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GREEN NEWS

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INTERVJU / INTERVIEW
MINISTARKA RUDARSTVA I ENERGETIKE
Dubravka Đedović Handanović
MINISTER OF MINING AND ENERGY

INTERVJU / INTERVIEW
VD GENERALNOG DIREKTORA EPS-a
Dušan Živković
ACTING GENERAL DIRECTOR OF THE JOINT STOCK COMPANY ELECTRIC POWER INDUSTRY OF SERBIA (EPS)

INTERVJU / INTERVIEW
PREDSEDNIK UPRAVE IEE CORPORATION
Borko Torbica
PRESIDENT OF THE BOARD OF IEE CORPORATION

Šta je RECIKLAŽA E-OTPADA i kako se obavlja?

What is E-Waste Recycling and How is It Done?

HIDROENERGIJA / HYDRO ENERGY

KLJUČ BORBE PROTIV KLIMATSKIH PROMENA

The Key to Fighting Climate Change

30 GODINA ISKUSTVA I TRADICIJE

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GLAVNI I ODGOVORNI UREDNIK

Olivera Krstić

EDITOR IN CHIEF

Hidroenergija
Hidro energy

REČ UREDNIKA

Poštovani čitaoci,

Drago nam je da vas ponovno pozdravimo u novom izdanju magazina ***Green News****, posvećenog obnovljivim izvorima energije i zaštiti životne sredine. Ovaj broj donosi svežu perspektivu na temu koja je ključna za održivu budućnost - hidroenergiju.*

Hidroenergija je ključni deo naše tranzicije ka čistoj i održivoj budućnosti, te smo se posvetili istraživanju najnovijih tehnoloških dostignuća, ekoloških izazova i inspirativnih priča koje oblikuju budućnost energetske industrije.

Pružamo priliku da pročitate ekskluzivne intervjue sa vodećim stručnjacima, inovatorima i liderima u oblasti hidroenergije. Njihovi pogledi i iskustva osvetliće vam put ka održivoj budućnosti energije i zaštiti naše planete.

Uvereni smo da će vas ***Green News*** *inspirisati da se angažujete u zaštiti životne sredine i podržite korišćenje hidroenergije kao ključnog koraka prema održivoj budućnosti. Hvala što ste deo naše zajednice koja teži boljem svetu i sa nestrpljenjem očekujemo vaše komentare i povratne informacije.*

Srdačan pozdrav.

EDITOR WORDS

Dear readers,

We are pleased to welcome you again to the new issue of ***Green News*** *magazine, dedicated to renewable energy sources and environmental protection. This issue brings a fresh perspective to a topic crucial to a sustainable future - hydropower.*

Hydropower is a key part of our transition to a clean and sustainable future, and we are dedicated to researching the latest technological advances, environmental challenges and inspiring stories that are shaping the future of the energy industry.

We provide the opportunity to read exclusive interviews with leading experts, innovators and leaders in the field of hydropower. Their views and experiences will light your path to the future of sustainable energy and the protection of our planet.

We are confident that ***Green News*** *will inspire you to get involved in environmental protection and support the use of hydropower as a key step towards a sustainable future. Thank you for being part of our community that strive for a better world, and we look forward to your comments and feedback.*

Kind regards.

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Dubravka Đedović Handanović

MINISTARKA RUDARSTVA I ENERGETIKE

Vratili smo optimizam u sektor obnovljivih izvora energije

Dubravka Đedović Handanović

MINISTER OF MINING AND ENERGY

We Have Brought Back Optimism in the Sector of Renewable Energy Sources

Foto: Emilija Jovanović

Dubravka Đedović Handanović

MINISTARKA RUDARSTVA I ENERGETIKE U VLADI REPUBLIKE SRBIJE

Foto: Emilija Jovanović

Struja iz obnovljivih izvora energije je sada jeftinija od konvencionalnih izvora, ali cenu na tržištu određuju takozvane marginalne ponude koje dolaze iz fosilnih elektrana, a u Evropi su to pre svega gasne elektrane

Za godinu dana mandata uspeli smo da vratimo duh optimizma u sektor obnovljivih izvora energije. Doneli smo veoma važne izmene Zakona o korišćenju obnovljivih izvora energije i set podzakonskih akata kroz koje smo pomirili interes da imamo više obnovljivih izvora uz siguran rad sistema, da osiguramo novih više od milijardu evra investicija u OIE koje će pozitivno uticati na rast BDP-a, ali i više zelene energije dostupne za naše građane i privredu. Rezultat tog rada su prve uspešne aukcije na kojima smo dodeli 425 MW podsticaja elektranama ukupne snage 711 MW.

