remove all the harmful chemicals from our sewage system alone, according to UK Water Industry Research (UKWIR).

Even if we were to pay that bill, there is still the question of the effectiveness of the available technology.

However, Oxyle, a Switzerland-based company, has discovered a way to dramatically clear PFAS-contaminated water while keeping costs down.

„A lot of bottled water has PFAS in it,” says Fajer Mushtaq, Oxyle’s co-founder. „We’re even lower than bottled drinking water after our treatment”.

The technology builds on Mushtaq’s doctoral thesis at ETH Zurich, where she developed nanomaterials that can oxidize and destroy PFAS. She grew up in Delhi, and her research was inspired by the city’s water crisis.

„Not being able to access water whenever I wanted, or rationing it during summer months, leaves an imprint on you,” she says. „Since I was a child, I knew this is a really important resource which needs to be valued, and what happens when you don’t take good care of it.”

WHY IS PFAS REMOVAL SO DIFFICULT?

PFAS’ heat-proof, water-repellent properties make them attractive materials for hardwearing consumer products (like non-stick pans, waterproof clothes and stain-resistant fabrics), but it also means they are hard to destroy.

When we wash clothes that contain these chemicals, we inadvertantly send them into our waterways through waste water. PFAS are also present in some pesticides and firefighting foam.

The precise effects that PFASs may have on our health are still being researched, but studies have linked the chemicals to some types of cancer (including kidney and prostate), a reduced immune system, hormonal changes and high blood pressure.

Their release into the environment is endemic, and with some PFAS taking more than 1,000 years to break down, they have accumulated in huge amounts. Their ubiquity is an expensive problem.

„They’re called ‚forever chemicals’ for a reason,”

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rešenjima za PFAS. „Nisu lako biorazgradive. Nije ih lako ukloniti. Zato su i korišćene.“

Problem dodatno komplikuje varijacija između PFAS-a.

„Postoji više od 10.000 različitih PFAS-a“, nastavlja Džoržes. „Oni obuhvataju čitav spektar fizičko-hemijskih svojstava, što znači različite načine na koje ih možete potencijalno ukloniti.“

Metode sanacije PFAS-a mogu se uglavnom podeliti u tri kategorije: adsorbenti, separacija i uništavanje.

Adsorbenti i separacija su efikasne u uklanjanju PFAS-a iz otpadnih voda, ali nijedna ne eradikira problematične hemikalije.

Adsorpcija obično koristi granularni aktivni ugalj (GAC) da izvuče PFAS iz otpadnih voda. Preostali ugalj je tada kontaminiran i treba ga odložiti - ali slanje na deponiju rizikuje dalje zagađenje, jer PFAS prodiru u tlo i podzemne vode.

„Morate ih uništiti, inače ih samo prebacujete u različite medije, bilo da je to mulj ili čak vazduh“, kaže Džoržes.

UKWIR je 2021. godine označio spaljivanje kao jedini način da se PFAS trajno uništi. Ovo obično zahteva sagorevanje na temperaturama iznad 1.000°C, što troši ogromne količine energije.

Neke studije su postavile pitanje da li spaljivanje zaista uništava PFAS potpuno, ili dozvoljava da čestice u vazduhu pobegnu i formiraju zagađenje vazduha.

Takođe može oslobađati gasove staklene bašte poput tetrafluorometana i heksafluoroetana.

KAKO FUNKCIONIŠE OXYLE

„Mi smo čista tehnologija uništavanja“, kaže Muštak. „Oksidišemo i redukujemo ove hemikalije.“

Oxyle uklanja PFAS razbijajući veze između molekula, razgrađujući duge i kratke lance na njihove sastavne delove, koji su bezbedni za odlaganje.

„Recimo da imate vezu između ugljenika i vodonika. Mi je razbijamo. Imate vezu između ugljenika i fluora, mi je razbijamo“, kaže Muštak. „Na kraju tretmana, sve što ostaje su CO_2, molekuli vode, neki fluoridi, sulfati i minerali - osnovni gradivni blokovi.“

Hemija nije nova, objašnjava ona, i već je u upotrebi kod nekoliko kompanija. Ono što izdvaja Oxyle je način na koji stvara energiju za olakšavanje reakcije.

Gde drugi mogu propuštati struju kroz elektrode ili primenjivati UV svetlo na otpadnu vodu (oba skupa i energetski intenzivna procesa), Oxyle koristi mehaničku energiju, poput vibracija proizvedenih mehurićima ili protokom vode. Zatim primenjuje nanoporozni materijal stvoren tokom Muštakovine doktorske disertacije na vodu, gde on formira katalizator.

„Aktivira se i počinje da cepa vodu i formira različite hemijske vrste koje mogu razbijati veze ovih PFAS molekula“, kaže ona.

Korišćenje mehurića smanjuje potrošnju energije Oxyle-a za najmanje 15 procenata - u nekim slučajevima čak 60 procenata.

„Energija je najveći pokretač troškova za tehnologiju uništavanja“, kaže Muštak, što znači da Oxyle može ponuditi niže operativne troškove od svojih konkurenata.

„Naša tehnologija je prilično modularna“, nastavlja ona. „Svaki reaktor može tretirati oko 10 kubnih metara na sat, što je 10.000 litara na sat.“

Ovo daje Oxyleu fleksibilnost da povećava svoje operacije, dodajući više reaktora za veće klijente.

S KIM OXYLE SARAĐUJE

Tretman PFAS-a u otpadnim vodama je skup posao koji, prema Džoržes, uglavnom snose potrošači kroz račune za vodu.

„Javnost u Velikoj Britaniji plaća za uklanjanje“, kaže ona. „Kompanije koje proizvode te hemikalije treba da plaćaju vodovodnim preduzećima, na primer, za uklanjanje tih hemikalija.“

Oxyle već ima takve kompanije koje proizvode PFAS u svom vidokrugu.

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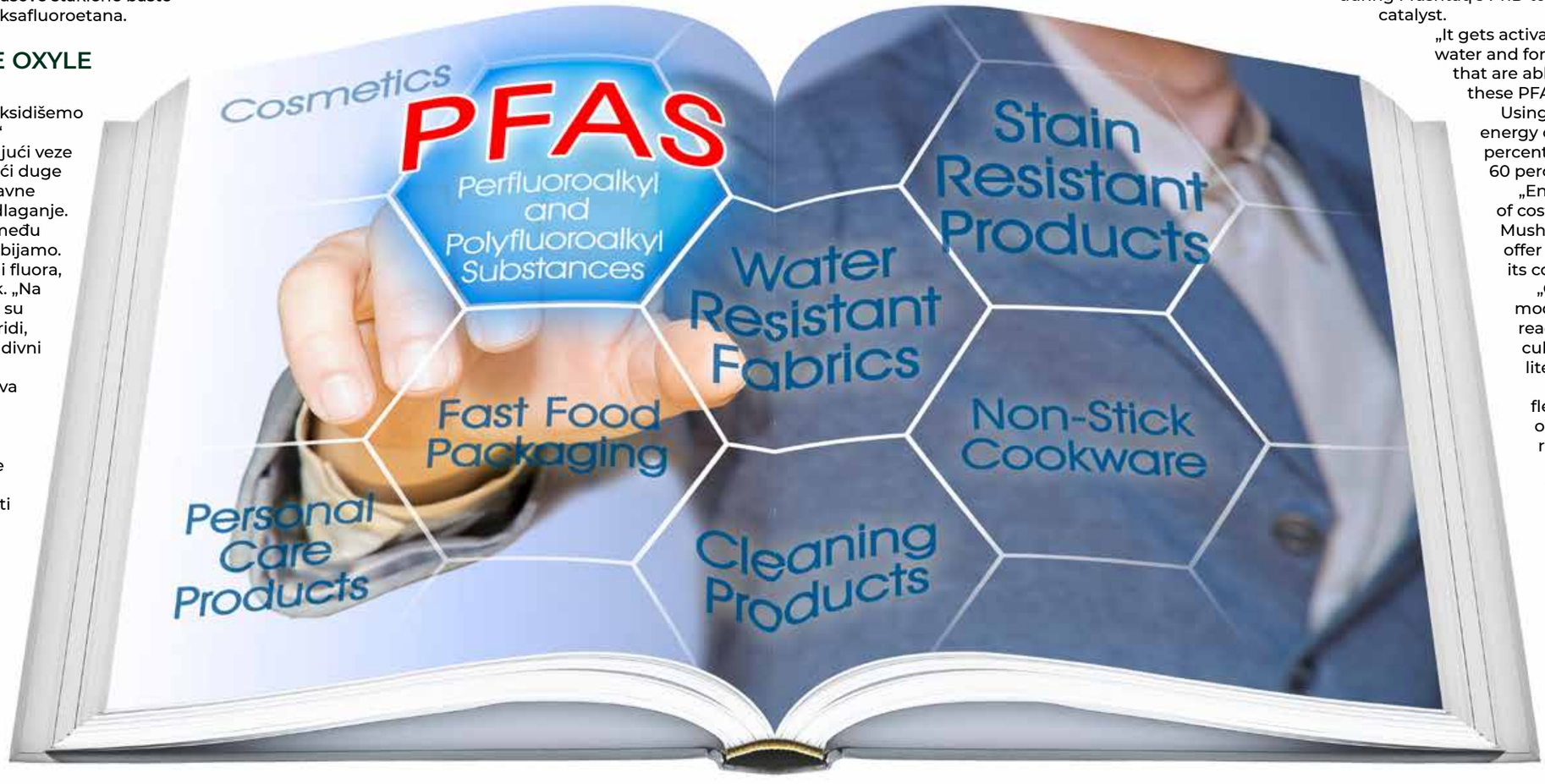

says Karyn Georges, who co-authored the UKWIR report on PFAS solutions. „They are not easily biodegradable. They are not easy to remove. That's why they were used in the first place."

. The problem is further complicated by the variation between PFAS.

„There are more than 10,000 different PFAS," Georges continues. „They comprise a whole range of physical chemical properties, and by that, I mean different ways you can potentially remove them."

PFAS remediation methods can be broadly divided into three categories: adsorbents, separation and destruction. Adsorbents and separation are effective in removing PFAS from wastewater, but neither eradicates the problematic chemicals.

Adsorption typically uses granular activated carbon (GAC) to extract PFAS from wastewater. The remaining carbon is then contaminated and needs disposing of - but sending it to landfill risks further pollution, as PFAS seep into the soil and groundwater.

„You have to destroy them, otherwise you're just circulating them to different media, be it sludge or even air," says Georges.

In 2021, UKWIR identified incineration as the only way to permanently destroy PFAS. This usually requires burning at temperatures above 1,000°C, spending huge amounts of energy.

Some studies have questioned whether incineration actually destroys PFAS completely, or it allows airborne particles to escape and form air pollution.

It can also release greenhouse gases like tetrafluoromethane and hexafluoroethane.

HOW DOES OXYLE WORK?

„We are purely destruction tech," says Mushtaq. „We are oxidizing and reducing these chemicals."

Oxyle removes PFAS by breaking the bonds between molecules, breaking down long and short chains into their component parts, which are safe for disposal.

"Let's say you have a carbon hydrogen. We break it. You have a carbon fluorine bond, you break it," says Mushtaq. „At the end of the treatment, all you're left with is CO_2, water molecules, some fluorides, sulphates and minerals – basically, building blocks."

The chemistry is not new, she explains, and is already in use by several companies. What sets Oxyle apart is the way it creates energy to facilitate the reaction.

Where others may pass electricity through electrodes or apply UV light to wastewater (both expensive and energy-intensive processes), Oxyle uses mechanical energy, like vibrations produced by bubbles or water flow.

It then applies the nanoporous material created during Mushtaq's PhD to the water, where it forms a catalyst.

„It gets activated and starts to split the water and form different chemical species that are able to break the bonds of these PFAS molecules," she says.

Using bubbles reduces Oxyle's energy consumption by at least 15 percent - in some cases as much as 60 percent.

„Energy is the biggest driver of cost for destruction tech," says Mushtaq, which means Oxyle can offer lower operating costs than its competitors.

„Our technology is quite modular," she continues. „Each reactor can treat about 10 meter cubes an hour, which is 10,000 liters an our."

This gives Oxyle the flexibility to scale up its operations, adding more reactors for larger customers.

WHO IS OXYLE WORKING WITH?

Treating PFAS in wastewater is a costly business that, according to Georges, is largely shouldered by consumers' water bills.

„The UK public are paying for the removal," she says. „Companies producing

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„Uglavnom su to industrijski igrači“, kaže Muštak. „Oni koji ili proizvode ove hemikalije i moraju tretirati otpadnu vodu ili su kontaminirali okolne objekte i moraju vršiti sanaciju.“

Oxyle je prošle godine završio pilot projekat sa švajcarskom hemijskom kompanijom CIMO, kada je tretirao podzemne vode kontaminirane PFAS-om. Muštak kaže da je Oxyle uklonio 99 procenata zagađujućih jedinjenja svaki dan tokom šest meseci.

„Najvažnije je bilo to što smo to uspeli da uradimo sa energetskom vrednošću koju nikada nisu videli u oblasti sanacije“, kaže ona. Ta potrošnja energije je iznosila nešto više od dva kilovata po kubnom metru na sat. „Najbliža konkurencija je oko 20 kilovat sati, što je deset puta više.“

OGRANIČENJA U UKLANJANJU PFAS-A

Ipak, Oxyle se bori protiv ogromne količine zagađenja. Sa svim istorijskim zagađenjem PFAS-om i stalnim curenjem u životnu sredinu, trebaće nam više od sanacije da se oslobodimo večnih hemikalija.

„Ne uklanjamo ih brzinom kojom se zagađenje dešava“, kaže Šubi Šarma, istraživač u CHEM Trust. „Zaustavljanje zagađenja na izvoru mora biti prioritet. Tehnologije sanacije mogu se primeniti paralelno, ali su one privremeno rešenje.“

Dok EU predlaže opštu zabranu 10.000 PFAS-a od 2026. godine, Šarma kaže da je regulativa u Velikoj Britaniji na mrtvoj tački.

„Nedostatak akcije u Velikoj Britaniji po pitanju regulative PFAS-a je šokantan“, kaže ona. Pre Brexita, objašnjava ona, niz međunarodnih ugovora ograničavao je PFOS, PFHxS, PFOA i TDFA (četiri vrste PFAS-a koje su privukle međunarodnu pažnju zbog svog uticaja na zdravlje i životnu sredinu), ali od tada nisu uvedeni novi propisi.

„Vlada Velike Britanije treba da se uskladi sa EU i uvede univerzalno ograničenje PFAS-a takođe.“

Ali, upozorava ona, ne postoji trenutno rešenje za PFAS. PFOS je zabranjen Stokholmskom konvencijom 2009. godine, ali se još uvek pojavljuje u životnoj sredini zbog svoje postojanosti.

„Kao kompanija koja se bavi sanacijom PFAS-a, postojati ćemo decenijama“, kaže Mušak. „Što pre zabranimo njihovu upotrebu, to bolje, jer će biti potrebna manja sanacija.“

those chemicals should be paying water companies for example, to remove those chemicals.”

Oxyle already has such PFAS-producing companies within their sights.

„It’s mostly industrial players,” says Mushtaq. „The one who are either producing these chemicals and have to treat the wastewater or have contaminated the facilities around and need to do remediation.”

Oxyle completed a pilot project with the Swiss chemical company CIMO last year, when it treated groundwater contaminated with PFAS. Mushtaq says Oxyle removed 99 percent of polluting compounds every day for six months.

„The kicker was we were able to do that at energy value, which they have never seen in the construction space before,” she says. That energy use equated to just over two kilowatts per meter cubed in an hour. „The nearest competition is around 20 kilowatt hours, which is ten times higher.”

THE LIMITS OF PFAS REMOVAL

However, Oxyle is fighting a huge amount of pollution. With all the historic PFAS pollution and ongoing leaks into the environment, we will need more than remediation to rid ourselves of forever chemicals.

„We’re not removing it as fast as the pollution is happening,” says Shubhi Sharma, a researcher at CHEM Trust. „Stopping pollution at source has to be the priority.” Remediation technologies can be applied in parallel, but they are a sticking plaster.”

While the EU has proposed a blanket ban on 10,000 PFAS from 2026, Sharma says regulation in the UK has been at a standstill.

„The lack of action in the UK on PFAS regulation is shocking,” she says. Prior to Brexit, she explains, a series of international treaties restricted PFOS, PFHxS, PFOA and TDFA (four types of PFAS that have attracted international attention for their impact on health and the environment), but no new regulations have been introduced since then.

„The UK government needs to align with the EU and bring forward a universal PFAS restriction as well.”

But, she cautions, there is no instant fix for PFAS. PFOS was banned by the Stockholm Convention in 2009, but still appears in the environment due to its persistence.

„As a company that does remediation of PFAS, we will be exisiting for decades,” Mushtaq says. „The sooner we ban the use of them, the better, because it’s less remediation needed.”

Treba zabraniti filtere za cigarete

Istraživači su otkrili da filteri otpuštaju hiljade toksičnih hemikalija i plastičnih vlakana u okruženje, što dodatno šteti vodenim životinjama

Za razliku od očiglednog uticaja smeća kao što su jednokratne plastične slamke, kese ili flaše, filteri cigareta deluju neprimetno. Koliko zapravo mogu biti loši?

Već znamo iz brojnih studija da su filteri cigareta najčešći oblik smeća na svetu. Ali sada, studija sa Univerziteta u Geteborgu dodaje novi nivo hitnosti u potrebi da se reši ova pošast. Istraživači su otkrili da filteri otpuštaju hiljade toksičnih hemikalija i plastičnih vlakana u okruženje, što dodatno šteti vodenim životinjama.

Povećanje upotrebe filtera na cigaretama

Pre 1950. godine, manje od 1% cigareta je imalo filter. Ali početkom 1950-ih, uspostavljena je veza između pušenja i raka, što je podstaklo industriju duvana da stvori filtere kako bi cigarete bile „sigurnije". Kako je objašnjeno u izveštaju Generalnog hirurga objavljenom od strane CDC-a 2010. godine, „povećano izveštavanje u medijima o potencijalnim opasnostima pušenja dovelo je do eksplozije razvoja i marketinga filtera".

Zapravo, u nastojanju da ublaži uticaj zdravstvenih rizika pušenja na tržište, industrija je lansirala talas filtera, uz značajna marketinška ulaganja koja su porasla sa 55 miliona dolara 1952. godine na približno 150 miliona dolara 1959. godine.

Do 1960. godine, filteri su činili 51% tržišta cigareta, a do 2005. godine, gotovo sve cigarete su imale filter.

PROBLEMI SA FILTERIMA

Šezdesetih godina, agencije su procenjivale sadržaj katrana i nikotina na osnovu uniformne metode testiranja na mašinama, ali ta merenja nisu odgovarala stvarnim vrednostima koje dobijaju (i dobijaju) pušači. Kako navodi izveštaj Generalnog hirurga, podaci i dokazi ne pokazuju da su „napori da se smanje mašinski merene vrednosti katrana i nikotina zapravo smanjili zdravstvene rizike pušenja, uglavnom zato što ove promene nisu smanjile stvarnu izloženost pušača toksinantima iz duvana." Izveštaj dalje detaljno objašnjava kako filteri čine pušenje još više zavisnim i opasnim.

Takođe, mišljenje autora studije, profesorke ekotoksikologije sa Univerziteta u Geteborgu Betani Kani Almrot i drugih stručnjaka, ističe da filteri mogu pući, uzrokujući da pušači udišu plastična vlakna (filteri cigareta su napravljeni od plastičnog acetata celuloze). Autori takođe potvrđuju da filteri nikada nisu učinili pušenje sigurnijim, već su stvorili više zdravstvenih rizika. „Uprkos ovim problemima, većina (>90%) cigareta danas se prodaje sa jednokratnim plastičnim filterom koji sadrži kolekciju vlakana celuloze acetata i različitih dodataka."

Cigarette Filters Should Be Banned

Researchers have found that filters release thousands of toxic chemicals and plastic fibers into the environment, further harming aquatic animals

Unlike the obvious impact of litter such as single-use plastic straws, shopping bags or bottles, cigarette butts seem unassuming. How bad can they really be?

We already know from numerous studies that cigarette filters are the most common form of litter in the world. But now, a study from the University of Gothenburg adds a new level of urgency to the need to tackle this scourge. Researchers have found that filters release thousands of toxic chemicals and plastic fibers into the environment, further harming aquatic animals.