Svi investitori dali su ukupno 25 miliona evra vrednosti bankarskih garancija da će ove kapacitete realizovati u naredne tri godine. Finalni rezultat će biti devet novih zelenih elektrana dok je za prvu i ujedno najveću elektranu pre nekoliko dana potpisan Ugovor o tržišnoj premiji i Ugovor o otkupu električne energije i preuzimanju balansne odgovornosti između „Elektroprivrede Srbije“ i kompanije „Vetrozelena“. Time omogućavamo proizvodnju električne energije iz vetroelektrana za oko 180.000 građana po najnižoj ceni, na aukciji od oko 64 evra po megavat-satu, što je dvostruko niže od trenutne tržišne cene. Ugovori predstavljaju pravi primer za druge projekte jer će sva proizvedena električna energija biti iskorišćena za snabdevanje naših građana a ne za izvoz, kaže u intervjuu za Green News ministarka rudarstva i energetike Srbije Dubravka Đedović Handanović i dodaje:

„Posebno smo zadovoljni što sve više projekata pronalazi način da bez podsticaja grade postrojenja na OIE. U ovoj godini imamo 10 MW solarnu elektranu i jedan mini vetropark od 9 MW koji su izgradjeni u potpunosti na komercijalnoj osnovi, a do kraja godine očekuje se na mreži i prvi veliki komercijalni vetropark Krivača od 103 MW, što je jasan pokazatelj da nam je regulativa dovoljno dobra za investitore.”

Dubravka Đedović Handanović

MINISTER OF MINING AND ENERGY IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA

Electricity from renewable energy sources is now cheaper than from conventional ones, but the price on the market is determined by the so-called marginal offers that come from fossil power plants, and in Europe these are primarily gas power plants

In one year of the mandate, we have managed to bring back the spirit of optimism in the sector of renewable energy sources. We have made very important changes in the Law on the Use of Renewable Energy Sources and a set of by-laws through which we have reconciled the interest of having more renewable sources with the safe operation of the system, ensuring more than one billion euros of new investments in RES that will have a positive impact on GDP growth, but also more green energy available for our citizens and economy. The results of that work are the first successful auctions where we have awarded 425 MW of incentives to power plants with a total capacity of 711 MW.

All investors have given a total of 25 million euros bank guarantees for the reaization of these capacities in the next three years. The final result will be nine new green power plants. For the first, and at the same time, the largest power plant, the Contract on market premium and the Contract on purchasing electricity and assuming balancing responsibility were signed between Elektroprivreda Srbije and the company Vetrozelena a few days ago. This enables the production of electricity from wind farms for about 180,000 citizens at the lowest price, at an auction of about 64 euros per megawatt-hour, which is twice as low as the current market price. The contracts represent a true example for other projects because all the electricity produced will be used to supply our citizens and not for export, says Dubravka Đedović Handanović, the Serbian Minister of Mining and Energy in an interview with Green News, and adds:

„We are particularly satisfied that more and more projects are finding a way to build renewable energy plants without incentives. This year, we have a solar power plant of 10 MW, and one mini wind farm of 9 MW that have been built entirely on a commercial basis, and the first large commercial wind farm Krivača of 103 MW is expected to be on the grid by the end of the year, which is a clear indication that our regulations are good enough for investors.”

Some countries have managed to get 100 percent of their electricity needs from renewable energy sources, but the electricity paid by their households and economy is much higher than in our country. How can you maintain a balance between the price of electricity and the desire to increase the capacity of electricity obtained from renewable energy sources?

- The electricity from renewable energy sources is now cheaper than from conventional ones, but the price on the market is determined by the so-called marginal offers that come from fossil power plants, and in Europe these are primarily gas power plants. It was the gas crisis that opened the question in the EU about the validity of the existing market design, where the effect of cheap renewable sources is not sufficiently reflected in the realized price of electricity on the market. So, it is no longer a question of the price ratio of electricity from RES and conventional sources in Europe, and even in our country. The main question here and in the world is how to ensure the safe operation of the system when there is no sun or wind to run power plants, that is why more and more attention is directed to the balance reserve, electricity storage and the activation of flexible services in the consumption that should adapt to new patterns of electricity production. We are working to increase the capacity from RES, but at the same time not to endanger the operation of the system. At the same time, we are making efforts to increase our ability to integrate RES, which is why we are actively working on the realization of the RHP Bistrica with a capacity of 656 MW and a project of 1 GW of solar power plants with battery storage. We have secured more green energy and the diversification through the realization of the first auctions from which the state expects to earn between 12 and 28 million euros.