The rise of the filter tip cigarettes

Before 1950, less than 1% of cigarettes were filtered. But in the early 1950s, the link between smoking and cancer was established, prompting the tobacco industry to create filters to make „safer" cigarettes. As explained in a Surgeon General's report published by the CDC in 2010, „the increasing lay press coverage of the potential dangers of smoking led to an explosion of filter development and marketing."

In fact, in an effort to mitigate the market impact of smoking's health risks, the industry launched a wave of filters, with significant marketing investments that rose from $55 million in 1952 to approximately $150 million in 1959.

By 1960, filtered cigarettes accounted for 51% of the cigarette market, and by 2005, almost all cigarettes had filters.

PROBLEMS WITH FILTERS

In the 1960s, agencies assessed tar and nicotine yields based on a uniform machine-based test method for measurement, which in the end did not correspond to the tar and nicotine yields that actual smokers got (and get). According to the Surgeon General's report, the data and evidence do not show that „efforts to lower machine-measured tar and nicotine yields actually decreased the health risks of smoking, primarily because these changes did not reduce smokers' actual exposure to tobacco toxins." The report goes on to explain in detail how filters make smoking even more addictive and dangerous.

Also, the opinion of the study author Bethany Carney Almroth, professor of Ecotoxicology at the University of Gothenburg, and other experts, points out that filters can splinter, causing smokers to inhale plastic fibers (cigarette filters are made of plastic cellulose acetate). The authors also confirm that filters have never made smoking safer, but instead have created more health risks. „Despite these issues, the majority (>90%) of cigarettes today are sold with a single-use plastic filter composed of a collection of cellulose acetate fibers and various additives."

SMEĆE OD CIGARETA JE SVUDA

Cigarete su jedan od najčešćih predmeta smeća na javnim mestima i jedan od najčešćih na plažama širom sveta. Iako prodaja cigareta u Sjedinjenim Državama opada decenijama, u 2020. godini je i dalje prodato 203,7 milijardi cigareta. Globalno, procenjuje se da u okruženje svake godine dospe 4,5 biliona upotrebljenih filtera cigareta.

Studija iz Geteborga istražuje ponašanje u vezi sa odlaganjem smeća od cigareta - i pomaže u objašnjenju zašto mnogi ljudi smatraju iznenađujućim što su filteri cigareta problematični. Autori napominju da se odlaganje smeća od cigareta dešava češće u poređenju sa drugim vrstama smeća. Zapravo, stopa odlaganja smeća od cigareta je 65%, za razliku od 17% za opšte smeće. Iz studije:

Izgleda da pušači imaju nerealno viđenje svojih postupaka i štetnosti. Iako pušači misle da bace jednu od 10 cigareta kao smeće, posmatranja su pokazala da pušači zapravo bace dve od tri cigarete. Najvažnije, studije iz SAD-a i Nemačke su potvrdile da većina pušača ne zna da su filteri cigareta napravljeni od plastike. To je bio slučaj čak i među adolescentima i mladima koji se smatraju delom ekološki osvešćene generacije.

FILTERI SU PUNI PLASTIKE

Autori mišljenja napominju da „svaki filter cigarete sadrži oko 15.000 mikroplastičnih vlakana i može ih ispustiti brzinom od oko 100 mikroplastičnih vlakana dnevno u vodu."

Filteri cigareta završavaju u vodenim okruženjima putem vetra, kiše, sistema za drenažu ili kišne kanalizacije. Iz studije:

Kada jednom dospeju tamo, odbačeni filteri cigareta mogu ispuštati više hemikalija koje potiču od berbe i prerade duvana (npr. ostatke pesticida), od proizvodnje filtera (npr. titan-dioksid, triacetin) ili procesa sagorevanja (npr. metali). Dimljeni filteri cigareta mogu ispuštati policiklične aromatične ugljovodonike (PAHs) - posebno naftalen, nikotin, etilfenol, benzen, toluen, etilbenzol, ksilene (BTEX) i teške metale u vodu. Zauzvrat, rastvoreni PAHs, nikotin, BTEX i teški metali mogu se akumulirati u tkivu vodenih organizama. Ukratko, smeće od filtera cigareta klasifikovano je kao opasan otpad sa dugoročnim potencijalom opasnosti, prema Direktivi EU o okviru otpada.

PRETNJA ŽIVOTINJAMA I EKOSISTEMIMA

Istraživači sa Univerziteta u Geteborgu testirali su efekte ove toksične supstance na larve akvatičnih komaraca, uočivši da toksini dovode do 20% veće stope smrtnosti među larvama komaraca. (Naravno, neki bi se mogli obradovati ovome, ali komarci nisu poenta!) Ranija istraživanja otkrivaju da su toksini u filterima štetni i za mnoge druge akvatične organizme.

CIGARETTE BUTTS ARE EVERYWHERE

Cigarettes are one of the most commonly found litter items in public places and one of the most frequently found litter items on beaches around the world. Although sales of cigarettes in the United States have been declining for decades, there were still 203.7 billion cigarettes sold in 2020. Globally, it is estimated that 4.5 trillion used cigarette filters enter the environment each year.

The Gothenburg study explores behavior around cigarette litter - and it helps explain why so many people find it surprising that cigarette butts are problematic. The authors note that cigarette littering occurs more frequently compared to littering of other items. In fact, the littering rate for cigarettes is 65%, as opposed to 17% for general litter. From the study:

Smokers seem to have unrealistic perception of their bahaviour and its harmfulness. Although smokers think they throw away one out of 10 cigarettes as trash, observations have shown that smokers actually throw away two out of three cigarettes. Most importantly, studies from the US and Germany confirmed that most smokers do not know that cigarette filters are made of plastic. This was the case even among adolescents and young people who are considered part of the environmentally conscious generation.

FILTERS ARE FILLED WITH PLASTICS

The authors of the opinion piece note that „each cigarette filter contains approximately 15,000 microplastic fibers and can shed these at a rate of around 100 microplastic fibers per day into water."

Cigarette filters end up in aquatic environments via wind, rain, drainage systems or stormwater sewers. From the study:

Once there, discarded cigarette filters can release more chemicals that come from tobacco harvesting and processing (e.g., pesticide residuals), from the filter production (e.g., titanium dioxide, triacetin), or from the combustion process (e.g., metals). Smoked cigarette filters can release polycyclic aromatic hydrocarbons (PAHs) - especially naphthalene, nicotine, ethylphenol, benzene, toluene, ethylbenzene, xylenes (BTEX) and heavy metals into water. In turn, dissolved PAHs, nicotine, BTEX and heavy metals can accumulate in the tissue of aquatic organisms. Overall, cigarette filter litter is classified as hazardous waste with long-term hazardous potential, under the EU Waste Framework Directive.

Od 2006. godine, skoro tri desetine studija istraživale su toksičnost filtera cigareta na biljke i životinje kako u akvatičnim tako i u kopnenim staništima, dokumentujući različite smrtonosne i štetne uticaje

The report explains in detail how filters make smoking even more addictive and dangerous

Na primer, pišu autori, „ribe mogu umreti ako su izložene koncentracijama toksina koji odgovaraju onima koje ispuštaju jedva dva filtera cigarete u jednom litru vode tokom četiri dana".

Od 2006. godine, skoro tri desetine studija istraživale su toksičnost filtera cigareta na biljke i životinje kako u akvatičnim tako i u kopnenim staništima, dokumentujući različite smrtonosne i štetne uticaje.

„Filteri cigareta su takođe glavni izvor mikroplastike koja dospeva u našu okolinu – nešto što znamo da ima značajan negativan uticaj na biološki život", kaže Almroth.

ZABRANA PLASTIČNI FILTERA ZA CIGARETE

Almroth i drugi pozivaju na zabranu filtera za cigarete, nazivajući ih opasnim bez koristi za društvo.

„Stojimo na raskrsnici gde količina plastike i drugih ‚novih entiteta' premašuje planetarne granice i ugrožava stabilnost Zemljinih sistema... Filteri cigareta su marketinški alat, a ne zaštitni zdravstveni uređaj, koji predstavlja i zdravstvene i ekološke probleme; stoga, njihovo ograničenje koristi i javnom i ekološkom zdravlju", pišu autori.

S obzirom na snagu industrije i činjenicu da bi Big Tobacco morao da poništi 60 godina marketinških poruka koje hvalospevaju filtere kao zdravstveni dodatak, može se zamisliti da će biti mnogo otpora. Šta će reći?

Ipak, kako autori mišljenja navode u vezi potpune zabrane filtera za cigarete, to bi bio „relativno mali institucionalni korak koji bi smanjio zagađenje i minimizirao suviše čest oblik jednokratnog plastičnog otpada koji sadrži višestruke toksične hemikalije."

„Davanje zabrane plastičnih filtera olakšalo bi tranziciju ka održivijoj potrošnji," dodaju oni, „i kao takvo, usaglašava se sa principima brige o Zemlji, kao i sa širokim međunarodnim mandatom za razvoj UN-ovog sporazuma o zaustavljanju zagađenja plastikom."

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Izveštaj detaljno objašnjava kako filteri čine pušenje još više zavisnim i opasnim

A THREAT TO ANIMALS AND ECOSYSTEMS

Researchers from the University of Gothenburg tested the effects of this toxic substance on aquatic mosquito larvae, finding that the toxins lead to a 20% higher mortality rate among mosquito larvae. (Of course, some might be happy about this, but mosquitoes are not the point!) Earlier research reveals that the toxins in the filters are harmful to many other aquatic organisms as well.

For example, the authors write, „fish can die if they are exposed to concentrations corresponding to the toxins exuded by barely two cigarette butts in one liter of water for four days."

Since 2006, nearly three dozen studies have looked at the toxicity of cigarette filters in plants and animals in both aquatic and terrestrial habitats, documenting an array of lethal and harmful impacts.

„Cigarette filters are also a major source of microplastics that find their way into our environment – something we know has a major negative impact on biological life," says Almroth.

BANNING PLASTIC CIGARETTE FILTERS

Almroth and others are calling for a ban on cigarette filters, calling them dangerous without benefit to society.

„We stand at a crossroads where the quantity of plastics and other ‚novel entities' exceeds planetary boundaries and threatens the stability of Earth systems... Cigarette filters are a marketing tool, not a protective health device, that pose both health and ecological concerns; thus, restricting them benefits both public and environmental health," the authors write.

Given the strength of the industry and the fact that Big Tobacco would have to undo 60 years of marketing messages praising filters as a health supplement, one can imagine there will be a lot of resistance. What will they say?

However, as the authors of the opinion state regarding a complete ban on cigarette filters, it would be a „relatively minor institutional change that would reduce pollution and minimize an all-too-common form of single-use plastic debris containing multiple toxic chemicals."

„Banning plastic filters would facilitate the transition towards more sustainable consumption," they add, „and as such, aligns with the principles of Earth stewardship as well as the broad international mandate to develop a UN Treaty to end plastic pollution."

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Užareno leto

RASHLAĐIVANJE EVROPSKIH METROPOLA

I ove godine delovi Grčke, Kipra i Turske trpe razorne toplotne talase, ali sve više iznalaze načine kako da iskoriste drveće, vodu i zelene objekte u rashlađivanju.

Delovi južne Evrope suočavaju se sa žestokim toplotnim talasima već na početku letaa, dok drugi pate od rekordnih padavina. Ovi ekstremni vremenski događaji postaju sve žešći i češći kao rezultat klimatskih promena i za mnoge zemlje predstavljaju zastrašujući uvid u budućnost.

Dani sa rekordnim temperaturama, već početkom juna, otkrili su koliko su naši gradovi nepripremljeni za temperature od 40°C. Takođe su nas naveli da više cenimo delove koji pružaju olakšanje: ulice sa drvoredima, parkove, otvorene bazene i klimatizovane javne prostore, navodi se u analizi Juronjuza.

Zbog efekta poznatog kao ‚urbano toplotno ostrvo', gradovi postaju mnogo topliji od drugih delova zemlje jer se toplota zarobljava između visokih zgrada i upija se u asfalt i beton. Zato su potrebne neke inovativne mere da bi se oni ohladili.

Od Atine do Antalije, nisu svi gradovi isto pogođeni toplotnim talasima. Šta možemo naučiti od onih koji prednjače u adaptaciji na klimatske promene?

HLADNE ULICE U BEČU

Beč je najpogodniji grad za život na svetu, prema Globalnom indeksu pogodnosti za život Economist Intelligence Unita.

Visoko se rangira i na polju klimatskih mera, jer je austrijska prestonica prvi put napravila klimatski plan 1999. godine, a 2018. postala jedan od prvih evropskih gradova koji je postavio strategiju za identifikaciju i borbu protiv urbanih toplotnih talasa.

Kada vrućina postane neizdrživa, stanovnici mogu hodati ulicama koje ih hlade 'maglovitim tuševima' finog spreja.

Ove ‚hladne ulice' su samo jedan deo plana javne infrastrukture opštinske vlade. Takođe je uvedena nova mreža biciklističkih ruta kako bi se učinilo privlačnijim napuštanje automobila koji proizvode toplotu (i zagađuju), a obećana je i sadnja 4.500 novih stabala svake godine.

Pored dodavanja novih elemenata gradu, Beč zadržava ono što funkcioniše. Još uvek ima više od 1.000 javnih fontana za piće i zadržao je opsežnu mrežu gradskih bazena izgrađenih 1920-ih.

Kada vrućina postane neizdrživa, stanovnici Beča mogu hodati ulicama koje ih hlade 'maglovitim tuševima' finog spreja

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Scorching Summer

COOLING DOWN FOR THE EUROPEAN METROPOLISES

This year, parts of Greece, Cyprus and Turkey are suffering searing heatwaves, but they are also finding ways to use trees, water and green buildings to cool them down.

Parts of southern Europe are already facing scorching heatwaves at the start of summer, while others are suffering record rainfall. These extreme weather events are becoming more severe and more frequent as a result of climate change, and for many countries they represent a frightening glimpse into the future.

Record-breaking days at the beginning of June revealed how unprepared our cities are for 40°C temperatures. They also made us appreciate the parts that provide relief: tree-lined streets, parks, lidos and air-conditioned public spaces, according to a Euronews analysis.

Due to an effect known as the ‚urban heat island', cities get much hotter than other parts of the country as heat is trapped between tall buildings and soaked up by asphalt and concrete. Therefore, some innovative measures are needed to cool them down.

From Athens to Antalya, not all cities are equally affected by heatwaves. What can we learn from those that are leading the way in climate adaptation?

COOL STREETS IN VIENNA

Vienna is the most liveable city in the world, according to Global Liveability Index from the Economist Intelligence Unit.

It also ranks high in the field of climate measures, as the Austrian capital first created a climate plan in 1999, and in 2018 became one of the first European cities to set out a strategy to identify and combat urban heatwaves.

When the heat becomes unbearable, residents can walk down the streets which cool them down with ‚fog showers' of fine mist.

These ‚cool streets' are only one part of the municipal government's public infrastructure plan. It has also introduced a new network of bike routes to make ditching heat-producing (and polluting) cars more appealing, and has promised to plant 4,500 new trees every year.

Besides adding new elements to the city, Vienna is holding on to what works. It still has more than 1,000 public drinking fountains and has retained an extensive network of municipal pools built in the 1920s.

When the heat becomes unbearable, the residents of Vienna can walk down the streets which cool them down with ‚fog showers' of fine mist

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Gradovi postaju mnogo topliji od drugih delova zemlje jer se toplota zarobljava između visokih zgrada i upija se u asfalt i beton. Zato su potrebne neke inovativne mere da bi se oni ohladil

VENTILACIONI KORIDORI U FRANKFURTU

Bivši evropski pobednik u kategoriji Grad drveća, Frankfurt već dobro stoji kada je reč o zelenim površinama. Drveće može smanjiti površinske temperature do 12°C tokom leta, prema satelitskoj studiji iz 2021. godine, pa je oko 200.000 stabala na javnim prostorima velika prednost za finansijsku prestonicu.

Kao jedan od najtoplijih gradova u Nemačkoj, Frankfurt je takođe morao značajno da se preoblikuje. Frankfurt ima ventilacione koridore, ili 'Luftleitbahnen': delove zemlje gde nema visokih zgrada ili velikih površina drveća, kako bi se uvukao hladniji vazduh iz okolnih područja.

Luftleitbahn na reci Nida, na primer, omogućava protok do 40.000 m3 hladnog vazduha po sekundi u grad tokom letnjih noći.

Pored toga, Frankfurt zahteva da mnoge nove zgrade imaju 'zelene' krovove pokrivene biljkama. Ovi krovovi mogu ostati zapanjujuće hladniji tokom sunčanih dana nego njihovi tradicionalni crni ekvivalenti.

„Zeleni krovovi imaju brojne pozitivne efekte," objašnjava Lara-Marija Mor iz frankfurtskog odeljenja za životnu sredinu. „Oni štite zgradu, izoluju je i hlade. To takođe štedi troškove. Buka se apsorbuje, fini praškovi filtriraju biljke, a efekti jakih kiša ublažavaju se time što kiša može biti apsorbovana supstratom."

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VENTILATION CORRIDORS IN FRANKFURT

A former European City of Trees winner, Frankfurt is already doing well when it comes to green spaces. Trees can reduce surface temperatures by up to 12°C in summer, according to a 2021 satellite study, so around 200,000 trees in public spaces are a huge asset for the financial capital.

As one of the hottest cities in Germany, Frankfurt also had to undergo a major makeover. Frankfurt has ventilation corridors, or ‚Luftleitbahnen': areas of land where there are no tall buildings or large stretches of trees, in order to draw in cooler air from the surrounding areas.

The Luftleitbahn on the river Nidda, for example, allows up to 40,000 m3 of cold air per second to flow into the city during summer nights.

In addition, Frankfurt requires that many new buildings have ‚green' roofs covered with plants. These roofs can stay surprisingly cooler on sunny days than their traditional black counterparts.

„Green roofs have numerous positive effects," explains Lara-Maria Mohr from the Frankfurt Environment Department. „They protect a building, insulate and cool it. This also saves costs. Noise is swallowed, fine dust is filtered by the plants, and heavy rainfall effects are cushioned by the fact that the rain can be absorbed by the substrate."

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Cities get much hotter than other parts of the country as heat is trapped between tall buildings and soaked up by asphalt and concrete. Therefore, some innovative measures are needed to cool them down.

GREENNEWS

KLIMATSKA SKLONIŠTA U MADRIDU

Topli letnji dani su očekivani u Španiji, do određene tačke.

Prošlog leta, temperature u glavnom gradu zemlje redovno su dostizale 40°C, dok je južni grad Valensija oborio rekord u toploti kada je živa dostigla 46.8°C.

I dok su Mediteranci dugo prilagođavali svoje radne i društvene živote oko vrućine, sa ranijim počecima i popodnevnim siestama, to nije privilegija koja je dostupna svima. Jedan 60-godišnji ulični čistač iz Madrida tragično je preminuo od toplotnog udara 2022. godine, nakon što se srušio na poslu prethodnog dana.

Nisu svi građani jednako pogođeni toplotnim talasima. Stanovnici u područjima sa nižim prihodima nemaju adekvatno izolovane kuće i pristup hladnim, zelenim površinama.

Kako bi poboljšao svoj rezultat, Madrid je otvorio klimatska skloništa u klimatizovanim javnim prostorima kao što su biblioteke i društveni centri tokom prošlogodišnjeg toplotnog talasa, i postavio aplikaciju za ubrzavanje ulaska u gradske, subvencionisane, javne bazene.

Takođe postoji dugoročna strategija za hlađenje grada. Pod planom 'Madrid ostrvo boja' iz 2019. godine, gradi se 'zeleni pojas' šuma dug 75 km oko prestonice. Termografske slike iz obližnjih područja 2022. godine pokazale su da su temperature tla već smanjene za 2°C u dve godine, izveštava PolitiKo.

KOJI SU NAJBOLJI NAČINI ZA HLAĐENJE GRADOVA?

Postoje mnogi načini na koje gradovi sprečavaju prekomerno zagrevanje tokom previše vrućih dana. U Nirnbergu su, na primer, tramvajske linije prekrivene travom kako bi se rashladile.

Arhitekte iz Norviča projektovale su 100 socijalnih stanova orijentisanih sever-jug, sa horizontalnim senkama preko prozora okrenutih ka jugu, kako bi sprečile najgore vrućine. Goldsmith Street je redak primer domova u Velikoj Britaniji koji su podobni i za leto i za zimu.

Bolje stanovanje i humani izgrađeni prostori, zeleni transport, drveće i vodena tela; ovo su ključni elementi gradova prilagođenih klimi. Ali sa tako različitim klimatskim uslovima i istorijskim karakteristikama, kako evropski lideri i urbanisti znaju šta tačno treba da rade?