Is the state planning investments in renewable energy sources, or will it leave them to the private sector?

- Absolutely yes. According to the basic principles of the government's energy infrastructure development plan adopted this year, the state plans to build 2,000 MW of renewable energy power plants through EPS in the next few years, including additional 400 MW from solar power plants on the coal dumps of EPS thermal power plants. The role of the private sector is unavoidable, which is why we adopted a three-year auction plan until 2025, and determined sustainable incentives for 1,300 MW of wind and solar RES capacity. Through the synergy of the two sectors, we expect between 3.5 and 4 GW of RES capacity in 2030, which will forever change the layout of our power system.

Regulations have been amended to make it easier for citizens to install solar panels on the roofs of their houses. How much can it contribute to energy stability and the reduction of the demand for electricity produced and distributed by the state?

Dubravka Đedović Handanović

MINISTER OF MINING AND ENERGY IN THE GOVERNMENT OF THE REPUBLIC OF SERBIA

Foto: Emilija Jovanović

Foto: Emilija Jovanović

- We are very pleased that, in partnership with the Ministry of Finance, this year, we have managed to change all the relevant regulations governing taxes and fees paid by buyers-producers, so that taxes and fees are calculated not on the electricity taken from the grid, but on the difference between delivered and received electricity, which significantly reduces the basis for paying taxes and fees, but also has a positive effect on the quick return of the investment, which ultimately gives more incentives for citizens to install panels. Currently, the number of buyers-producers is 36 MW, which is a six-fold increase compared to last year, when there were about 6 MW in October.

Also, the Ministry of Mining and Energy, in cooperation with local governments, grants subsidies for the installation of solar collectors for heating water as well as solar panels for the production of electricity. This year, 131 local governments are participating in the program, where citizens can, among other things, replace joinery, facades, and heating devices by realizing up to 65 percent of the value of the planned investment. Citizens' interest in subsidies for solar panels is high, and to date, public calls have been announced in more than 80 cities and municipalities where they can apply.

GN ***Serbia has been planning to build the reversible hydropower plant Bistrica for a long time, how far has it progressed?***

- In June 2023, the Government of the Republic of Serbia adopted the document „Basic principles of the energy infrastructure development plan and energy efficiency measures for the period until 2028 with projections until 2030" which defined the RHE Bistrica project as the highest priority project from the hydro segment. It is planned that the project will be realized by 2032. A Preliminary Feasibility Study with the General Project has been completed, and the Conceptual Design, Feasibility Study and Environmental Impact Study are currently being developed.

The RHE Bistrica is one of the most important investments on the list of priority projects, which is important for energy stability, the balancing of energy produced from renewable sources, and the development of the electricity market. By building the RHE Bistrica, Serbia would increase its capacity for energy storage from water potential. It is particularly useful for balancing supply and demand in power systems, allowing electricity to be supplied when needed, even when renewable energy sources, such as wind and solar power, are not available. The planned capacity of the RHE Bistrica is 656 MW, and the construction of the plant is important for the stability and reliability of the power system, because RHEs can quickly switch from a storage mode to an energy production mode to compensate for fluctuations in demand or sudden interruptions in energy supply. It will further accelerate and ensure the integration of renewable energy sources into our power system. GN

Dubravka Đedović Handanović

MINISTARKA RUDARSTVA I ENERGETIKE U VLADI REPUBLIKE SRBIJE

Ministarstvo rudarstva i energetike u saradnji sa lokalnim samoupravama dodeljuje subvencije za postavljanje solarnih kolektora za zagrevanje vode kao i solarnih panela za proizvodnju električne energije

Neke zemlje su uspele da 100 posto potreba za električnom energijom dobiju iz obnovljivih izvora energije, ali je kod njih električna energija koju plaćaju domaćinstva i privreda mnogo veća nego kod nas. Kako napraviti balans između cene električne energije i želje da se kapaciteti dobijene električne energije iz obnovljivih izvora energije povećaju?

- Struja iz obnovljivih izvora energije je sada jeftinija od konvencionalnih izvora, ali cenu na tržištu određuju takozvane marginalne ponude koje dolaze iz fosilnih elektrana, a u Evropi su to pre svega gasne elektrane. Upravo je ova gasna kriza otvorila pitanje u EU o opravdanosti postojećeg dizajna tržišta gde se u ostvarenoj ceni struje na tržištu ne vidi dovoljno uticaj jefitnih obnovljivih izvora. Tako da u Evropi, pa ni kod nas više nije pitanje odnosa cene struje iz OIE i konvencionalnih izvora. Glavno pitanje je i kod nas i u svetu kako obezbediti siguran rad sistema kada nema sunca niti vetra da pokreću elektrane, zato se sve veća pažnja usmerava na balansnu rezervu, skladištenje struje i aktiviranje fleksibilnih usluga na strani potrošnje koja treba da se prilagodi novim obrascima proizvodnje struje. Mi radimo na tome da povećamo kapacitete iz OIE ali da istovremeno ne ugrozimo rad sistema. Paralelno radimo na tome da povećamo našu sposobnost integracije OIE, zbog čega aktivno radimo na realizaciji RHE Bistrica kapaciteta 656 MW i projekta od 1 GW solarnih elektrana sa baterijskim skladištima, a obezbedili smo više zelene energije i diversifikaciju samo kroz realizaciju prvih aukcija od kojih je očekivano da će država prihodovati između 12 i 28 miliona evra.

Da li država planira investicije u obnovljive izvore energije ili će to prepustiti privatnom sektoru?

- Apsolutno da. Prema Polaznim osnovama plana razvoja energetske infrastrukture Vlade donetim ove godine, država planira da kroz EPS izgradi 2.000 MW elektrana na OIE u narednih nekoliko godina, uključujući i dodatnih 400 MW iz solarnih elektrana na deponijama uglja EPS-ovih termoelektrana. Uloga privatnog sektora je nezaobilazna, zbog čega smo doneli trogodišnji plan aukcija do 2025. gde smo opredili održive podsticaje za 1.300 MW OIE kapaciteta na vetar i solar. Kroz sinergiju dva sektora očekujemo između 3,5 i 4 GW OIE kapaciteta u 2030. godini što će zauvek promeniti izgled našeg elektroenergetskog sistema.

Urađene su izmene propisa kako bi građani mogli lakše da postavljaju solarne panele na krovove svojih kuća. Koliko to može da pomogne energetskoj stabilnosti i smanjenju potražnje za strujom koju proizvodi i distribuira država?

- Veoma smo zadovoljni što smo u partnerstvu sa Ministarstvom finansija uspeli ove godine da izmenimo sve relevantne propise kojima se uređuju porezi i naknade koje plaćaju kupci-proizvođaci tako da se obračun poreza i naknada vrši ne na preuzetu električnu energiju iz mreže, nego na razliku isporučene i preuzete električne energije, što značajno smanjuje osnovicu za plaćanje poreza i naknada, ali i pozitivno utiče na brzi povraćaj investicije, a to krajnjoj liniji daje još veći podstrek građanima da instaliraju panele. Trenutno, broj kupaca-proizvodja iznosi 36 MW što je šest puta veće povećanje u odnosu na prošlu godinu kada je ih u oktobru bilo oko 6 MW.

Takođe, Ministarstvo rudarstva i energetike u saradnji sa lokalnim samoupravama dodeljuje subvencije za postavljanje solarnih kolektora za zagrevanje vode kao i solarnih panela za proizvodnju električne energije. U ovoj godini u programu učestvuje 131 lokalna samouprava u kojoj građani mogu, između ostalog i da zamene stolariju, fasadu i grejne uređaje ostvarivanjem do 65 odsto vrednosti planirane investicije. Interesovanje građana za subvencije za solarne panele je veliko i do danas su raspisani javni pozivi u više od 80 gradova i opština na kojima mogu da se prijave.

Srbija dugo planira da izgradi reverzibilnu hidroelektranu Bistrica, dokle se odmaklo sa time?

- U junu 2023. godine, Vlada Republike Srbije je usvojila dokument „Polazne osnove plana razvoja energetske infrastrukture i mera energetske efikasnosti za period do 2028. sa projekcijama do 2030. godine“ kojim je projekat RHE Bistrica definsian kao projekat najvišeg prioriteta iz segmenta hidro projekata. Predviđeno je da se projekat realizuje do 2032, urađena je Prethodna studija opravdanosti sa Generalnim projektom, a u toku je izrada Idejnog projekta, Studija opravdanosti kao i Studija uticaja na životnu sredinu.