Više drveća je dobitak na više frontova. Ali pomaže saznanje, na primer, da je potrebno 40 odsto nadstrešnice ulica da bi se maksimalno iskoristile prednosti onoga što stručnjak za planiranje zelenih gradova Jon Burke naziva "najnaprednijom tehnologijom za klimatizaciju prirode".

Postoje ključni proračuni koji se moraju napraviti o onome što su očigledno i estetska poboljšanja. Mreža C40 Cool Cities je jedna organizacija koja radi na ovim linijama. Pomogla je u razvoju alata za otpornost na toplotu gradova, koji omogućava donosiocima odluka da kvantifikuju tačne prednosti određenih parkova i zelene infrastrukture, reka, jezera i hladnih i vegetativnih površina.

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CLIMATE SHELTERS IN MADRID

Hot summer days are expected in Spain, up to a point. Last summer, temperatures in the country's capital regularly reached 40°C, while the southern city of Valencia broke a heat record when the mercury hit 46.8°C.

And while Mediterraneans have long adapted their work and social lives around the heat, with earlier starts and afternoon siestas, it is not a privilege available to everyone. A 60-year-old street cleaner from Madrid tragically died of heatstroke in 2022, after collapsing at work the previous day.

Not all citizens are equally affected by heatwaves. Residents in lower-income areas do not have adequately insulated houses and access to cool, green spaces.

To improve its score, Madrid opened climate shelters in air-conditioned public spaces such as libraries and community centers during last year's heatwave, and set up an app to speed up entry into the city's subsidized municipal pools.

There is also a long-term strategy to cool the city down. Under the ‚Madrid Island of Color' plan from 2019, a 75 km long ‚green belt' of forests is being built around the capital. Thermographic images from nearby areas in 2022 showed that ground temperatures were already reduced by 2°C in two years, Politico reports.

WHAT ARE THE BEST WAYS TO COOL CITIES DOWN?

There are many ways cities prevent overheating during excessively hot days. In Nuremberg, for example, the tram lines are covered with grass to cool them down.

Norwich architects designed 100 social housing units oriented north-south, with horizontal shades over south-facing windows to keep out the worst of the heat. Goldsmith Street is a rare example of homes in the UK that are suitable for both summer and winter.

Better housing and humane built spaces, green transport, trees and bodies of water; these are key elements of climate-adapted cities. But with such different climates and historic features, how do European leaders and urban planners know what to do exactly?

More trees are a win on multiple fronts. But it helps to know, for example, that it takes 40 percent on-street canopy cover to really maximize the benefits of what green city planner Jon Burke calls „nature's most advanced air conditioning technology."

There are key calculations that must be made about what are obviously aesthetic improvements. The C40 Cool Cities Network is one organization working along these lines. It has helped develop a ‚Heat Resilient Cities' tool, which allows decision makers to quantify the exact benefits of specific parks and green infrastructure, rivers, lakes, and cool and vegetative areas.

Madrid opened climate shelters in air-conditioned public spaces such as libraries and community centers during last year's heatwave, and set up an app to speed up entry into the city's subsidized municipal pools

Urbana rešenja za borbu protiv klimatskih promena

Putevi se tope, požari haraju, ljudi umiru - činjenica da živimo u klimatskoj krizi nikada nije bila očiglednija nego u ovom trenutku. Širom sveta, temperature u gradovima širom Evrope, Azije i SAD dostigle su rekordne visine koje su nekada smatrane nemogućim.

Pored visokih temperatura, gradovi su pogođeni olujnim poplavama, porastom nivoa mora i kolapsom infrastrukture usled ekstrema sa kojima jednostavno nisu opremljeni da se nose. S obzirom na to da 56 odsto svetske populacije živi u urbanim područjima, vreme je da preispitamo naše gradove i promenimo kako se oni projektuju, grade i upravljaju.

ZGRADA POKRETANA ALGAMA U HAMBURGU

Zgrada pokretana biljkama? Ovo više nije naučna fantastika, kako pokazuje stambena zgrada Bio Intelligent Quotient (B.I.Q.) u Hamburgu, Nemačka. Upečatljiva fasada od biomase algi generiše obnovljivu energiju putem biomase i solarnog termalnog grejanja.

Budući da je sistem potpuno integrisan sa sistemima zgrade, višak toplote iz foto-bioreaktora može se koristiti za zagrevanje vode i grejanje zgrade. Takođe se može skladištiti za kasniju upotrebu.

Devet godina nakon izgradnje B.I.Q. zgrade, integracija biomase u arhitekturu još uvek je u početnim fazama. Međutim, ovaj projekat je dokazao da mikroalge mogu nadmašiti druge obnovljive izvore svojom sposobnošću apsorpcije ugljen-dioksida, recikliranja otpadnih voda i oslobađanja kiseonika. Zgrade sa živim algama pružaju uzbudljive mogućnosti za buduće zelene gradove.

ZELENE TRAMVAJSKE PRUGE

Čest prizor u mnogim evropskim gradovima poput Bordoa, Frankfurta i Barselone, zelene tramvajske pruge pružaju obilje koristi.

Vegetacija smanjuje rizik od brzih poplava apsorbujući kišnicu, istovremeno hladeći okolinu kroz proces transpiracije. Sa čestim i intenzivnijim pojavama brzih poplava usled klimatskih promena, zelene tramvajske pruge su važan korak koji gradovi mogu preduzeti da se zaštite.

Prednosti idu dalje od smanjenja rizika od poplava: zelene površine tramvajskih pruga pružaju stanište za brojne insekte i beskičmenjake, dok meka površina takođe smanjuje vibracije i buku od tramvajskih točkova.

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Urban Solutions to Fight Climate Change

Roads are melting, fires are raging, people are dying - the fact that we are living in a climate crisis has never been more evident than at this moment in time. Around the world, temperatures in cities across Europe, Asia and the US have reached record highs once thought impossible.

In addition to high temperatures, cities have been hit by flash floods, rising sea levels and infrastructure collapse as a result of extremes that they are simply not equipped to contend with.

With 56 percent of the world's population living in urban areas, it is time to rethink our cities and change how they are designed, built and managed.

HAMBURG'S ALGAE-POWERED BUILDING

A building powered by plants? This is no longer science fiction, as the Bio Intelligent Quotient (B.I.Q.) apartment building in Hamburg, Germany, shows. The striking algae biomass facade generates renewable energy from biomass and solar thermal heat.

Since the system is fully integrated with the building systems, the excess heat from the photo-bioreactor can be used to heat water and the building as well. It can also be stored for later use.

Nine years after the construction of the B.I.Q. building, the integration of biomass into architecture is still in its in initial phases. However, this project has proved that microalgae can outperform other renewable sources in their ability to absorb carbon dioxide, recycle wastewater, and release oxygen.

Living algae buildings offer exciting possibilities for future green cities.

GREEN TRAM TRACKS

A common sight in many European cities such as Bordeaux, Frankfurt and Barcelona, green tram tracks provide an abundance of benefits.

The vegetation reduces the risk of flash floods by absorbing rainwater while cooling the environment through the process of transpiration. With frequent and more intense occurrences of flash floods due to climate change, green tram tracks are important steps that cities can take to protect themselves.

The benefits go beyond reducing the risk of flooding: green surfaces of the tram tracks provide a habitat for numerous insects and invertebrates, while the soft surface also reduces vibrations and the noise from tram wheels.

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S obzirom na to da 56 odsto svetske populacije živi u urbanim područjima, vreme je da preispitamo naše gradove i promenimo kako se oni projektuju, grade i upravljaju

DRVEĆE U PARIZU

Nakon što je 2019. godine zabeležena temperatura od skoro 43°C, Francuzi su očajnički tražili načine da rashlade svoj vrelu prestonicu, Pariz. Odgovor na njihove probleme može doći u obliku sadnje 160.000 stabala. Ovog leta, temperatura od 56°C je zabeležena odbijanjem s površine jedne od ulica bez drveća; to je dvostruko više od 28°C zabeleženih u hladu obližnje bulevara sa drvoredom.

Takvi porasti temperature poznati su kao efekat urbanih toplotnih ostrva, što se odnosi na situaciju u kojoj nedostatak drveća i zelenila čini urbana područja mnogo toplijim od ruralnih područja. Drveće je najbolji saveznik grada u smanjenju unutrašnjih temperatura, kao i borbi protiv klimatskih promena.

GRČKE BELE KUĆE

Među najinovativnijim urbanih rešenjima širom sveta ne možemo izostaviti bele zgrade koje dominiraju pejzažima ostrva poput Santorinija u Grčkoj. Ispostavlja se da ove bele kuće ne služe samo estetskim svrhama.

Čovek koristi znanje da bela boja reflektuje sunčevu svetlost već stotinama godina. Nedavno istraživanje zgrada koje koriste boju sa barijum sulfatom pokazalo je da one mogu održavati unutrašnje temperature oko 4,5°C nižim od spoljne temperature vazduha. Tehnološki proboji poput ovog mogu znatno pomoći onima koji se bore u pregrejanim domovima. Takođe postoji potencijal za značajno smanjenje troškova hlađenja zgrada smanjenjem potrebe za klima uređajima.

INTEGRISANJE PRIRODE U ZGRADE

Ključ za rešavanje klimatskih promena u gradovima je uključivanje prirode u njihovu infrastrukturu. Treći na našem spisku urbanih rešenja je „The Valley", višenamenski neboder u finansijskoj četvrti Amsterdama, inovativni projekat koji je sjajan primer kako se biofilija može uklopiti u gradski život. 13.000 biljaka, drveća i grmova integrisanih u fasadu zgrade doprinose poboljšanoj kvalitetu vazduha, unapređenom blagostanju i lokalizovanim efektima hlađenja. Integracija prirode u gradove mora postati osnovni princip dizajna. Samo tada gradovi mogu nastaviti da prosperiraju u promenljivoj klimi.

With 56 percent of the world's population living in urban areas, it is time to rethink our cities and change how they are designed, built and managed

TREES IN PARIS

After a temperature of almost 43°C in 2019, the French have been desperately looking for ways to cool their hot capital, Paris. The answer to their problems may come in the form of planting 160,000 trees. This summer, a temperature of 56°C was recorded by bouncing from the surface of one of the treeless streets; that was double the 28°C recorded in the shade of a nearby tree-lined boulevard.

Such temperature rises are known as the urban heat island effect, which refers to a situation where the lack of trees and greenery makes urban areas much hotter than rural areas. Trees are the city's best ally in reducing inner city temperatures, as well as fighting climate change.

GREEK WHITE BUILDINGS

Among the most innovative urban solutions around the world, we cannot omit the white buildings that dominate the landscapes of islands like Santorini in Greece. It turns out that these white houses do not have just aesthetic purposes.

Man has used the knowledge that white colour reflects sunlight for hundreds of years. A recent study of buildings using barium sulfate paint has showed that they can maintain indoor temperatures about 4.5°C lower than the outside air temperature.

Technological breakthroughs like this can greatly help those struggling in overheated homes. There is also the potential to significantly reduce the cost of cooling buildings by reducing the need for air conditioning.

INTEGRATING NATURE INTO BUILDINGS

The key to addressing climate change in cities is to incorporate nature into their infrastructure. The third on our list of urban solutions is The Valley, a multifunctional skyscraper in the financial district of Amsterdam, an innovative project that is a great example of how biophilia can fit into city life. The 13,000 plants, trees and shrubs incorporated into the building's façade provide improved air quality, enhanced well-being and localized cooling effects. Integrating nature into cities must become a basic design principle. Only then can cities continue to thrive in a changing climate.

Kružne brane na moru

Kružna brana izgrađena tik uz obalu sprečila bi prodor morske vode u unutrašnju, veštačku lagunu u kojoj bi nivo vode bio niži

Težnja EU prema zelenoj energiji nastoji da iskoristi tradicionalno čist izvor energije, uz neke izmene. Evropa ima za cilj da postane prvi klimatski neutralan kontinent do 2050. godine.

Dr. Džeremi Briker, inženjer hidraulike i obalnog područja, ima velike snove. Negde na obali Severnog mora, on zamišlja izgradnju brane za upravljanje snabdevanjem čiste energije u evropskim „nizinama".

DOBRA BRANA

Briker radi prema tom cilju. On i drugi inženjeri deo su projekta koji je dobio sredstva EU za unapređenje revolucionarne opcije skladištenja energije zasnovane na vodi. Prema njihovom planu, kružna brana izgrađena tik uz obalu sprečila bi prodor morske vode u unutrašnju, veštačku lagunu u kojoj bi nivo vode bio niži.

Ispumpavanje vode iz donje lagune u okolni okean obavljalo bi se kada postoji prevelika zaliha iz drugih obnovljivih izvora, poput sunca i vetra. Kada je potrebna energija, vodi bi se tada dozvolilo da teče nazad u lagunu kroz turbine koje proizvode energiju, pokretane silom okolnog okeana.

„U unutrašnjoj laguni mogli bismo skladištiti energiju ekvivalentnu hiljadama baterija," rekao je Briker, vanredni profesor na Tehnološkom univerzitetu Delft u Holandiji.

On je naučni koordinator projekta. Projekat pod nazivom ALPHEUS trebalo bi da završi u septembru 2024. godine nakon četiri i po godine.

Korišćenje gravitacije kako bi se omogućilo da voda teče nazad u donju lagunu kroz turbine omogućilo bi proizvodnju hidroenergije na zahtev kada je snabdevanje nisko, popunjavajući prazninu u snabdevanju i obezbeđujući rešenje za skladištenje čiste energije.

Univerziteti, uključujući Chalmers u Švedskoj, Braunschweig u Nemačkoj i Ghent u Belgiji, i kompanije udružili su snage u osam evropskih zemalja kako bi razvili ključne nove tehnologije potrebne za hipotetičku branu na moru, kao što su vodene turbine pogodne za korišćenje na moru.

POVRATAK U BUDUĆNOST

Dok hiljade hidroenergetskih instalacija već postoji širom sveta, one su gotovo isključivo u planinskim regionima gde prirodni teren dopušta gravitaciji da pokaže svoju snagu ili gde je rečni tok dovoljno snažan da se može iskoristiti za proizvodnju energije.

Zanimanje za tehnologiju ponovo raste, ovaj put za potencijalnu upotrebu u ravnijim područjima, uključujući mora, jer bi mogla pomoći ekološki prihvatljivoj evropskoj ekonomiji.

Evropa ima za cilj da postane prvi klimatski neutralan kontinent do 2050. godine. Ovaj cilj će zahtevati odmak od fosilnih goriva, uključujući ugalj, prirodni gas i naftu, ka obnovljivim izvorima energije, poput hidroenergije.

EU ima za cilj povećanje udela obnovljivih izvora energije na 42,5% do 2030. godine sa 23% koliko je bilo 2022. Taj udeo će se morati još više povećati kako bi se klimatska neutralnost postigla do 2050. godine.

Circular Dams at Sea

A circular dam built just off the coast would prevent seawater from entering the inner, artificial lagoon where the water level would be lower

The EU's drive towards green energy seeks to use a traditionally clean source of energy, with some modifications. Europe aims to become the first climate-neutral continent by 2050.

Dr. Jeremy Bricker, a hydraulics and coastal engineer, has big dreams. Somewhere on the North Sea coast, he imagines the construction of a dam to manage the supply of clean energy to Europe's „lowlands".

A GOOD DAM

Bricker is working towards that goal. He and other engineers are part of an EU-funded project to advance a revolutionary energy-storage option based on water . According to their plan, a circular dam built just off the coast would prevent seawater from entering the inner, artificial lagoon where the water level would be lower. Pumping water from the lower lagoon into the surrounding ocean would be done when there is an oversupply from other renewable sources, such as solar and wind. When energy is needed, the water would then be allowed to flow back into the lagoon through energy-generating turbines, driven by the force of the surrounding ocean.

„In the inner lagoon, we could store energy equivalent to thousands of batteries," said Bricker, an associate professor at Delft University of Technology in the Netherlands. He is the scientific coordinator of the project. The project, called ALPHEUS, should end in September 2024 after four and a half years.

Using gravity to allow water to flow back into the lower lagoon through turbines would make it possible to generate hydropower on demand when supply is low, filling the supply gap and providing a clean energy storage solution.

Universities, including Chalmers in Sweden, Braunschweig in Germany and Ghent in Belgium, and companies have joined forces in eight European countries to develop key new technologies needed for a hypothetical offshore dam, such as water turbines fit for use at sea.

BACK TO THE FUTURE

While thousands of hydropower installations already exist around the world, they are almost exclusively in mountainous regions where the natural terrain allows gravity to show its force or where the river flow is strong enough to be harnessed for energy production. Interest in the technology is growing again, this time for potential use in flatter areas, including seas, as it could help Europe's eco-friendly economy.

Europe aims to become the first climate-neutral continent by 2050. This goal will require a shift away from fossil fuels, including coal, natural gas, and oil, towards renewable energy sources such as hydropower. The EU aims to increase the share of renewable energy sources to 42.5% by 2030, from 23% in 2022. This share will have to rise even more for climate neutrality to be achieved by 2050.

BRZI ODGOVOR NA POTREBE

Jedan od izazova je taj što obnovljivi izvori energije poput vetra i sunca mogu biti povremeni. Oblaci mogu zakloniti sunce i vetar može prestati da duva. Kada se to desi, energetski sistem mora biti u stanju da brzo reaguje kako bi uravnotežio ponudu i potražnju. To znači - biti u mogućnosti skladištiti višak energije i ponovo ga vratiti u mrežu kada je to potrebno.

Iako baterije trenutno služe ovoj svrsi, one imaju ograničenja. Skladište male količine energije, zavise od kritičnih sirovina i imaju relativno kratak životni vek, posebno u poređenju sa branom.

„Ako ne izgradimo više skladišta energije, mogli bismo se suočiti sa nestankom struje i nestabilnošću mreže u budućnosti," rekao je Briker, čija karijera ga je odvela iz Sjedinjenih Država do rada na univerzitetima u Japanu i Holandiji.

DEMONSTRACIJA FLEKSIBILNOSTI

U međuvremenu, drugi istraživači u Evropi unapređuju postojeće hidroenergetske instalacije koristeći veštačku inteligenciju kako bi voda mogla preuzeti veću ulogu u nizu obnovljivih izvora energije. U sklopu još jednog projekta kojeg finansira EU, ovi stručnjaci su osmislili tehnologije za poboljšanje potencijala skladištenja energije, performansi i fleksibilnosti hidroelektrana.

Pod nazivom XFLEX HYDRO, projekat je završen u februaru 2024. godine nakon četiri i po godine. Integracija sve većih i većih količina povremene solarne energije i energije vetra, koja se takođe naziva varijabilnom obnovljivom energijom (VRE), zahtevaće veću fleksibilnost nego što je trenutno moguće kako bi se izbegli prekidi u snabdevanju.

„Svedoci smo preporoda hidroenergije. Nova, obnovljiva električna mreža treba fleksibilnost. To menja način na koji gledamo na hidroenergiju," kaže dr. Elena Vagnoni, predavač na Švajcarskom saveznom institutu za tehnologiju u Lozani, ili EPFL, i naučna koordinator projekta XFLEX HYDRO.

Projekat je spojio stručnost evropskih elektroprivreda, svetskih proizvođača opreme, istraživačkih institucija i energetskih konsultantskih kuća u Austriji, Francuskoj, Nemačkoj, Portugalu, Španiji i Ujedinjenom Kraljevstvu. Izveo je opsežne demonstracije svojih novih tehnologija u objektima u Francuskoj, Švajcarskoj i Portugalu.

POVEĆANJE EFIKASNOSTI

Povremeni padovi u snabdevanju povećavaju trošenje i habanje instalacija koje su projektovane imajući na umu redovnije snabdevanje energijom.

„U prošlosti su se pumpe uključivale najviše jednom dnevno. Sada ih moramo pokretati nekoliko puta dnevno, zavisno o vremenu. To ozbiljno opterećuje ove instalacije," rekao je Fransoa Avelan, počasni profesor na EPFL-u koji je bio naučni savetnik na projektu XFLEX HYDRO.

Projekat je testirao novi sistem, „hidraulički kratki spoj", na brani Grand'Maison u francuskim Alpima, najvećoj pumpnoj hidroelektrani u Evropi. Pri najvećem kapacitetu može uneti 1800 megavata energije u mrežu, što je ekvivalentno elektrani srednje veličine na prirodni gas ili ugalj. Nova tehnologija omogućava brani Grand'Maison da crpi vodu i proizvodi električnu energiju u isto vreme.

Softver XFLEX HYDRO upravlja protokom energije kako bi bio u stalnoj ravnoteži sa potrebama mreže. Očekivano povećanje efikasnosti smanjilo bi zavisnost od postrojenja na gas i ugalj i potencijalno uštedelo oko 90.000 tona emisija ugljen-dioksida godišnje, prema Avelanu.

U međuvremenu, Briker, s projekta ALPHEUS, rekao je da njegovi učesnici traže industrijskog partnera koji može povećati tehnologiju projekta. Finansiranje EU pomoglo mu je da njegov san o postrojenju vodene energije na moru postane stvarnost, a za njegovu izgradnju biće potrebno više godina istraživanja i privatnog ulaganja.

„Tehnologija je ovde. Sada nam samo treba industrijsko vođstvo i finansiranje," rekao je.

QUICK RESPONSES TO NEEDS

One of the challenges is that renewable energy sources like wind and solar can be intermittent. Clouds can block the sun and the wind can stop blowing. When this happens, the energy system must be able to react quickly to balance supply and demand. This means being able to store surplus energy and reintroduce it into the grid when needed.

Although batteries currently serve this purpose, they have limitations. They store a small amount of energy, depend on critical raw materials and have a relatively short lifespan, especially compared to a dam.

„If we don't build up more energy storage, we might be facing blackouts and grid instability in the future," said Bricker, whose career has taken him from the United States to work at universities in Japan and the Netherlands.

DEMONSTRATING FLEXIBILITY

Meanwhile, other researchers in Europe have been upgrading existing hydropower installations using artificial intelligence so that water can take on a greater role in a range of renewable energy sources. As part of another EU-funded project, these experts have devised technologies to improve the energy storage potential, performance and flexibility of hydropower plants. The project called XFLEX HYDRO was completed in February 2024 after four and a half years. The integration of larger and larger amounts of intermittent solar and wind power, also called variable renewable energy (VRE), will require greater flexibility than it is currently possible so as to avoid disruptions in supply.

„We are seeing a renaissance of hydropower. A new, renewable power grid needs flexibility. That changes the way we look at hydropower," says Dr. Elena Vagnoni, a lecturer at the Swiss Federal Institute of Technology in Lausanne, or EPFL, and the scientific coordinator of the XFLEX HYDRO project.

The project combined the expertise of European power companies, global equipment manufacturers, research institutions and energy consulting firms in Austria, France, Germany, Portugal, Spain and the United Kingdom. It conducted extensive demonstrations of its new technologies at facilities in France, Switzerland and Portugal.

INCREASING EFFICIENCY

Occasional drops in supply increase wear and tear to installations that were designed with a more regular energy supply in mind.

„In the past, you would turn on the pumps once a day at most. Now we need to start them several times a day, depending on the weather. That puts a severe strain on these installations," said Francois Avellan, professor emeritus at EPFL who was a scientific advisor on the XFLEX HYDRO project .

The project tested a new system, a „hydraulic short circuit", at the Grand'Maison dam in the French Alps, the largest pumped storage hydropower installation in Europe. At peak capacity, it can feed 1,800 megawatts of energy into the grid, equivalent to a medium-sized natural gas or coal-fired power plant. New technology allows the Grand'Maison dam to pump water and generate electricity at the same time.

The XFLEX HYDRO software manages the energy flow to keep it constantly in balance with the needs of the grid. The expected increase in efficiency would reduce dependence on gas and coal-fired plants and potentially save about 90,000 tons of carbon dioxide emissions annually, according to Avellan.

Meanwhile, Bricker of the ALPHEUS project said its participants are looking for an industrial partner that can scale up the project's technology. EU funding has helped make his dream of an offshore hydropower plant a reality, and it will take years of research and private investment to build it.

„The technology is here. Now it just needs industrial leadership and funding," he said.

Literatura koja može spasiti svet

Ekološka svest sve dublje ulazi u pore društava širom sveta, ali i umove pojedinaca. Pored niza akcija i inicijativa za spas planete, u ovaj segment podizanja svesti o očuvanju planete uključili su se i pisci. Sve je više knjiga na policama knjižara koje razmatraju ekološka rešenja kojima bi se moglo smanjiti zagađenje i podstakla reciklaža. Knjigama koje nam jasno govore da ovako više ne može i da moramo učiniti mnogo više kako bi našim unucima ostavili svet u kojem će moći da uživaju na sličan način kao i generacije pre njih.

Mahom se radi o stručnim radovima, koji u najvećem broju slučajeva nisu baš lako razumljivi čitaocima, posebno onim naviknutim na beletrističke dela i knjige iz oblasti popularne psihologije i nauke. Međutim, izdavačka kuća „Dereta“ je nedavno predstavila dva izuzetna naslova na temu ekologije koja osvetljavaju ekološke probleme i čitaocima koji do sada nisu bili temeljnije upućeni u ovu temu. Skrećemo vam pažnju na ove knjige uz toplu preporuku da ih još koliko ovog leta pročitate, jer su teme koje one obrađuju veoma zanimljive, ali i hitne.

Andri Snajr Magnason

O vremenu i vodi

Andri Snajr Magnason (1973) nagrađivani je islandski pisac i reditelj. Piše romane, poeziju, drame, kratke priče, eseje i knjige za decu. Njegova dela objavljena su na više od 40 jezika.

Magnason je veliki pobornik zaštite prirode i to je glavna tema svih njegovih dela. Bio je posebno aktivan u borbi protiv uništenja nenaseljene unutrašnjosti Islanda radi izgradnje fabrika, o čemu je pisao u svojoj knjizi Zemlja snova (2006), za koju je nagrađen Islandskom književ-nom nagradom u kategoriji publicistike. Po knjizi je 2009. nastao i dokumentarni film, koji je režirao sam autor.

Prestižnu islandsku književnu nagradu dobio je još dvaput, između ostalog i za knjigu za decu Priča o plavoj planeti (1999). Njegovo Pismo za budućnost povodom topljenja glečera postalo je poznato širom sveta.Godine 2016. kandidovao se za predsednika Islanda s programom koji je snažno zagovarao zaštitu životne sredine.

Pre nekoliko godina vodeći svetski klimatolog upitao je Andri Snajra Magnasona, jednog od najomiljenijih islandskih pisaca i intelektualaca, zašto ne piše o najvećoj krizi sa kojom se čovečanstvo suočilo. Magnason se branio tvrdeći da nije specijalista na polju klimatskih promena. Ali naučnik je bio uporan: „Ako vi ne možete da razumete naša naučna otkrića i predstavite ih u emotivnom, psihološkom, poetskom ili mitološkom kontekstu”, rekao mu je, „onda niko zaista neće razumeti problem i svet će nestati.”

Knjiga „O vremenu i vodi“ protkana je ličnim, istorijskim i mitološkim pričama, ali i zasnovana na intervjuima sa vodećim glaciolozima, okeanolozima, klimatolozima i geografima. Ona predstavlja Magnasonov odgovor, zanimljiv i ubedljiv u isto vreme, jedan od onih koji ilustruje stvarnost klimatskih promena i nudi kakvu-takvu nadu pred neizvesnom budućnošću. Polazeći od ideje pisanja čitulje za santu leda, suštinskog razumevanja ljudskog vremena i naših obaveza prema drugima, kroz istoriju i širom sveta, O vremenu i vodi je duboko lična i globalno orijentisana knjiga - putopis, svetska istorija i očajnička molba da živimo odgovorno prema budućim generacijama.

Veliki svetski bestseler, već preveden u preko 30 zemalja, ova knjiga je potpuno drugačija od bilo čega što je do sada objavljeno na temu trenutne vanredne klimatske situacije, koja preti da našu planetu učini nemogućim mestom za život.

Literature That Can Save the World

Environmental awareness is getting deeper and deeper into the pores of societies around the world, but also into the minds of individuals. Writers have also participated in a series of actions and initiatives to save the planet, and raise the awareness of its preservation. There are more and more books on environmental solutions that could help reduce pollution and encourage recycling. The books tell us clearly that it cannot be this way anymore, and that we must do much more in order to leave our grandchildren a world in which they can enjoy in a similar way as generations before them did.

These are mainly professional works, which in most cases are not very easy to understand, especially for readers accustomed to works of fiction and books in the field of popular psychology and science. However, the publishing house Dereta has recently presented two exceptional titles on ecology, which shed light on ecological problems for readers who have not been thoroughly informed about this topic so far. We draw your attention to these books, with a warm recommendation to read them during this summer, because the topics they cover are very interesting, but also urgent.

Andri Snaer Magnason

On Time and Water

Andri Snaer Magnason (1973) is an award-winning Icelandic writer and director. He writes novels, poetry, plays, short stories, essays and children’s books. His works have been published in more than 40 languages.

Magnason is a great supporter of nature protection and this is the main theme of all his works. He was particularly active in the fight against the destruction of the uninhabited interior of Iceland for the construction of factories, which he wrote about in his book Dreamland (2006), for which he was awarded the Icelandic Literary Award in the non-fiction category. In 2009, he directed a documentary film based on the book.

He received the prestigious Icelandic literary award twice again, among other things, for the children’s book The Story of the Blue Planet (1999). His Letter to the Future about melting glaciers became known worldwide. In 2016, he ran for president of Iceland with a program that strongly advocated environmental protection.

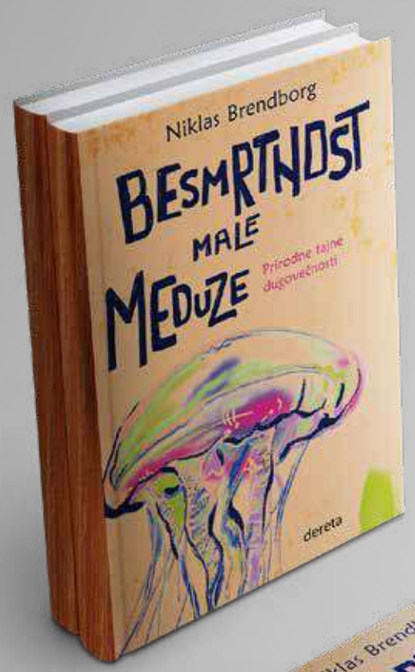
A few years ago, a world’s leading climatologist asked Andri Snaer Magnason, one of Iceland’s most beloved writers and intellectuals, why he was not writing about the greatest crisis humanity has ever faced. Magnason defended himself by claiming that he is not an expert in climate change. But the scientist persisted: „If you cannot understand our scientific discoveries and present them in an emotional, psychological, poetic or mythological context,” he told him, „then no one will really understand the issue and the world will end”

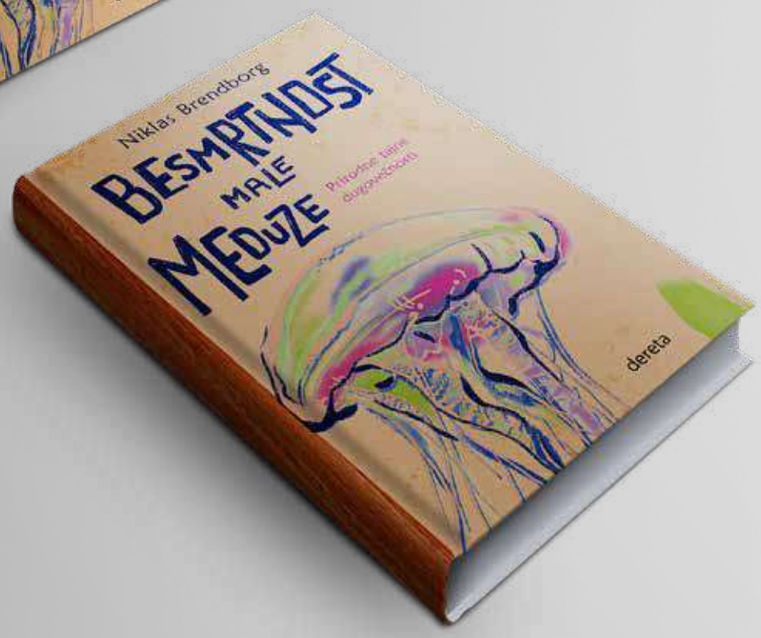
The book On Time and Water is interwoven with personal, historical and mythological stories, but also based on interviews with leading glaciologists, oceanologists, climatologists and geographers. It presents Magnason’s response, interesting and convincing at the same time, one that illustrates the reality of climate change and offers some kind of hope in the face of an uncertain future. Starting from the idea of writing an obituary for an iceberg, a fundamental understanding of human time and our obligations to one another, throughout history and around the world, On Time and Water is a deeply personal and globally oriented book - a travel story, a world history and a desperate plea to be responsible for future generations.

A major global bestseller, already translated in over 30 countries, this book is completely unlike anything that was published before on the subject of the current climate emergency, which threatens to make our planet an unlivable place.

Niklas Brendborg

Besmrtnost male meduze: prirodne tajne dugovečnosti





Niklas Brendborg (1995) doktorand je molekularne biologije na Univerzitetu Kopenhagen i jedan od najtalentovanijih istraživača u ovoj oblasti. Kao uspešni mladi naučnik, član je Međunarodnog programa za talente farmaceutske kompanije „Novonordisk“, koja ga i stipendira.

Godine 2015. Brendborg je objavio svoju prvu knjigu, Top Student. Takođe je, zajedno s Larsom Tvedeom, autor bestselera Supertrends.

Nedavni napredak u medicini i tehnologiji proširio je naše razumevanje starenja na čitavo životinjsko carstvo i osnažio bezvremenu čovekovu potragu za izvorom mladosti. Ipak, uprkos tome što savremeni ljudi danas žive duže nego ikada ranije, široka javnost nije bila upoznata s tim šta je sve zaista moguće – do sada.

U svom živahnom, entuzijastičnom delu Besmrtnost male meduze Niklas Brendborg otkriva da li je ključ besmrtnosti supersila koja nam je nadohvat ruke, ilustrujući svoja saznanja zapanjujućim pričama iz sveta prirode i ljudi, upoznavanjem sa nezamislivim trajanjem života nekih biljaka i životinja, kao i razotkrivanjem nekih fizioloških darova prirode koji su bliži magiji nego stvarnosti.

Kombinujući najsavremenija istraživanja s pričama iz staništa širom sveta, molekularni biolog Niklas Brendborg proučava produženi životni ciklus u svim njegovim varijantama, obogaćujući svoje delo brojnim zanimljivostima.

Tako u njegovoj knjizi srećemo čoveka koji je postio duže od godinu dana, ženu koja je promenila sopstvenu DNK, sekvoje koje preživljavaju hiljadama godina, a u tlu Uskršnjeg ostrva – ključ večne mladosti.

Besmrtnost male meduze je ljubavno pismo ogromnoj moći prirode i zahvalnost na onome čemu nas tajna dugovečnosti mnogih zemaljskih životinja i biljaka može naučiti. GN

Nicklas Brendborg

Jellyfish Age Backwards: Nature’s Secrets to Longevity

Nicklas Brendborg (1995) is a doctoral student of molecular biology at the University of Copenhagen and one of the most promising research talents in the field. As a successful young scientist, he is a member of the Novo Nordisk International Talent Program, and has been awarded the scholarship.

In 2015, Brendborg published his first book, Top Student. He also co-authored Lars Tvede’s bestseller Supertrends.

Recent advances in medicine and technology have extended our understanding of aging to the entire animal kingdom, and fueled man’s timeless search for the fountain of youth. Yet, despite the fact that modern humans today live longer than ever before, the general public has been unaware of what is truly possible - until now.

In his spunky, effervescent work Jellyfish Age Backwards, Nicklas Brendborg discovers whether the key to immortality is a superpower within our reach, illustrating his findings with astonishing stories from the world of nature and people, introducing the unimaginable lifespans of some plants and animals, as well as revealing some physiological gifts of nature that are closer to magic than reality.

Combining state-of-the-art research with stories from habitats around the world, molecular biologist Nicklas Brendborg studies the extended life cycle in all its variants, enriching his work with numerous interesting facts.

Thus, in his book, we meet a man who fasted for more than a year, a woman who changed her own DNA, redwoods that have survived for thousands of years, and in the soil of Easter Island - the key to eternal youth.

Jellyfish Age Backwards is a love letter to the immense power of nature, and gratitude for what the secret of the longevity of many terrestrial animals and plants can teach us. ` GN

Iako je obnovljiva energija sada jeftiniji način za proizvodnju električne energije od fosilnih goriva koja zagrevaju klimu, vaš račun za struju i dalje može rasti. Pa, šta se dešava, i kada će se situacija promeniti?

U 2023. godini, SAD su proizvele 238 teravat-sati električne energije iz solarne energije, osam puta više nego deceniju ranije

Obnovljiva energija SVE JEFTINIJA

Računi za struju SVE SKUPLJI

Although renewable energy is now a cheaper way to generate electricity than climate-warming fossil fuels, your electricity bill may still be rising. So, what is happening, and when will the situation change?

Renewable Energy Is Getting Cheaper and Electricity Bills Are Getting More Expensive

In 2023, the US generated 238 terawatt-hours of electricity from solar energy, eight times more than a decade earlier

Solarni paneli i vetroturbine proizvode električnu energiju po niskoj ceni. Problem je što ih nema dovoljno.

Pre više od 40 godina, predsednik Džimi Karter er je instalirao solarne panele na krovu Bele kuće. U svom govoru prilikom predstavljanja panela, Karter je upozorio da bi ova tehnologija mogla postati „znatiželja, muzejski eksponat, primer puta koji nije izabran" ili, kako je rekao optimistično, ključni trenutak za zemlju, „iskorišćavajući snagu sunca da obogatimo naše živote dok se udaljavamo od naše zavisnosti od stranih naftnih derivata."

Sa dramatičnim rastom solarne energije u poslednjih nekoliko godina, tehnologija je sigurno postala mnogo više od znatiželje. Počinje da ispunjava svoje obećanje o čistoj, jeftinoj, obilnoj energiji.

„Kada je Karter postavio solarne panele na Belu kuću, to je bio jedinstven trenutak, ali solarni paneli su tada bili izuzetno skupi. Bio je to simbol onoga što su predstavljali. Nije bila ekonomska odluka," rekao je Arvin Ganesan, izvršni direktor kompanije Fourth Power, proizvođača uređaja za skladištenje energije. „Ono što se desilo od tada je da su troškovi obnovljive energije sada najjeftiniji način za generisanje novih elektrona na mreži."

Iako je obnovljiva energija sada jeftiniji način za proizvodnju električne energije od fosilnih goriva koja zagrevaju klimu, vaš račun za struju i dalje može rasti. Pa, šta se dešava, i kada će se situacija promeniti?

TROŠKOVI ELEKTRIČNE ENERGIJE I DALJE RASTU

Prilično je jeftino pretvoriti solarnu energiju u električnu. Ali ne izgleda kao da je ta energija jeftina kada stigne račun za struju.

Prosečne cene električne energije povećale su se za skoro 3 odsto između februara 2023. i februara 2024, prema američkom Zavodu za statistiku rada. To povećanje nije bilo univerzalno, zavisno od države, zahvaljujući veoma različitim politikama i ekonomskim faktorima. Na primer, Severna Karolina je zabeležila najveće povećanje, od 17 odsto, tokom tog perioda, dok su troškovi u Nju Hempširu pali za 17,7 odsto.

Ti troškovi su važni. Nacionalno udruženje direktora za energetsku pomoć i Centar za energetsku siromaštvo i klimu očekuju da će troškovi hlađenja doma porasti za 7,9 odsto u odnosu na prošlu godinu, velikim delom zbog porasta temperature.

Istovremeno, ubiramo više čiste električne energije nego ikad pre. U 2023. godini, SAD su proizvele 238 teravat-sati električne energije iz solarne energije, osam puta više nego deceniju ranije.

Problem: Još uvek nemamo dovoljno jeftine obnovljive energije. Oko 60 odsto električne energije u SAD još uvek dolazi iz fosilnih goriva - uključujući 43 odsto iz prirodnog gasa - prema američkoj Agenciji za energetiku.

To znači da je veći deo mreže podložan promenama cena nafte, koje mogu biti pod uticajem ratova širom sveta, vremenskih nepogoda i drugih haosa.

U međuvremenu, deo električne energije koji dolazi iz obnovljivih izvora postaje sve jeftiniji. U 2022. godini, izveštaj Međunarodne agencije za obnovljivu energiju pokazao je da su troškovi električne energije iz vetra i solarnih izvora pali za 13 odsto ili više širom sveta.

„Obnovljivi izvori su daleko najjeftiniji oblik energije danas", rekao je Frančesco La Kamera, generalni direktor IRENA, u svom izveštaju. „Godina 2022. je jasan primer koliko je ekonomski isplativa postala nova proizvodnja obnovljive energije. Obnovljiva energija oslobađa ekonomije od nestabilnih cena fosilnih goriva i uvoza, smanjuje troškove energije i poboljšava otpornost tržišta - još više ako današnja energetska kriza potraje."

„Efikasnost solarnih panela je sada značajno bolja," rekao je. „Izlazna snaga solarnog panela je sada veoma efikasna. To su omogućili mnogi projekti koje je vlada katalizovala tokom tih 20 godina kako bi smanjila troškove obnovljivih izvora. Dakle, to je bilo vladino istraživanje i razvoj, intervencija vlade koja je pokrenula ovu revoluciju kako bi se na tržište doneli jeftini, visokoefikasni solarni paneli. Isto važi za vetar."

KO TREBA DA PLATI ZA ENERGETSKU TRANZICIJU

Uprkos prelasku ka jeftinijim, čistijim, obnovljivim izvorima energije, potrošači i dalje ne daju visoke ocene energetskom sistemu. Nedavni izveštaj globalne

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Solar panels and wind turbines produce electricity at a low cost. The problem is that there are not enough of them.

More than 40 years ago, President Jimmy Carter installed solar panels on the roof of the White House. In his speech to introduce the panel, Carter warned that this technology could become „a curiosity, a museum piece, an example of the road not taken" or, as he said optimistically, a defining moment for the country, „harnessing the power of the sun to enrich our lives as we move away from our dependence on foreign oil."

With the dramatic growth of solar energy over the past few years, the technology has certainly become much more than a curiosity. It is starting to live up to its promise of clean, cheap, abundant energy.

„When Carter put solar panels up on the White House, it was a moment, but solar panels were super expensive. It was a symbol of what that represented. It wasn't an economic decision," said Arvin Ganesan, CEO of Fourth Power, a manufacturer of energy storage devices. „What has happened since then is that the cost of renewable energy is now the cheapest way to generate new electrons on the grid."

Although renewable energy is now a cheaper way to generate electricity than climate-warming fossil fuels, your electricity bill may still be rising. So, what is happening, and when will the situation change?

ELECTRICITY COSTS CONTINUE TO RISE

It is quite cheap to turn solar energy into electricity. But it does not look like that energy is cheap when the bill arrives.

Average electricity prices increased by nearly 3 percent between February 2023 and February 2024, according to the U.S. Bureau of Labor Statistics. That increase was not universal, depending on the state, thanks to widely varying policies and economic factors. For example, North Carolina saw the largest increase, at 17 percent, during that period, while costs in New Hampshire dropped by 17.7 percent.

Those costs are important. The National Energy Assistance Directors Association and the Center for Energy Poverty and Climate expect home cooling costs to rise 7.9 percent compared to last year, in large part due to rising temperatures.

At the same time, we are harvesting more clean electricity than ever before. In 2023, the US generated 238 terawatt-hours of electricity from solar energy, eight times more than a decade earlier.

The problem: We still do not have enough cheap renewable energy. About 60 percent of U.S. electricity still comes from fossil fuels — including 43 percent from natural gas — according to the U.S. Energy Information Administration.

That means that the majority of the grid is susceptible to swings in oil prices, which can be affected by wars around the world, severe weather and other chaos.

Meanwhile, the share of electricity that comes from renewable sources is getting cheaper. In 2022, a report by the International Renewable Energy Agency showed that the cost of electricity from wind and solar sources fell by 13 percent or more worldwide.

„Renewables are by far the cheapest form of power today," said Francesco La Camera, Director General of IRENA, in the report. „The year 2022 is a stark example of just how economically viable new renewable energy generation has become. Renewable power frees economies from volatile fossil fuel prices and imports, curbs energy costs and enhances market resilience - even more so if today's energy crunch continues."

„The efficiency of solar panels is just significantly better at this point" he said. „The output of a solar panel is now highly efficient. And what caused that is a lot of projects the government catalyzed over that intervening 20 years to bring down the cost of renewables. So it was government research and development, government intervention that launched this revolution to bring low-cost, high-efficient solar panels to the market. And the same is true for wind."

WHO SHOULD PAY FOR THE ENERGY TRANSITION?

Despite the shift to cheaper, cleaner, renewable energy sources, consumers still do not give the energy system high marks. A recent report by the global accounting and consulting firm Ernst & Young detailed

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računovodstvene i konsultantske firme Ernst & Young detaljno opisuje pad poverenja u energetski sistem i osećaj među potrošačima da je teret na njima, kao pojedincima, da se promene. Umesto toga, Amerikanci smatraju da bi teret energetske tranzicije trebao više pasti na energetsku industriju.

Anketa od 3.000 američkih potrošača pokazala je da samo 30 odsto Amerikanaca „veruje da će njihova energija ostati pristupačna" i pokazala je „pad poverenja potrošača u američki energetski sistem" na 56,9 odsto sa 65,8 odsto u 2022. Takođe je otkrila da većina Amerikanaca (68%) veruje da „rade sve što mogu da budu održivi" i da bi energetski provajderi (65%), lokalne vlasti (42%) i naftne i gasne kompanije (38%) trebali preuzeti vodeću ulogu u prelasku na čistu energiju.

Greg Gatridž, globalni lider za iskustvo kupaca u sektoru energije i resursa u EY, i glavni autor izveštaja, rekao je da ga nalazi nisu iznenadili.

„Postoji veliki jaz, i to je tačno ono što smo očekivali da vidimo," rekao je. „Rani usvojitelji su se pomerili, a sada treba da nađemo način da aktiviramo one koji ili ne mogu ili ne žele da se pomere, u ovom trenutku, kroz energetsku tranziciju."

Čak i oni koji su spremni da pređu na čistu energiju ne mogu uvek to da urade, što čini tržište sve izazovnijim za potrošače, rekao je Kris Ventura, izvršni direktor ogranka Consumer Energy Alliance za Srednji zapad. Dok programi poput zajedničke solarne energije i Solar za sve imaju za cilj da prošire pristup solarnoj energiji izvan krovnih solarnih sistema, na primer, nisu dostupni svima.

„Za veliku većinu ljudi, to će potrajati," rekao je Ventura. „Za razliku od iPhone-a, gde nije važno gde živite, ako volite obnovljivu energiju i želite da postavite solarni panel na svoj krov, možete to učiniti ako posedujete svoj dom. Ali ako ste podstanar ili živite u stambenoj jedinici ili kondominijumu, nemate te mogućnosti."

Kao i potrošači koje je anketirao Ernst & Young, Ventura je rekao da bi trebalo manje zahtevati od pojedinaca i više naglasiti sistemske promene kako bi se rešili „sistemski problemi."

„Apsolutno se slažem sa idejom da ljudi generalno osećaju preopterećenost i ne žele da taj teret padne na njihova ramena," rekao je. „Jedan od pet ljudi ne može sebi priuštiti da plati račun za struju u Sjedinjenim Državama, pa je nepravedno da rešenje isključivo padne na njihova ramena, posebno kada su vlade i komunalne službe mnogo bolje pripremljene da pruže rešenja."

KADA ĆE OBNOVLJIVI IZVORI SNIZITI CENU ENERGIJE

U industriji koja sustiže tehnologiju, potražnju i infrastrukturu, kada će potrošači videti razliku u svojim troškovima energije? Stručnjaci se nadaju da nismo daleko, i zamah je na njihovoj strani.

„Jednostavno rečeno, ako su (kapitalni troškovi) izgradnje novih obnovljivih izvora plus skladištenje jeftiniji od izgradnje nove elektrane na prirodni gas, plus trošak goriva, svaki put ćete izgraditi čistu energiju," rekao je Ventura. „To smanjenje troškova će na kraju dovesti do ušteda za potrošače. I upravo smo na toj tački preokreta."

Jedan od faktora koji utiče na čistu energiju je početni trošak. Od instalacije solarnih panela do električnih vozila, obećanje povraćaja ulaganja može biti teško za prodaju. Ali kako taj početni trošak opada sa boljom tehnologijom, predstavljanje postaje lakše.

Ulaganje u obnovljivu energiju „zvuči previše dobro da bi bilo istinito," rekao je Albert Gor, izvršni direktor Udruženja za transport sa nultom emisijom (i sin bivšeg potpredsednika Al Gora). „I takođe, zahteva mogućnost ulaganja, u slučaju solarnog sistema, 30.000 dolara znajući da će se možda isplatiti za osam godina, u zavisnosti od toga gde živite. Ali javni sentiment se dramatično poboljšao."

I za sve upotrebe električne energije, jedno je sigurno: stabilnost je dobra stvar. Bilo da punite svoje električno vozilo ili napajate svoj dom, lakše je osloniti se na vetar i sunce nego na fosilna goriva i njihovo transportovanje širom sveta.

„Obnovljivi izvori, u kombinaciji sa drugom tehnologijom imaju potencijal da pomognu u stabilizaciji mreže na duži rok, i tako snize troškove," rekao je Ben Pročažka, izvršni direktor nevladine, neprofitne organizacije The Electrification Coalition.

a decline in confidence in the energy system and a sense among consumers that the onus is on them, as individuals, to change. Instead, Americans believe that the burden of the energy transition should fall more on the energy industry.

The survey of 3,000 US consumers found that only 30 percent of Americans „feel confident their energy will remain affordable" and saw „consumer confidence toward the US energy system" plunge to 56.9 percent from 65.8 percent in 2022. It also found that most Americans (68%) believe they are „doing everything they can to be sustainable" and that energy providers (65%), local governments (42%) and oil and gas companies (38%) should take the lead in transitioning to cleaner energy.

Greg Guthridge, global energy and resources customer experience transformation leader at EY, and the lead author of the report, said he was not surprised by the findings.

„There's this big gap, and that's exactly what we expected to see," he said. „The early adopters moved, and now we need to find a way to activate those who either can't or won't move, at the moment, through the energy transition."

Even those willing to switch to clean energy cannot always do so, making the market increasingly challenging for consumers, said Chris Ventura, executive director of the Midwest branch of the Consumer Energy Alliance. While programs like community solar and Solar for All aim to expand access to solar energy beyond rooftop solar systems, for example, they are not available to everyone.

„For the vast majority of people out there, it's going to take some time," Ventura said. „Unlike an iPhone, where it doesn't matter where you live, if you love renewable energy and you want to put a solar panel on your roof, you can do that if you own your home. But if you're a renter or living in a multi-family housing unit or a condo, you don't have those opportunities."

Like the consumers surveyed by Ernst & Young, Ventura said there should be less demand on individuals and more emphasis on systemic change to address „systemic problems."

„I absolutely resonate with the idea that people feel overburdened in genral and don't want this to fall on their shoulders," he said. „One out of five people can't afford to pay their electricity bill in the United States, so to have the solution fall exclusively on their shoulders is not fair, especially when governments and utilities are much better poised to deliver the solutions."

WHEN WILL RENEWABLE SOURCES DECREASE THE PRICE OF ENERGY?

In an industry that is catching up to technology, demand and infrastructure, when will consumers see a difference in their energy costs? Experts hope that we are not far away, and the momentum is on their side.

„Simply stated, if the (capital expenditures) of building new renewables plus storage is cheaper than building a new natural gas plant, plus the cost of fuel, then every single time you're going to build clean energy" Ventura said. „That reduction in cost will eventually kind of ladder up cost savings for consumers. And we're about at that inflection point now."

One of the factors that affects clean energy is the initial cost. From installing solar panels to electric vehicles, the promise of return on investment can be a tough sell. But as that initial cost decreases with better technology, the introduction becomes easier.

Investing in renewable energy „sounds too good to be true," said Albert Gore, executive director of the Zero Emission Transportation Association (and son of former Vice President Al Gore). „And also, it does require the ability to invest, in the case of a solar system, $30,000 knowing that you'll break even in maybe eight years, depending on where you live. But public sentiment has improved dramatically."

And for all these electricity uses, one thing is certain: Stability is a good thing. Whether you are charging your electric vehicle or powering your home, it is easier to rely on wind and sun than fossil fuels, and transporting them around the world.

„Renewables, in conjunction with other technology, have the potential to help make the grid stable in the long term, and thus drive down costs," said Ben Prochazka, executive director of the non-governmental, non-profit organization The Electrification Coalition.

Govor mržnje obično raste sa temperaturom:

broj tvitova u SAD-u koji koriste pežorativni ili diskriminatorni jezik skočio je za do 22 posto tokom ekstremnih vrućina

Vrućina ne samo da vas tera da se znojite - može takođe da utiče na vaš mozak.

Utvrđeno je da vruće vreme može rezultirati nižim rezultatima na testovima matematike i većim stopama agresije, od zlobnog ponašanja do nasilnog kriminala. Mali, ali rastući broj istraživanja sugeriše da može takođe uticati na način na koji ljudi govore.

Prema studiji objavljenoj u časopisu iScience, političari često koriste kraće reči u govorima kada je temperatura napolju 26 stepeni ili više. Analiza je obuhvatila 7 miliona govora u osam zemalja - Sjedinjenim Američkim Državama, Velikoj Britaniji, Austriji, Holandiji, Novom Zelandu, Danskoj, Španiji i Nemačkoj - upoređujući ih sa prosečnom temperaturom tog dana kada su bili izgovoreni. Hladni dani nisu pokazivali isti efekat.

POSLEDICE TOPLOTE

Razumevanje posledica toplote na kognitivne sposobnosti postaje posebno važno kako se klima zagreva, rekao je Risto Conte Keivabu, koautor studije koji istražuje klimatske promene na Max Planck Institutu za istraživanje demografije u Nemačkoj.

U danima kada je temperatura bila viša od 27 stepeni, jednostavniji jezik koji su političari koristili bio je ekvivalentan gubitku pola meseca obrazovanja. Taj rezultat verovatno je potcenjen, rekao je Conte Keivabu, jer je studija pokušala „razdvojiti uticaj toplote od svih mogućih faktora smetnje na najkonzervativniji način mogući." Pregledom samo podataka iz Nemačke, istraživači su ustanovili da je efekat bio sličan smanjenju obrazovanja za četiri meseca, dodao je.

Govori su mereni pomoću Flesch-Kincaid testa čitljivosti, koji procenjuje koliko je tekst težak za razumevanje na osnovu dužine reči i rečenica. Studija je takođe otkrila da su odrasli stariji od 57 godina osetljiviji na toplotu, na osnovu nemačkih podataka, pri čemu su temperature u rasponu od 20-23 stepeni povezane sa promenama u njihovom govoru. Toplota je posebno opasna za starije odrasle osobe, koje imaju težiće da se ohlade zbog slabije cirkulacije krvi i propadanja znojnih žlezda.

VRUĆINA PODSTIČE GOVOR MRŽNJE

Druge studije podržavaju ideju da toplota može uticati na naše reči - mada više zbog toga što može pogoršati raspoloženje. Govor mržnje obično raste sa temperaturom: broj tvitova u SAD-u koji koriste pežorativni ili diskriminatorni jezik skočio je za do 22 posto tokom ekstremnih vrućina, prema studiji iz 2022. godine. Sličan fenomen primećen je i na kineskim društvenim mrežama, gde ljudi koriste više negativnog jezika tokom veoma vrućih dana.

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Hate speech tends to rise with temperatures:

The number of tweets in the US that use pejorative or discriminatory language jumped by up to 22 percent during extreme heat

Heat waves do not just make you sweat—they can also affect your brain.

It has been found that hot weather can result in lower scores on math tests and higher rates of aggression, ranging from mean-spirited behavior to violent crime. A small but growing body of research suggests it may also affect the way people speak.

According to a study published in the journal iScience, politicians often use shorter words in speeches when the temperature outside is 26 degrees or higher. The analysis included 7 million speeches in eight countries - the United States, Great Britain, Austria, the Netherlands, New Zealand, Denmark, Spain and Germany - comparing them with the average temperature on the day they were delivered. Cold days did not produce the same effect.

THE CONSEQUENCES OF HEAT

Understanding the consequences of heat on cognitive abilities becomes especially important as the climate warms, said Risto Conte Keivabu, a co-author of the study who researches climate change at the Max Planck Institute for Demographic Research in Germany.

On days when a temperature was higher than 27 degrees, the simpler language used by politicians was equivalent to losing half a month of education. That result is likely an underestimate, Conte Keivabu said, since the study tried to „disentangle the impact of heat from all the possible confounding factors in the most conservative way possible." Looking at data from Germany alone, researchers found that the effect was similar to a four-month reduction in education, he added.

The speeches were measured using Flesch-Kincaid readability tests, which assess how difficult a text is to understand based on the length of words and sentences.

The study also found that adults over the age of 57 were more sensitive to heat, based on German data, with temperatures in the range of 20-23 degrees linked with changes in their speech. Heat is especially dangerous for older adults, who have a harder time cooling down due to weaker blood circulation and deteriorating sweat glands.

HEAT ENCOURAGES HATE SPEECH

Other studies support the idea that heat can affect our words - though more for the reason that it can worsen our mood. Hate speech tends to rise with temperatures: The number of tweets in the US that use pejorative or discriminatory language jumped by up to 22 percent during extreme heat, according to a

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Vrućina utiče na naše reči

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On days when a temperature was higher than 27 degrees, the simpler language used by politicians was equivalent to losing half a month of education

Hot Weather Influences Our Words

Za razliku od objava na društvenim mrežama, međutim, govori se obično pripremaju unapred, što čini promenu političara ka manje kompleksnom jeziku u vrućim danima iznenađujućom. Istraživači pretpostavljaju da bi psihološki efekti toplote mogli „uticati na govornika da pojednostavi govor ili se odmakne od pripremljenih napomena zbog oštećene kognitivne funkcije i komfora."

Kako to da talas vrućine napolju može promeniti kvalitet govora u zatvorenom prostoru? Studija iznosi nekoliko teorija. Možda čak i kratka izloženost toploti može izazvati probleme, poput čekanja na voz tokom putovanja ili odmora napolju; ili, obrnuto, neudobne temperature napolju mogu navesti ljude da ostanu unutra gde nedostatak svežeg vazduha može ometati njihove kognitivne sposobnosti. Druga mogućnost je da ljudi često lošije spavaju kada im je vruće, što im otežava jasno razmišljanje narednog dana.

GENERIČKE REČI

Korišćenje jednostavnijeg jezika nije nužno loše - zapravo, često je lakše razumeti. Ali kada neko koristi manje kompleksan jezik tokom dužeg vremenskog perioda, to može ukazivati na kognitivni pad, prema rečima Conte Keivabua.

„Ne znamo da li ovo vodi ka ishodima kada je reč o odlučivanju političara ili koliko su efikasni u prenošenju svojih poruka", rekao je. Istraživači su ustanovili da korišćenje više generičkih reči može biti rani znak demencije, obrazac koji je primećen u knjigama autora i govorima političara.

Toplota nije jedini faktor životne sredine koji može suptilno uticati na nas da kažemo jedno umesto drugog. Studija iz 2019. godine otkrila je da izloženost zagađenju vazduha takođe dovodi do smanjenja složenosti govora članova Kanadskog parlamenta.

study from 2022. A similar phenomenon has been observed on Chinese social media, where people use more negative language during very hot days.

Unlike social media posts, however, speeches are usually prepared in advance, making politicians' shift to less complex language on hot days surprising. The researchers assume that psychological effects of heat could „influence a speaker to simplify speech or diverge from prepared remarks due to impaired cognitive function and comfort."

How is it that a heat wave outside can change the quality of speech indoors? The study presents several theories. Perhaps even brief exposure to heat can cause problems, such as waiting for a train while traveling or taking a break outside; or, conversely, uncomfortable temperatures outdoors may lead people to stay indoors where the lack of fresh air may interfere with their cognitive abilities. Another possibility is that people often sleep worse when they are hot, making it harder for them to think clearly the next day.

GENERIC WORDS

Using simpler language is not necessarily bad - in fact, it is often easier to understand. But when someone uses less complex language for a long period of time, it can indicate cognitive decline, according to Conte Keivabu.

„We don't know if this leads towards outcomes when it comes to the decision-making of politicians or how effective they are in conveying their messages," he said.

Researchers have found that using more generic words can be an early sign of dementia, a pattern that has been observed in authors' books and politicians' speeches.

Heat is not the only environmental factor that can subtly influence us to say one thing instead of another.

A study in 2019 found that exposure to air pollution also led to a reduction in the complexity of speeches by members of the Canadian Parliament.

Nano emulzija za zaštitu i efikasnost solarnih panela

Emulzija se lako nanosi i stvara film koji odbija vodu, led i prašinu tj. omogućava da nečistoće lako skliznu sa površine panela bez upotrebe hemije i sredstava za čišćenje

Solarni paneli postaju su sve rasprostranjeniji, kako u obliku solarnih farmi, tako i kad je reč o individualnoj upotrebi snabdevanja domova solarnom energijom.

Jedna od bitnih stvari kad je reč o solarnim panelima jeste njihovo održavanje.

Čestice prašine, ptičiji izmet, kiša i druge „nepogode“ predstavljaju veliku pretnju efikasnosti ove tehnologije, koja zahteva neprestano održavanje. Međutim, često su paneli tako gusto [illegible]ijeni da je jako teško priči im i adekvatno očistiti, a kad problem nije u tome, onda ovaj zahvat zahteva frekvetno održavanje, što ponekad nije realno.

Firma Biolog iz Beograda započela je distribuciju jedinstvenog načina zaštite solarnih panela. Radi se o emulziji iz domena nanotehnologije - SUPER Glanc NanoTehnology.

Sa SUPER Glanc NanoTehnology emulizija povečava efikasnost solarnog panela do 30%.

Najsunčanija mesta su često izložena većom prljavštinom i nečistoćama.

Pomislite samo na neke ruralne sredine i industrijske zone. Ali upravo u tim područjima paneli daju najbolje rezultate, kako po količini tako i po intenzitetu zračenja.

Sve što se nađe na panelu generalno smanjuje performanse fotonaponskog sistema i do 30 odsto. Primena nanotehnologije u čišćenju i održavanju fotonaponskih panela može se koristiti za tretiranje površina koje brzo spiraju mrlje bilo koje vrste. Ovaj specijalni tretman deluje tako što apsorbuje svetlost i pretvara je kao katalizator koji štiti površine i, kada svetlost deluje na nanočestice, površine postaju super hidrofilne, a posledica je da se zagađivači „ispiraju“. Zahvaljujući ovoj posebnoj kombinaciji, povećava se propusnost panela.

SUPER Glanc NanoTehnology emulzija predstavlja vrhunski proizvod nano tehnologije na bazi silicijum dioksida. Njegovom upotrebom tretirane površine se odlikuju snažnim hidrofobičnim i oleofobičnim svojstvima. Formirani ultratanki slojevi odbijaju vodu, led i raznu prljavštinu omogućavajući njeno lakše uklanjanje bez korišćenja abrazivnih i jakih hemijskih sredstava (efekat antilepljivosti i lakog čišćenja).

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Nano Emulsion for the Protection and Efficiency of Solar Panels

The emulsion is easy to apply, and it creates a film that repels water, ice and dust, making it easy to slide off the surface of the panel without the use of chemicals and cleaning products

Solar panels are becoming more and more widespread, both in the form of solar farms and when it comes to individual use of supplying homes with solar energy.

One of the important things when it comes to solar panels is their maintenance.

Dust particles, bird droppings, rain and other „bad things” pose a major threat to the efficiency of this technology, which requires constant maintenance. However, the panels are often so tightly packed that it is very difficult to approach them and clean them adequately. When the problem is not in that, then this procedure requires frequent maintenance, which is sometimes not realistic.

The Biolog company from Belgrade has started the application of a unique way of protecting solar panels. It is an emulsion from the domain of nanotechnology - SUPER Glanc NanoTechnology.

With SUPER Glanc NanoTechnology, the emulsion increases the efficiency of the solar panel by up to 30%.

The sunniest places are often exposed to more dirt and impurities.

Just think of some rural areas and industrial zones. But it is precisely in those areas that the panels give the best results, both in terms of quantity and intensity of radiation.

Anything found on the panel generally reduces the performance of the photovoltaic system by up to 30 percent. The application of nanotechnology in the cleaning and maintenance of photovoltaic panels can be used to treat surfaces that quickly wash away stains of any kind. This special treatment works by absorbing light and converting it into a catalyst that protects the surfaces and, when light hits nanoparticles, the surfaces become super hydrophilic, with the result that pollutants are „washed away”. Thanks to this special combination, the permeability of the panel increases.

SUPER Glanc NanoTechnology emulsion is a top product of nanotechnology based on silicon dioxide. Surfaces treated with it are characterized by strong hydrophobic and oleophobic properties. The formed ultra-thin layers repel water, ice and various dirt, enabling its easier removal without the use of abrasive and strong chemical agents (effects of non-stickiness and easy cleaning).

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KARAKTERISTIKE

- EFEKAT SAMOČIŠĆENJA
- OTPORNOST NA VODU I ULJE
- OTPORNOST NA MRLJE (PTIČIJI IZMET SE NE ZADRŽAVA NA ZAŠTIĆENOJ POVRŠINI)
- HEMIJSKA OTPORNOST
- UV ZAŠTITA
- UŠTEDA ENERGIJE
- PROZRAČNOST PREMAZA
- POBOLJŠAVA VIDLJIVOST
- LAKOĆA ČIŠĆENJA
- ZNAČAJNO SMANJUJE GRAFITNU INKRUSTACIJU
- ŠTITI POVRŠINU OD RAZVOJA BAKTERIJA I VIRUSA
- ŠTITI POVRŠINU OD RAZVOJA BUĐI I GLJIVICA
- ŠTITI POVRŠINU OD NISKIH TEMPERATURA
- NE DOZVOLJAVA PRLJAVŠTINI DA PRODRE U PORE TRETIRANE POVRŠINE
- ŠTITI POVRŠINU OD PRLJANJA, PARENJA, ZAMUĆENJA ILI ZATAMNJENJA
- POMAŽE KIŠNICI DA SVOJIM KLIZANJEM ČISTI POVRŠINU
- SMANJUJE NEKONTROLISANO CURENJE VODE STVORENE KONDENZACIJOM
- NANO OBLOŽENI SOLARNI PANELI PROIZVODE DO 8% VIŠE ELEKTRIČNE ENERGIJE
- NE SADRŽI SILIKON, VOSAK ILI ULJA
- ŠTEDI NOVAC ZA REDOVNO ČIŠĆENJE
- POTROSNJA PREMAZA JE 5-7ml PO m²

CHARACTERISTICS

- SELF-CLEANING EFFECT
- WATER AND OIL RESISTANCE
- RESISTANCE TO STAINS (BIRD DROPPINGS DO NOT STICK TO THE PROTECTED SURFACE)
- CHEMICAL RESISTANCE
- UV PROTECTION
- ENERGY SAVING
- THE BREATHABILITY OF THE COATING
- IMPROVES VISIBILITY
- SIGNIFICANTLY REDUCES GRAPHITE INCRUSTATION
- PROTECTS THE SURFACE FROM THE DEVELOPMENT OF BACTERIA AND VIRUSES
- PROTECTS THE SURFACE FROM THE DEVELOPMENT OF MOLD AND FUNGI
- EASY TO CLEAN
- PROTECTS THE SURFACE FROM LOW TEMPERATURES
- DOES NOT ALLOW DIRT TO PENETRATE INTO THE PORES OF THE TREATED SURFACE
- PROTECTS THE SURFACE FROM DIRT, FOGGING, CLOUDING OR DARKENING
- IT HELPS THE RAINWATER TO CLEAN THE SURFACE WITH ITS SLIDING
- REDUCES UNCONTROLLED LEAKAGE OF WATER CREATED BY CONDENSATION
- NANO COATED SOLAR PANELS PRODUCE UP TO 8% MORE ELECTRICITY
- DOES NOT CONTAIN SILICONE, WAX OR OILS
- SAVES MONEY FOR REGULAR CLEANING
- COATING CONSUMPTION IS 5-7ml PER m²

GREENNEWS

Kada se tretira površina naponskog panela sa nano emulzijom dobija se film koji je nevidljiv ali ima karakteristiku da se ništa ne lepi za panel, brzo se spira i osteje čist

KAKO FUNKCIONIŠE NANO EMULZIJA ZA STAKLO?

- Nano emulzija stvara super hidrofilnu površinu protiv zamagljivanja.
- Nano emulzija stvara nevidljivi zaštitni sloj na solarnim panelima i zatvara preostale pore u kojima se prljavština može sakupiti.
- Površine solarnih panela su izuzetno glatke, tako da prljavština više ne može da prianja. Osim toga, zaštićeni su i tako ostaju kao novi i dugo zadržavaju svoju izvornu vrednost.
- Nano emulzija odbija različite vrste nečistoća (prašine, polena, čađi, i dr.)
- Dugotrajno štite površine solarnih panela u zavisnosti od načina održavanja.
- Zbog antistatičkog efekta i njegovog posebnog načina delovanja, dobro poznati efekat lotosa je čak i jasno nadmašen (listovi lotosa sa voštanom strukturom na površini čini da kapljice vode klize po listu bez zadržavanja i čiste ga od prljavštine).
- Paneli će imati veću propusnost, povećavajući konverziju energije.
- Za razliku od drugih hemijskih sredstava za čišćenje, Nano emulzija je pos[illegible] fina struktura i ekološki prihvatljiva. Nema št[illegible] isparenja ili negativnih nuspojava,ekološki prihvatljiva.

NAČIN PRIMENE

Dobro očistiti površinu od masti, prašine i druge prljavštine. Koristiti sredstva za čišćenje koja ne ostavljaju ostatke nakon korišćenja. Na dobro očišćene i suve površine, naneti Nano emulziju kružnim pokretima. Nakon par minuta sušenja, suvom mikrofiber krpom blago ispolirati površine dok se potpuno ne uklone vidljivi tragovi nano slojeva. Formirane nano strukture su potpuno stabilne nakon 24 sata. Nakon tog vremena tretirane površine je moguće testirati na efekte superhidrofobičnosti, antilepljivosti i lakog čišćenja.

Efikasnost i proizvodnja električne energije povećava se i do 30 odsto!

KARAKTERISTIKE

- Superhidrofobičana i oleofobična svojstva, stvaranje efekta antilepljivih površina sa osobinama lakog čišćenja I održavanja. Nano slojevi su nevidljivi golim okom debljine 100-150nm), UV stabilni i hemijski otporni do Ph13.
- Termička otpornost je izražena do 350°C. Nano premaz je izuzetno otporan na abraziju i veoma je lak za nanošenje.
- Potrošnja: 5-7ml/m².

KOLIKO DUGO TRAJE NANO- EMULZIJA?

Nano emulzija je otporan na UV zračenje što mu omogućava višegodišnju funkcionalnost (3-5 godina) uz adekvatno održavanje. Mnogi konkurentni proizvodi se vrlo brzo razgrađuju pod uticajem sunčeve svetlosti i UV zračenja.

EFEKAT LAKOG ČIŠĆENJA I OTPORNOST NA HABANJE

Snažna hemijska veza sa podlogom omogućava odličnu otpornost na habanje. Mnogi konkurentni proizvodi se lako uklanjaju korišćenjem abrazivnih sredstava.

HEMIJSKA STABILNOST

Proizvod je otporan na skoro sva standardna sredstva za čišćenje u domaćinstvu i industriji (sa izuzetkom koncentrovane baze, Ph veći od 13). Mnogi konkurentni proizvodi se moraju ponovo nanositi nakon čišćenja površine.

When the surface of the voltage panel is treated with nano emulsion, a film is formed that is invisible but has the characteristic that nothing sticks to the panel, it is quickly washed off, and stays clean

HOW DOES NANO-EMULSION FOR GLASS WORK?

- Nano emulsion creates a super hydrophilic anti-fog surface.
- Nano emulsion creates an invisible protective layer on the solar panels and closes the remaining pores where dirt can collect.
- The surfaces of solar panels are extremely smooth, so dirt can no longer stick. In addition, they are protected and thus remain as new, and retain their original value for a long time.
- Nano emulsion repels various types of impurities (dust, pollen, soot, etc.)
- They protect the surfaces of solar panels for a long time, depending on the way of maintenance.
- Due to the antistatic effect and its special mode of action, a well-known lotus effect is even clearly surpassed (lotus leaves with a waxy structure on the surface make water droplets slide without stopping and clean it of dirt).
- The panels will have a higher permeability, increasing the energy conversion.
- Unlike other chemical cleaning agents, Nano emulsion has a particularly fine structure and is environmentally friendly. There are no harmful fumes or negative side effects, it is environmentally friendly.

APPLICATION METHOD

Clean the surface well from grease, dust and other dirt. Use cleaning products that do not leave any residue after use. Apply Nano emulsion in circular motions on well-cleaned and dry surfaces,. After a few minutes of drying, gently polish the surfaces with a dry microfiber cloth until the visible traces of nano layers are completely removed. The formed nanostructures are completely stable after 24 hours. After this time, the treated surfaces can be tested for the effects of superhydrophobicity, non-stickiness and easy cleaning.

The efficiency and production of electricity increases up to 30 percent!

CHARACTERISTICS

- Superhydrophobic and oleophobic properties, creating the effect of non-sticky surfaces with features of easy cleaning and maintenance; Nano layers are invisible to the naked eye (100-150nm thick), UV stable and chemically resistant up to Ph13.
- Thermal resistance is expressed up to 350°C. Nano coating is extremely resistant to abrasion and is very easy to apply.
- Consumption: 5-7ml/m².

HOW LONG DOES NANO-EMULSION LAST?

Nano emulsion is resistant to UV radiation, which allows it to function for many years (3-5 years) with adequate maintenance. Many competitive products degrade very quickly under the influence of sunlight and UV radiation.

EASY-TO-CLEAN EFFECT AND ABRASION RESISTANCE

A strong chemical bond with the substrate provides excellent abrasion resistance. Many competitive products are easily removed using abrasives.

CHEMICAL STABILITY

The product is resistant to almost all standard household and industrial cleaning products (with the exception of concentrated base, Ph greater than 13). Many competing products must be reapplied after cleaning the surface.

Svet uzgaja više morskih plodova nego što ih ulovi

Porast akvakulture ističe potrebu za transformacijom sistema morske hrane kako bi se minimizirao njihov uticaj na planetu

Izveštaj Organizacije Ujedinjenih nacija za hranu i poljoprivredu (FAO) otkriva da je u 2022. godini više riba uzgajano širom sveta nego što je ulovljeno u divljini, što je očigledno prvi put.

Prošle nedelje, FAO je objavila svoj godišnji izveštaj o stanju akvakulture - što se odnosi na uzgoj morskih plodova i vodenih biljaka - i ribarstva širom sveta. Organizacija je utvrdila da je globalna proizvodnja iz akvakulture i ribarstva dostigla novi rekord - 223,3 miliona metričkih tona životinja i biljaka - u 2022. godini. Od toga, 185,4 miliona metričkih tona su bile akvatične životinje, a 37,8 miliona metričkih tona algi. Akvakultura je bila odgovorna za 51 odsto proizvodnje akvatičnih životinja u 2022. godini, što iznosi 94,4 miliona metričkih tona.

Ovaj prelazak u mnogim je pogledima bio očekivan, imajući u vidu svetsku nepresušnu potražnju za morskom hranom. Prema FAO-u, potrošnja morske hrane od 1961. godine raste dvostruko brže od godišnjeg rasta globalne populacije. S obzirom na to da se nivoi proizvodnje iz ribarstva ne očekuje da će se značajno promeniti u budućnosti, zadovoljenje rastuće globalne potražnje za morskom hranom gotovo sigurno zahteva povećanje akvakulture.

POTREBA ZA TRANSFORMACIJOM

Iako nivoi proizvodnje iz ribarstva variraju iz godine u godinu, „nije kao da postoje nova ribarstva koja čekaju da budu otkrivena”, rekao je Dejv Martin, programski direktor za Održiva partnerska ribarstva, međunarodnu organizaciju koja radi na smanjenju ekološkog uticaja lanaca snabdevanja morskom hranom.

„Stoga će svaki rast potrošnje morske hrane doći iz akvakulture.”

Međutim, porast akvakulture ističe potrebu za transformacijom sistema morske hrane kako bi se minimizirao njihov uticaj na planetu. Sama akvakultura i ribarstvo, ponekad nazivano ribarstvo iz ulova, jer uključuje ulov divlje morske hrane, dolaze sa značajnim ekološkim i klimatskim posledicama. Štaviše, ova dva sistema često zavise jedan od drugog, što otežava izdvajanje njihovih klimatskih uticaja.

„Postoji puno preklapanja između ribarstva i akvakulture koje prosečan potrošač možda ne vidi”, rekao je Dejv Lav, istraživački profesor u Centru za održivu budućnost na Univerzitetu Džons Hopkins.

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The World Grows More Seafood Than It Catches

The rise of aquaculture highlights the need to transform seafood systems to minimize their impact on the planet

A report from the Food and Agriculture Organization of the United Nations (FAO) reveals that more fish were farmed worldwide in 2022 than were harvested from the wild, apparently for the first time.

Last week, the FAO released its Annual report on the status of aquaculture - which refers to the cultivation of seafood and aquatic plants - and fisheries around the world. The organization found that global production from aquaculture and fisheries reached a new record - 223.3 million metric tons of animals and plants - in 2022. Of that, 185.4 million metric tons were from aquatic animals and 37.8 million metric tons were from algae. Aquaculture was responsible for 51 percent of aquatic animal production in 2022, or 94.4 million metric tons.

This transition was expected in many ways, given the world's inexhaustible demand for seafood. Since 1961, seafood consumption has increased at twicethe annual rate of the global population, according to FAO. Since production levels from fisheries are not expected to change significantly in the future, meeting the growing global demand for seafood will almost certainly require an increase in aquaculture.

THE NEED FOR TRANSFORMATION

Although fishery production levels fluctuate from year to year, „it's not as if there are new fisheries waiting to be discovered," said Dave Martin, program director for Sustainable Fisheries Partnerships, an international organization working to reduce the environmental impact of seafood supply chains.

„So, any growth in seafood consumption will come from aquaculture."

However, the rise of aquaculture highlights the need to transform seafood systems to minimize their impact on the planet. Both aquaculture and fisheries, sometimes referred to as capture fisheries, because they involve catching wild seafood, come with significant environmental and climate consequences. Moreover, these two systems are often interdependent, making it difficult to isolate their climate impacts.

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ODRŽIVA PROIZVODNJA MORSKE HRANE

Studije su pokazale da je najbolja ishrana za planetu ona koja je oslobođena životinjskih proteina. Ipak, morska hrana generalno ima mnogo niže emisije gasova staklene bašte u poređenju sa drugim oblicima proteina dobijenih od kopnenih životinja. S obzirom na to da mnogi ljudi nisu voljni ili sposobni da postanu vegani, FAO preporučuje transformaciju, prilagođavanje i proširenje održive proizvodnje morske hrane kako bi se nahranila rastuća svetska populacija i poboljšala sigurnost hrane.

Ali „postoji mnogo načina da se akvakultura obavlja dobro, i mnogo načina da se obavlja loše", rekao je Martin. Akvakultura može rezultirati oslobađanjem azota i fosfora u prirodno okruženje, što može oštetiti vodene ekosisteme.

Uzgajane ribe takođe mogu širiti bolesti među divljim populacijama ili pobeći iz svojih ograničenja i razmnožavati se sa drugim vrstama, što dovodi do genetske zagađenosti koja može narušiti fitnes divlje populacije. Martin ističe da je dizel gorivo koje se koristi za napajanje opreme na određenim ribnjacima za ribu veliki izvor ekološkog uticaja akvakulture.

Prema analizi nevladine organizacije za rešavanje klimatskih problema, Project Drawdown, zamena generatora na bazi fosilnih goriva na ribnjacima za ribu hibridima napajanima obnovljivim izvorima energije mogla bi sprečiti emisiju 500 do 780 miliona metričkih tona ugljen-dioksida do 2050. godine.

Druga područja za unapređenje variraće u zavisnosti od specifičnih vrsta koje se uzgajaju. U Ujedinjenim nacijama 2012. godine, istraživanje je pokazalo da su mangrovske šume - glavna karbonska rupa - jako stradale zbog razvoja uzgoja škampa i ribe. Danas, učesnici industrije istražuju kako nove pristupe i tehnike uzgoja škampa mogu pomoći u obnavljanju mangrovskih šuma.

DIVLJE RIBOLOVNE OPERACIJE

U međuvremenu, divlje ribolovne operacije predstavljaju svoje sopstvene ekološke probleme. Na primer, loše upravljana ribarstva mogu brže sakupiti ribu nego što divlje populacije mogu da se razmnožavaju, pojava poznata kao prekomerni ribolov.

Određene destruktivne tehnike divljeg ribolova takođe ubijaju mnoge vrste koje nisu cilj, poznate kao „bycatch", što ugrožava morsku biodiverzitet.

Ali linija između akvakulture i riba ulovljenih u divljini nije tako jasna kao što se može činiti. Na primer, ružičasta losos koji se uzgaja u inkubatorima, a zatim pušta u divljinu da se hrani, sazreva i na kraju se ponovo uhvati, često se reklamira kao „uhvaćen u divljini". Jastozi, uhvaćeni u divljini u Mejnu, često se hrane mamacem koji im pomaže da dobiju na težini. „To je divlje ribarstvo", rekao je Lav - ali praksa jastogarstva koja ugoji svoj ulov pokazuje kako je ljudski intervencija prisutna čak i u operacijama ulova u divljini.

S druge strane, s aspekta klime i ishrane, manje ribe i morske alge takođe su dobre opcije.

„Dagnje, školjke, ostrige, alge - svi su oni puni makronutrijenata i minerala na različite načine" u poređenju s ribama, rekao je Lav.

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SUSTAINABLE SEAFOOD PRODUCTION

Studies have shown that the best diet for the planet is one that is free of animal protein. However, seafood generally has much lower greenhouse gas emissions compared to other forms of protein derived from wild animals. Since many people are unwilling or unable to become vegan, FAO recommends transforming, adapting and expanding sustainable seafood production to feed a growing world population and improve food security.

But „there are a lot of ways to do aquaculture well, and there are a lot of ways to do it poorly," Martin said. Aquaculture can result in the release of nitrogen and phosphorus into the natural environment, which can damage aquatic ecosystems.

Farmed fish can also spread diseases to wild populations or escape from their boundaries and breed with other species, leading to genetic contamination that can disrupt the fitness of wild populations. Martin points out that the diesel fuel used to power equipment at some fish farms is a major source of aquaculture's environmental impact.

According to an analysis by the climate non-governmental organization Project Drawdown, replacing fossil-fuel generators on fish farms with hybrid generators powered by renewable energy sources could prevent the emission of 500 to 780 million metric tons of carbon dioxide by 2050.

Other areas of improvement will vary depending on the specific species being farmed. In 2012, a United Nations study found that mangrove forests - a major source of carbon - have suffered greatly due to the development of shrimp and fish farming. Today, industry stakeholders are exploring how new approaches and shrimp farming techniques can help restore mangrove forests.

WILD FISHING

Meanwhile, wild fishing poses its own environmental problems. For example, poorly managed fisheries can harvest fish faster than wild populations can reproduce, a phenomenon known as overfishing.

Certain destructive wild fishing techniques also kill many non-target species, known as „bycatch", threatening marine biodiversity.

But the line between aquaculture and wild-caught fish is not as clear as it might seem. For example, pink salmon that are raised in hatcheries, then released into the wild to feed, mature and eventually caught againg, are often advertised as „wild caught". Lobsters, caught in the wild in Maine, are often fed on bait to help them gain weight. „It's a wild fishery," Love said — but the lobster fishermen's practice of fattening their catch shows that human intervention is present even in wild harvesting operations.

On the other hand, from a climate and nutritional standpoint, small fish and sea vegetables are also good options.

„Mussels, clams, oysters, seaweed - they're all loaded with macronutrients and minerals in different ways" compared to fish, Love said.

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EU radi na obnovi reka, jezera i mora

Evropa se suočava sa brojnim izazovima u vezi sa ovim ključnim resursom, pri čemu je zagađenje jedno od najozbiljnijih

Vode Evrope postaju sve zagađenije decenijama, uglavnom zbog lošeg upravljanja poljoprivredom, industrijom i tretmanom kanalizacije.

U ovom tekstu se bavimo alarmantnim statistikama i istražujemo šta EU preduzima povodom toga.

Meseci neuobičajeno visokih padavina su dopunili nivoe podzemnih voda u mnogim delovima Evrope, bar na kratko otklanjajući pretnju od nestašica. Međutim, Evropa se i dalje suočava sa brojnim izazovima u vezi sa ovim ključnim resursom, pri čemu je zagađenje jedno od najozbiljnijih.

PORAST ZAGAĐENJA PODZEMNIH VODA DECENIJAMA

Decenije lošeg upravljanja dozvolile su da naše reke, jezera i mora budu zagađeni iz različitih izvora, uključujući poljoprivredu, industriju i kanalizaciju iz zastarele sanitarne infrastrukture. Klimatske promene, opadanje biodiverziteta i degradacija ekosistema dodatno su pogoršali problem.

Zagađenje vode predstavlja značajne rizike po naše zdravlje. Širi bolesti poput kolere i dizenterije i može uzrokovati druge, dugoročne bolesti. Takođe može imati negativne posledice po životnu sredinu i ekonomiju, u smislu gubitka prihoda od turizma i smanjene poljoprivredne produktivnosti. Takođe utiče na industrije koje zavise od čistih izvora vode.

Neke statistike su zaista alarmantne. Na primer, 28 odsto podzemnih voda Evrope je zagađeno. To je izvor većine naše pijaće vode. Kompanije za vodosnabdevanje koštaju milijarde evra i njihov zadatak je da uklone nitrate i pesticide koji su uglavnom rezultat savremenih poljoprivrednih praksi.

Zagađenje takođe dolazi iz urbanih sredina - plastike, kanalizacije i rashladne vode iz elektrana. Otpadna voda neizbežno završava u našim vodenim tokovima, kao što otkriva još jedna alarmantna cifra: 22 odsto potoka, reka, jezera i mora u Evropi je pogođeno.

DETALJNA STATISTIKA

- **Ukupni ekološki troškovi zagađenja azotom procenjuju se na između 70 i 320 milijardi evra godišnje u EU.**
- **U 2022. godini, 85,7 odsto mesta za kupanje u EU ocenjena su kao izvrsna, a minimalni standardi kvaliteta vode ispunjeni su na 95,9 odsto mesta.**
- **Neispravna voda svake godine ubije više ljudi nego ratovi i svi drugi oblici nasilja zajedno.**
- **81 odsto morskih voda, 31 odsto obalnih voda, 36 odsto reka i 32 odsto jezera u EU su eutrofične - to je prekomerni rast biljaka poput algi, uzrokovan prekomernim količinama nitrata, što zatim guši druge biljke i životinjski svet.**
- **22 odsto površinskih voda Evrope i 28 odsto područja podzemnih voda značajno su pogođeni difuznim zagađenjem iz poljoprivrede, kako hranljivim materijama, tako i pesticidima.**
- **230.000 tona plastike uđe u Sredozemno more iz kopnenih izvora svake godine; dodatno, 20.000 tona dolazi iz brodskih aktivnosti.**
- **Evropljani su zabrinuti zbog zagađenja, pri čemu 69 odsto njih smatra da je to glavna pretnja njihovom vodosnabdevanju.**

The European Union Is Working to Restore Rivers, Lakes and Seas

Europe's waters have been getting more polluted over decades, mainly due to mismanagement of agriculture, industry and sewage treatment

In this text, we deal with the alarming statistics and explore what the EU is doing about it.

Months of unusually high rainfall have replenished groundwater levels in many parts of Europe, at least temporarily offsetting the threat of shortages. However, Europe still faces a number of challenges related to this key resource, with pollution among the most serious.

GROUNDWATER POLLUTION RISING FOR DECADES

Decades of mismanagement have allowed our rivers, lakes and seas to become polluted from a variety of sources, including agriculture, industry and sewage from ageing sanitation treatment infrastructure. Climate change, declining biodiversity and ecosystem degradation have further exacerbated the problem. Water pollution poses significant risks to our health. It spreads diseases like cholera and dysentery and can cause other, long-term illnesses. It can also have negative consequences for the environment and the economy, in terms of loss of income from tourism and reduced agricultural productivity. It also affects industries that depend on clean water sources.

Some statistics are truly alarming. For example, 28 percent of Europe's groundwater is polluted. This is where most of our drinking water comes from. It costs utility companies billions of euros to remove nitrates and pesticides caused mostly by modern agricultural practices.

Pollution also comes from urban environments, plastics, sewage and cooling water from power plants. Wastewater inevitably ends up in our waterways, as another alarming figure reveals: 22 percent of Europe's streams, rivers, lakes and seas are affected.

OBNAVLJANJE VODENIH PUTEVA EVROPE

Rešavanje ovih problema zahteva širok i dinamičan odgovor više sektora. Kao početnu tačku, zagađenje mora biti rešavano na izvoru sa održivom poljoprivredom, boljim tretmanom otpadnih voda, manje plastičnog otpada i obnovom ekosistema.

Put ka rešenjima je predstavljen u opštim politikama Evropske komisije. EU Direktiva o vodama reguliše jezera i reke, dok Direktiva o pijaćoj vodi jača kvalitet naše vode iz česme. Evropski zeleni dogovor uključuje akcioni plan za nultu zagađenost kako bi se unapredila legislativa o sprečavanju zagađenja.

PREDUZETE AKCIJE

Okvirna direktiva o vodama obavezuje države članice Evropske unije da postignu dobar kvalitativni i kvantitativni status svih vodenih tela.

- Direktiva o tretmanu urbanih otpadnih voda: Postavlja standarde za tretman otpadnih voda radi zaštite vodenih okruženja.
- Direktiva o nitratima: Cilj je zaštita kvaliteta vode širom Evrope sprečavanjem zagađenja nitrata iz poljoprivrednih izvora koji zagađuju podzemne i površinske vode, i promovisanje dobre poljoprivredne prakse.
- Direktiva o pijaćoj vodi: Glavni zakon EU o pijaćoj vodi. Odnosi se na pristup i kvalitet vode namenjene za ljudsku potrošnju radi zaštite ljudskog zdravlja.
- Direktiva o vodi za kupanje: Cilj je zaštita životne sredine i zdravlja Evropljana postizanjem dobrog kvaliteta vode za kupanje širom EU.
- Direktiva o ekološkim standardima kvaliteta: Cilj je postizanje dobrog hemijskog statusa površinskih voda.

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DETAILED STATISTICS

- The total environmental costs of nitrogen pollution are estimated at between 70 and 320 billion euros per year in the EU.
- In 2022, 85.7 percent of bathing water sites in the EU were rated as excellent, and minimum water quality standards were met at 95.9 percent of sites.
- Unsafe water kills more people every year than wars and all other forms of violence combined.
- 81 percent of marine waters, 31 percent of coastal waters, 36 percent of rivers and 32 percent of lakes in the EU are eutrophic - this is the excessive growth of plants like algae, caused by excessive amounts of nitrates, which then suffocates other plants and animal life.
- 22 percent of Europe's surface waters and 28 percent of groundwater areas are significantly affected by diffuse pollution from agriculture, both by nutrients and pesticides.
- 230,000 tons of plastics enter the Mediterranean Sea from land-based sources every year; additionally, 20,000 tons come from shipping activities.
- Europeans are concerned about pollution, with 69 percent of them considering it to be the main threat to their water supply.

Europe faces a number of challenges related to this key resource, with pollution among the most serious

RESTORING EUROPE'S WATERWAYS

Solving these problems requires broad and dynamic responses from multiple sectors. As a starting point, pollution must be tackled at source with sustainable agriculture, better wastewater treatment, less plastic waste and ecosystem restoration. The path to solutions is presented in general policies of the European Commission. The EU Water Directive regulates lakes and rivers, while the Drinking Water Directive strengthens the quality of our tap water. The European Green Deal includes a zero pollution action plan to improve legislation on preventing pollution.

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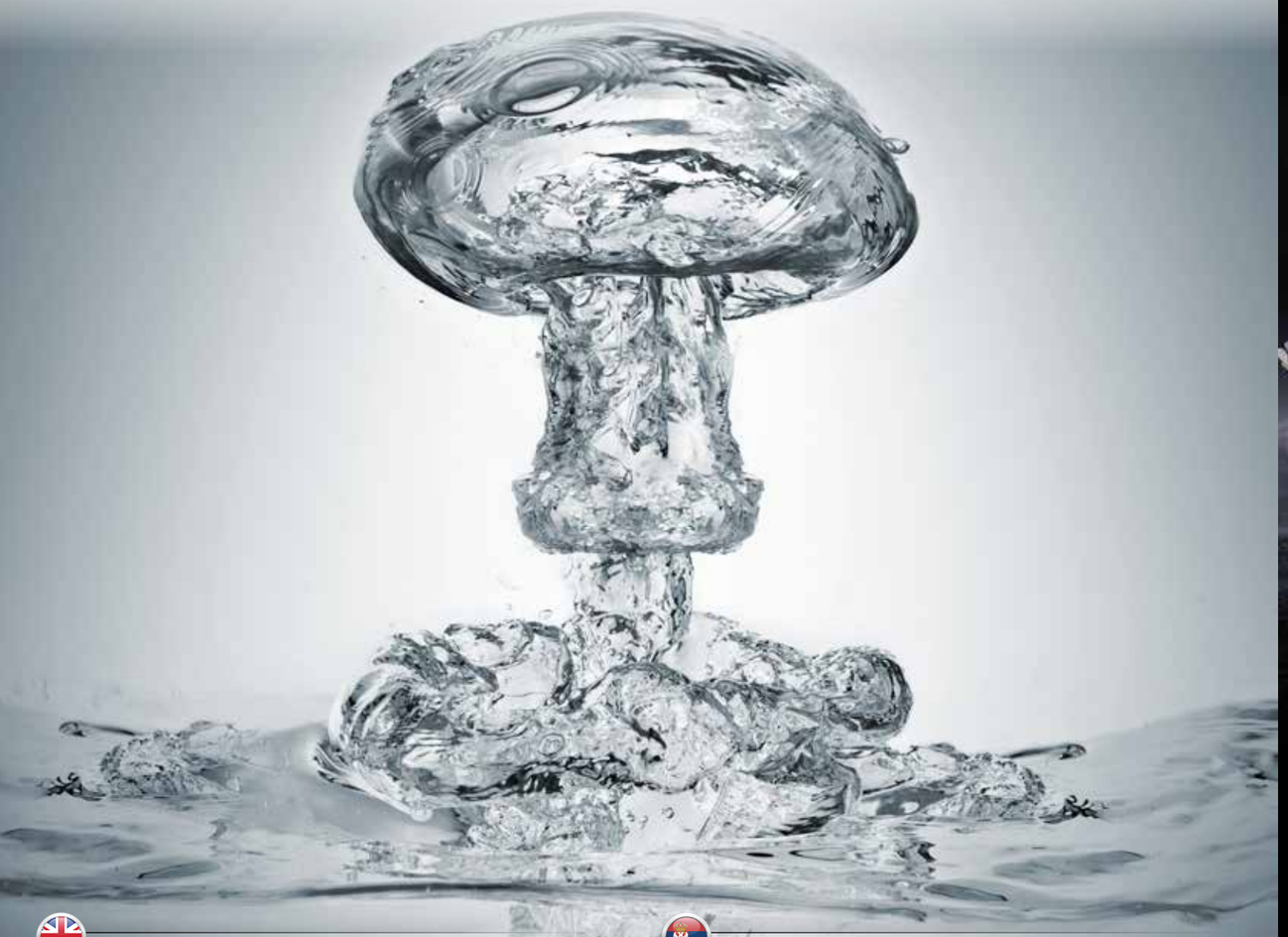
THE ACTIONS TAKEN

The Water Framework Directive commits EU member states to achieving a good qualitative and quantitative status of all water bodies.

- The Urban Wastewater Treatment Directive: Sets standards for the treatment of waste water in order to protect aquatic environments.
- The Nitrates Directive: The aim is to protect water quality across Europe by preventing nitrate pollution from agricultural sources that contaminate groundwater and surface water, and to promote good agricultural practices.
- The Drinking Water Directive: The main EU law on drinking water. It refers to access to and quality of water intended for human consumption in order to protect human health.
- The Bathing Water Directive: The aim is to protect the environment and the health of Europeans by achieving good bathing water quality throughout the EU.
- The Environmental Quality Standards Directive: The goal is to achieve a good chemical status of surface waters.



BEING WATER AWARE

However, we cannot get out of a problem that has been developing for decades only through legislation. Citizens can also play an important role by recycling and minimizing chemicals and single-use plastics, participating in clean-up initiatives and generally being more aware of water use.

A fundamental change in mindset and behavior will contribute to ensuring a clean and healthy water supply for future generations. DGN

BITI SVESTAN VODE

Međutim, ne možemo se samo zakonodavstvom izvući iz problema koji se razvijao decenijama. Građani takođe mogu igrati bitnu ulogu reciklažom i minimiziranjem hemikalija i jednokratne plastike, učestvovanjem u inicijativama za čišćenje i generalno većom svesnošću o korišćenju vode.

Fundamentalna promena u načinu razmišljanja i ponašanja doprineće obezbeđivanju čistog i zdravog snabdevanja vodom za buduće generacije. DGN

Najgora ekološka katastrofa prošlog veka

Gorka realnost je da se Aralsko more, nekada četvrto po veličini slatkovodno jezero na svetu sa površinom od 68.000 kvadratnih kilometara, pretvorilo u prostore Aralkumske pustinje koja je nastala na njegovom mestu

Jednom spektakularni vodeni raj u samom srcu Centralne Azije, Aralsko more danas stoji kao surovo podsećanje na razorni uticaj neadekvatnih politika navodnjavanja koje su dovele do njegovog nestanka, otežane efektima klimatskih promena na jednom od najzanimljivijih ekosistema na svetu. Dok su se vode povlačile, iza sebe su ostavile slanom prekrivene ravnice, prilično neprijateljsko okruženje gde malo toga može da opstane.

Kada posmatramo otvorena, peščana i oskudno vegetirana područja, teško je shvatiti da su ovo nekad bila duboka i velika jezera, smeštena usred Centralne Azije. Gorka realnost je da se Aralsko more, nekada četvrto po veličini slatkovodno jezero na svetu sa površinom od 68.000 kvadratnih kilometara (približno 26.300 kvadratnih milja), pretvorilo u prostore Aralkumske pustinje koja je nastala na njegovom mestu. Kako se jezero osušilo, podelilo se na dva različita vodena tela - Veliko Južno i Malo Severno Aralsko more. Danas postoji samo potonje, sa malo više od 10% vode koja je trenutno uočljivo putem satelitskih snimaka.

Na pustim obalama, gde je voda nekad dodirivala kopno, preostala flora se bori da preživi u surovom, slanom okruženju. Biljke poput šaule, kamiljeg trna i drugih halofita sada dominiraju pejzažom, prilagođavajući se sušnim uslovima koje je za sobom ostavilo povlačenje mora. Međutim, čak i ove otporne biljke suočavaju se sa izazovima kako se proces dezertifikacije ubrzava, sa slanim zemljištima i nedostatkom slatke vode koji ugrožavaju njihovu borbu za opstanak.

The Worst Environmental Disaster of the Last Century

The bitter reality is that the Aral Sea, formerly the fourth largest freshwater lake in the world with an area of 68,000 square kilometers, has transformed into the expanses of the Aralkum Desert that emerged in its place

Once a spectacular water heaven in the heart of Central Asia, the Aral Sea today stands as a harsh reminder of the devastating impact of inadequate irrigation policies that led to its disappearance, compounded by the effects of climate change on one of the world's most fascinating ecosystems. As waters receded, they left behind salt-covered plains, a rather inhospitable environment where little can thrive.

When looking at the open, sandy and sparsely vegetated areas, it is difficult to understand that these were once deep and large lakes, located in the middle of Central Asia. The bitter reality is that the Aral Sea, formerly the fourth largest freshwater lake in the world with an area of 68,000 square kilometers (approximately 26,300 square miles), has transformed into the expanses of the Aralkum Desert that emerged in its place. As the lake dried up, it divided into two distinct bodies of water - the Big South and Small North Aral Seas. Today, only the latter exists, with little more than 10% of the water currently discernible through satellite imagery.

On the barren shores, where water once lapped against the land, the remaining flora struggles to survive in the harsh, salty environment. Plants such as the saxaul shrubs, camelthorn and other halophytes now dominate the landscape, adapting to the arid conditions left behind by the receding sea. However, even these hardy plants face challenges as the desertification process accelerates, with saline soils and a lack of fresh water threatening their struggle for survival.

THE DIVERSION OF MAIN RIVERS

In the 1960s, the Soviet Union began diverging the main rivers that flowed into the Aral Sea - the Amu Darya from the Pamir Mountains and the Syr Darya from the Tien Shan mountain ranges - for irrigation purposes, mostly for cotton cultivation. This led to catastrophic consequences, including the loss of biodiversity, the displacement of communities that relied on fishing, and the emergence of health hazards from exposure to toxic sediments.

Dust and storms, fueled by the exposed seabed, spread across the region, affecting air quality and agricultural productivity. The loss of the sea's moderating influence altered the local climate, leading to extreme temperatures and disruptions in weather patterns, such as the intensification of the Siberian anticyclone in winter, and the weakening of warm low-level air currents in summer months in Central Asia.

PREUSMERAVANJE GLAVNIH REKA

Tokom 1960-ih, Sovjetski Savez je počeo preusmeravanje glavnih reka koje su se ulivale u Aralsko more - Amu Dariju koja potiče iz Pamirskih planina i Sira Darju iz planinskih lanaca Tijen Šan - u svrhu navodnjavanja, pretežno za uzgoj pamuka. To je dovelo do katastrofalnih posledica, uključujući gubitak biodiverziteta, raseljavanje zajednica koje su se oslanjale na ribolov, i pojavu zdravstvenih opasnosti zbog izloženosti toksičnim sedimentima.

Prašina i oluje, podstaknute izloženim morskim dnom, širile su se po regionu, utičući na kvalitet vazduha i poljoprivrednu produktivnost. Gubitak usmeravajućeg uticaja mora izmenio je lokalnu klimu, dovodeći do ekstremnih temperatura i poremećaja u vremenskim obrascima, poput intenzifikacije sibirskog anticiklona zimi i oslabljivanja toplih niskih vazdušnih struja u letnjim mesecima u Centralnoj Aziji.

ISTREBLJENJE ŽIVOTINSKIH VRSTA

Nekada prepun raznolikog vodenog života, uključujući vrste riba poput aralske pastrmke i endemičnog jesetre, opadanjem nivoa vode došlo je do uništenja ove populacije, remeteći celokupan akvatični lanac ishrane. Mnoge vrste su ili izumrle ili su na ivici istrebljenja.

Ali osim akvatičnih vrsta, Aralsko more nekada je bilo ključno mesto za odmor miliona migratornih ptica koje putuju duž Srednjoazijskog koridora migracije.

Ove ptice, uključujući pelikane, flamingose i različite vrste vodenih ptica, oslanjale su se na močvare mora kao mesta za razmnožavanje i ishranu. Međutim, kako se more smanjivalo, močvarni staništi su nestajala, prisiljavajući ptice da promene svoje obrasce migracije ili se suoče sa ozbiljnim izazovima u pronalaženju odgovarajućih mesta za odmor i ishranu.

Kako je ekosistem Aralskog mora prolazio kroz duboke promene, pojavili su se i sukobi između ljudi i divljih životinja.

Smanjeni riblji fondovi doveli su do povećane konkurencije između divljih životinja i lokalnih zajednica za ograničene resurse. Dodatno, gubitak močvarnih staništa doveo je određene vrste, poput divljih svinja i lisica, u bliži kontakt sa ljudskim naseljima, što je rezultiralo sukobima zbog štete usevima i napada na stoku.

Paradoksalno, povlačenje voda Aralskog mora takođe je stvorilo nova staništa. Izloženi muljeviti tereni i solni panjevi pružaju mesta za razmnožavanje određenih vrsta ptica i saiga antilopa, dok plitke, slane vode koje ostaju podržavaju prilagođene riblje populacije. Međutim, ova nova staništa često nedostaju složenost i biodiverzitet originalnih močvara, predstavljajući izazove za dugoročno očuvanje divljih životinja u regionu.

Inicijative za obnovu i održivost

Iako je nestanak Aralskog mora mnogima bio smatran kao izgubljeni slučaj, napori da se reši „jedna od najgorih ekoloških katastrofa na planeti", kako ju je opisao bivši generalni sekretar UN-a Ban Ki-Mun, danas su donekle uspešni, sa projektima usmerenim na obnavljanje vodotoka i ponovno punjenje sve manje baze Aralskog mora.

Međutim, izazovi ostaju ogromni i zahtevaju koordinisano delovanje kako na lokalnom, tako i na međunarodnom nivou. Integrisana rešenja, investicioni projekti i naučna saradnja ključni su pokretači održivog razvoja i regionalne integracije, podržani harmonizacijom pravnih okvira i uspostavljanjem organa bazena sa dovoljno ovlašćenja da obezbede kontinuitet upravljanja vodnim resursima.

Vlade Uzbekistana i Kazahstana, gde se jezero nalazi, preduzele su proaktivne mere za rešavanje ekološke krize izazvane smanjenjem Aralskog mora, uključujući više zainteresovanih strana. Projekti obuhvataju izgradnju brana, sadnju vegetacije koja zaustavlja eroziju kao što su šaule na milionima hektara, uspostavljanje kanala za preusmeravanje vode i primenu tehnologija za uštedu vode u poljoprivredi kako bi se smanjio pritisak na reke koje se ulivaju u more.

Na primer, 13 kilometara duga brana Kok-Aral već je omogućila značajan oporavak ribljih fondova povećavajući količinu vode u Severnom Aralskom moru, rezultirajući gotovo četvrtinskim proširenjem jezera od završetka 2005. godine. Takođe je smanjena slanost, omogućavajući raznovrsnim vrstama riba da uspevaju i dovodeći do značajnog povećanja ribolovnih kvota. Obnova je takođe dovela do povratka kišnih oblaka i potencijalnih promena u mikroklimi regiona, pružajući nadu borbenim farmerima.

Međunarodni fond za spasavanje Aralskog mora, koji čine Kazahstan, Tadžikistan, Turkmenistan i Uzbekistan, sarađuje na zajedničkim međudržavnim ekološkim, naučnim i praktičnim inicijativama kako bi sačuvao Aralsko more, poboljšao regionalnu ekološku situaciju i suočio se sa zajedničkim društvenim i ekološkim izazovima.

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THE EXTINCTION OF ANIMAL SPECIES

Once teeming with diverse aquatic life, including fish species such as the Aral trout and the endemic sturgeon, falling water levels have devastated these populations, disrupting the entire aquatic food chain. Many species have either become extinct or are on the verge of extinction.

But besides aquatic species, the Aral Sea used to be a crucial stopover point for millions of migratory birds traveling along the Central Asian flyway.

These birds, including pelicans, flamingos and various species of waterfowl, relied on the sea's wetlands as breeding and feeding grounds. However, as the sea receded, wetland habitats disappeared, forcing the birds to change their migration patterns or face serious challenges in finding suitable resting and foraging sites.

As the ecosystem of the Aral Sea underwent profound changes, conflicts between humans and wildlife also emerged.

Reduced fish stocks have led to increased competition between wildlife and local communities for limited resources. Additionally, the loss of wetland habitats has brought certain species, such as wild boars and foxes, into closer contact with human settlements, resulting in conflicts over crop damage and livestock predation.

Paradoxically, the receding waters of the Aral Sea have also created new habitats. Exposed mudflats and salt pans provide breeding grounds for certain species of birds and saiga antelopes, while the shallow, salty waters that remain support adapted fish populations. However, these new habitats often lack the complexity and biodiversity of the original wetlands, posing challenges for the long-term conservation of wildlife in the region.

INITIATIVES FOR RESTORATION AND SUSTAINABILITY

Although the disappearance of the Aral Sea was seen by many as a lost case, efforts to solve „one of the worst environmental disasters on the planet", as the former UN Secretary-General Ban Ki-Moon described it, have been somewhat successful today, with projects aimed at restoring water flow and replenishing the shrinking base of the Aral Sea.

However, the challenges remain enormous and require coordinated action both locally and internationally. Integrated solutions, investment projects and scientific cooperation are key drivers of sustainable development and regional integration, supported by the harmonization of legal frameworks and the establishment of basin authorities with sufficient authority to ensure the continuity of water resources management.

The governments of Uzbekistan and Kazakhstan, where the lake is located, have taken proactive measures to address the environmental crisis caused by the shrinking of the Aral Sea, involving multiple stakeholders. Projects include building dams, planting erosion-stopping vegetation such as saxaul shrubs over millions of hectares, establishing channels to divert water, and implementing water-saving technologies in agriculture to reduce pressure on rivers that flow into the sea.

For example, the 13-kilometer Kok-Aral dam has already enabled a significant recovery of fish stocks by increasing the amount of water in the North Aral, resulting in almost a quarter of the lake's expansion since its completion in 2005. Salinity also decreased, allowing a variety of fish species to thrive and leading to significant increases in fishing limits. The restoration also led to the return of rain clouds and potential changes in the region's microclimate, offering hope to struggling farmers.

The International Fund for Saving the Aral Sea, consisting of Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan, cooperates on joint interstate environmental, scientific and practical initiatives to preserve the Aral Sea, improve the regional ecological situation and face common social and environmental challenges.

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The Aral Sea used to be a crucial stopover point for millions of migratory birds traveling along the Central Asian flyway

SPOMENICI LJUDSKOG ZANEMARIVANJA

Sudbina Aralskog mora, zajedno sa drugim emblematskim slučajevima poput jezera Čad u Africi ili jezera Urmija u Iranu, služi kao potresan primer štetnih efekata ekoloških zloupotreba i klimatskih promena na prirodne ekosisteme. Njegovo brzo propadanje pokazuje hitnu potrebu za koordiniranim naporima kako bi se adresirali koreni uzroci degradacije životne sredine i implementirale održive strategije obnove. Složenost izazova sa kojima se suočava regija Aralskog mora zahteva prekograničnu saradnju i angažovanje raznolikog spektra zainteresovanih strana.

Nacionalne strategije u regionu prioritizuju dalji rast upotrebe vode za navodnjavanje i hidroelektrane, što zahteva koordinisanu regionalnu politiku vode kako bi se balansirala upotreba vodnih resursa i poboljšala ekološka situacija. Iako su napravljeni koraci, postizanje potpunog oporavka predstavlja značajan izazov, što zahteva neprekidno posvećenost i investicije u napore za očuvanje životne sredine radi zaštite Aralskog mora.

MONUMENTS OF HUMAN NEGLECT

The fate of the Aral Sea, along with other emblematic cases such as Lake Chad in Africa or Lake Urmia in Iran, serves as a poignant example of the harmful effects of environmental malpractice and climate change on natural ecosystems. Its rapid deterioration demonstrates the urgent need for coordinated efforts to address the root causes of environmental degradation and implement sustainable restoration strategies. The complexity of the challenges faced by the Aral Sea region requires cross-border cooperation and the engagement of a diverse range of stakeholders.

National strategies in the region prioritize further growth of water use for irrigation and hydropower, which requires a coordinated regional water policy to balance the use of water resources and improve the environmental situation. Although strides have been made, achieving full recovery is a significant challenge, requiring continued commitment and investment in environmental conservation efforts to protect the Aral Sea.

Ljudi prečesto peru odeću i štete životnoj sredini

Novo Istraživanje sugeriše da kampanje za smanjenje ekološkog uticaja pranja odeće treba da se fokusiraju na psihološke pokretače koji stoje iza ljudskih navika.

Danas peremo odeću više nego ikada pre, zahvaljujući tehnološkim napretcima koji pranje veša čine lakšim i jeftinijim.

Prosečno domaćinstvo u Evropi pere do pet mašina veša nedeljno, a veće mašine znače veću potrošnju energije i vode. Pristup veš-mašinama je takođe povećan, sa 30 procenata domaćinstava u svetu 2010. godine na 80 procenata u 2024. godini.

Jednostavnost ubacivanja nečega u korpu za veš i briga o tome da izgledamo čisto, tera nas da peremo odeću čak i kada nije stvarno prljava.

Ali, od mikroplastike koja se oslobađa iz naših odevnih predmeta do energije i vode koju troše veš mašine, ekološki uticaj našeg pranja veša je takođe porastao.

Od svih globalnih emisija mikroplastike, između 16 i 35 procenata dolazi od pranja sintetičkih vlakana. Jedno pranje poliesterske odeće može ispuštati 700.000 mikroplastičnih vlakana, prema istraživačkoj službi Evropskog parlamenta.

Novo istraživanje je pokazalo da, iako većina ljudi naginje ka ekološki prihvatljivim životnim izborima, neće to raditi na račun toga da izgledaju prljavo.

ZAŠTO PEREMO ODEĆU VIŠE NEGO IKADA PRE

Anketa sprovedena na 2.000 ljudi u Švedskoj pokazala je da naš strah od toga da izgledamo nečisto prevazilazi želju za ekološki prihvatljivim životnim izborima.

„Iako su mašine postale energetski efikasnije, koliko često biramo da peremo ima najveći uticaj na klimu - a nikada nismo toliko prali kao danas," kaže Erik Klint, doktorant na Odseku za analizu ekoloških sistema na Tehnološkom univerzitetu Chalmers u Švedskoj.

„Istovremeno, čini se da većina nas nije zainteresovana za promenu svojih navika pranja kako bi smanjila klimatski uticaj."

Klint je glavni autor nedavno objavljenog istraživanja koje je novim pristupom analiziralo naše navike pranja. Istraživanje ispituje dva glavna faktora koja mogu uticati na nas: naš ekološki identitet i sklonost ka osećaju gađenja.

„Istraživanje pokazuje da što je veća naša osetljivost na gađenje, to više peremo, bez obzira na to koliko visoko cenimo naš ekološki identitet. Osećaj gađenja jednostavno prevladava nad ekološkom svešću," kaže on.

Želimo da izbegnemo da budemo viđeni kao prljavi ili nečisti pred drugim ljudima, a ti osećaji gađenja i srama podstiču nas da peremo odeću više - čak i ako smo zabrinuti za naše emisije ugljenika.

Naučnici su već znali iz prethodnih istraživanja da mnogi ljudi ne povezuju svoje navike pranja sa životnom sredinom. I nakon što su videli da su kampanje za promenu ponašanja ljudi uglavnom neuspešne, želeli su da saznaju zašto.

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People Wash Clothes Too Often and Harm the Environment

New research suggests that campaigns to reduce the environmental impact of washing clothes should focus on the psychological drivers behind people's habits.

Today, we wash more clothes than ever before, thanks to technological advances that make it easier and cheaper to do laundry.

The average household in Europe does up to five loads of laundry a week, and bigger machines mean more energy and water consumption. Access to washing machines has also increased, from 30 percent of households worldwide in 2010 to 80 percent in 2024.

The ease of putting something in the laundry basket and concern about being seen as clean make us want to wash clothes even when they are not really dirty. But from the microplastics released from our clothes to the energy and water used by washing machines, the environmental impact of our laundry has also grown.

Of all global releases of microplastics, between 16 and 35 percent come from the washing of synthetic fibers. One wash load of polyester clothing can release 700,000 microplastic fibers, according to the European Parliament's research service.

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KAKO PODSTAĆI LJUDE DA PERU MANJE VEŠA

Klint veruje da kampanje koje nas navode da razmišljamo o ekološkom uticaju našeg pranja imaju pogrešan pristup.

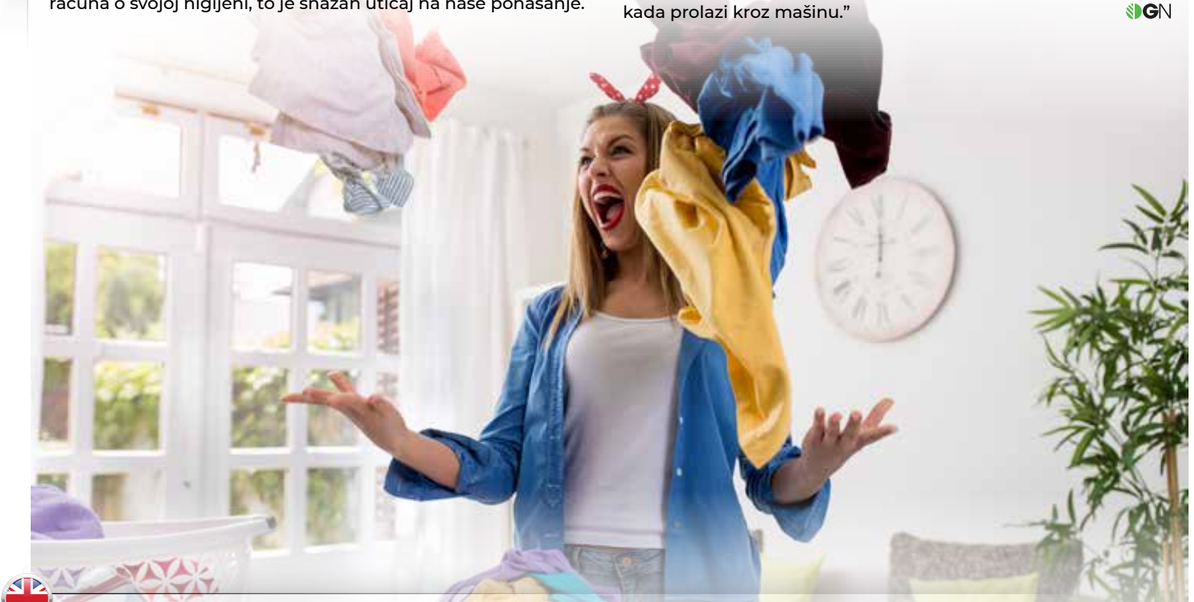
„Nije važno koliko imate razuman i istraživački zasnovan argument, ako se suprotstavljaju različitim pokretačima ljudi, kao što je želja za osećajem pripadnosti grupi, neće uspeti."

Gađenje toliko snažno upravlja našim ponašanjem jer je to evolucijski uslovljen osećaj koji funkcioniše kao zaštita od infekcije ili opasnih supstanci. U kombinaciji sa sramom ili strahom da ljudi ne žele da se druže sa nekim ko ne vodi računa o svojoj higijeni, to je snažan uticaj na naše ponašanje.

Umesto da pokušavamo da navedemo ljude da peru manje odeće, kaže Klint, ovo istraživanje sugeriše da kampanje treba da se fokusiraju na psihološke pokretače koji stoje iza navika ljudi. To uključuje pronalaženje načina da se ljudi podstaknu da ne stvaraju mnogo veša, kao što je korišćenje odeće više puta pre nego što završi u korpi za veš.

„Može se raditi o ciljanju prekomernog pranja, sa porukama kao što su ‚većina ljudi koristi svoju majicu više puta'", objašnjava on.

„Ali i zamenjivanje korišćenja veš-mašine drugim radnjama, kao što je provetravanje odevnih predmeta, četkanje prljavštine ili uklanjanje pojedinačnih mrlja ručno. Jedan način može biti i isticanje ekonomskih argumenata, jer se odeća troši kada prolazi kroz mašinu."



WHY DO WE WASH CLOTHES MORE THAN EVER BEFORE?

A survey of 2,000 people in Sweden has found that our fear of being seen as unclean outweighs our desire for environmentally friendly lifestyle choices.

„Even though machines have become more energy efficient, it is how often we choose to wash that has the greatest impact on the climate - and we have never done as much washing as we do today," says Erik Klint, a doctoral student at the Department of Environmental Systems Analysis at Chalmers University of Technology in Sweden.

„At the same time, most of us seem to be uninterested in changing our laundering behaviours to reduce climate impact."

Klint is the lead on this recently published study that used a new approach to analyze our washing habits. It examines two main factors that can influence us: our ecological identity and our tendency to feel disgust.

„The study shows that the higher our sensitivity to disgust, the more we wash, regardless of whether we value our environmental identity highly. The feeling of disgust simply wins out over environmental awareness," he says.

We want to avoid being seen as dirty or unclean in front of other people, and those feelings of disgust and shame encourage us to wash our clothes more—even if we are concerned about our carbon emissions. Scientists already knew from previous research that many people do not connect their washing habits with the environment. And after seeing that campaigns to change people's behavior were largely unsuccessful, they wanted to find out why.

HOW TO ENCOURAGE PEOPLE TO DO LESS LAUNDRY?

Klint believes that campaigns that make us think about the environmental impact of our laundry have the wrong approach.

„It doesn't matter how sensible and research-based an argument you have, if they run counter to people's different driving forces, such as the desire to feel a sense of belonging to a group, they won't work."

Disgust drives our behavior so strongly because it is an evolutionarily conditioned feeling that functions as a defense against infection or dangerous substances. Combined with shame or fear that people do not want to associate with someone who does not take care of their hygiene, it is a strong influence on our behavior.

Instead of trying to get people to wash clothes less, Klint says, this research suggests that campaigns should focus on the psychological drivers behind people's habits. That includes finding ways to encourage people not to create a lot of laundry, such as using clothes more than once before they end up in the laundry basket.

„It can be about targeting excessive washing, with messages such as ‚most people use their t-shirt more than once,'" he explains.

But also replacing washing machine use with other actions, such as airing the garments, brushing off dirt or removing individual stains by hand. One way could be to highlight the economic arguments here, as clothes get worn out when they go through the machine."

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