RHE Bistrica je jedna od najvažnijih investicija u listi prioritetnih projekata, koji je važan za energetsku stabilnost, balansiranje energije proizvedene iz obnovljivih izvora i razvoj tržišta električne energije. Izgradnjom RHE Bistrica Srbija bi povećala svoje kapacitete za skladištenje energije iz potencijala vode. To je posebno korisno za ravnotežu ponude i potražnje u elektroenergetskim sistemima, omogućavajući snabdevanje električnom energijom kada je potrebno, čak i kada obnovljivi izvori energije, poput vetra i sunčeve energije, nisu dostupni. Planirani kapacitet RHE Bistrica je 656 MW i izgradnja ovog postrojenja značajna nam je za stabilnost i pouzdanost elektroenergetskog sistema, jer RHE brzo mogu preći iz režima skladištenja u režim proizvodnje energije kako bi kompenzovali fluktuacije u potražnji ili iznenadne prekide u snabdevanju energijom. Dodatno će ubrzati i osigurati integraciju obnovljivih izvora energije u naš elektroenergetski sistem.

Foto: Emilija Jovanović

Ključ borbe
protiv klimatskih promena

U Srbiji postoji značajan hidropotencijal za male hidroelektrane, a razvoj ovih projekata doprinosi otvaranju novih radnih mesta i ekonomskom razvoju

Foto: EPS

Međunarodna agencija za energetiku (IEA) upozorava na zabrinjavajuće usporavanje u izgradnji hidroelektrana širom sveta.

U nedavnom izveštaju IEA, ističe se da hidroenergija ostaje najvažniji izvor električne energije bez emisija CO2, ali da napredak u izgradnji hidroelektrana ne ide tako brzo kao što je to bio slučaj tokom prethodnih decenija.

Prema podacima istog izvora, do 2030. godine očekuje se rast broja hidroelektrana za samo 17 odsto, što je daleko ispod nivoa potrebnog da bi se postigao globalni cilj nultih emisija CO2 u proizvodnji električne energije do 2050. godine. Da bismo ostvarili ovaj ambiciozni cilj, procenjuje se da bi rast broja hidroelektrana trebalo udvostručiti.

DIV ČISTE ENERGIJE

Hidroenergija je bila veliki izvor ukupne svetske proizvodnje električne energije u 2020. godini, čime je prestigla sve druge obnovljive izvore energije zajedno.

Fatih Birol, Generalni sekretar IEA, naglašava da je struja dobijena iz hidroenergije „zaboravljeni div čiste energije".

Ključna karakteristika hidroenergije je njena obnovljivost i pozitivan uticaj koji ostavlja na okolinu.

Ona se regeneriše zahvaljujući prirodnom ciklusu vode i ima izuzetno visok nivo efikasnosti u pretvaranju kinetičke energije vodotoka u električnu energiju. Pored toga, hidroenergija je jedan od najekonomičnijih izvora energije, što je čini privlačnom opcijom za proizvodnju električne energije.

KONTROVERZE I KONFLIKTI

Međutim, iako hidroenergija ima mnoge prednosti, izgradnja hidroelektrana može izazvati kontroverze i društvene konflikte. Jedan od glavnih izazova predstavlja pitanje kako uspostaviti ravnotežu koristi hidroenergije sa interesima lokalnog stanovništva i očuvanjem životne sredine.

Veliki hidroenergetski projekti često zahtevaju velike brane koje mogu imati ozbiljne ekološke i socijalne posledice, uključujući i promene u režimu vodotoka i preseljenje lokalnih zajednica.

The Key to Fighting Climate Change

In Serbia, there is significant hydro potential for small hydropower plants, and the development of these projects contributes to the creation of new jobs and economic development

The International Energy Agency (IEA) warns of a worrying slowdown in the construction of hydropower plants around the world.

In a recent report by the IEA, it is pointed out that hydropower remains the most important source of electricity without CO2 emissions, but that progress in the construction of hydropower plants is not going as fast as it was in previous decades.

According to data from the same source, by 2030 the number of hydropower plants is expected to grow by only 17 percent, which is far below the level needed to achieve the global goal of zero CO2 emissions in electricity production by 2050. In order to achieve this ambitious goal, it is estimated that the growth in the number of hydropower plants should be doubled.

THE GIANT OF CLEAN ENERGY

Hydropower was a large source of total global electricity production in 2020, overtaking all other renewable energy sources combined.

Fatih Birol, Secretary General of the IEA, emphasizes that electricity obtained from hydropower is the „forgotten giant of clean energy".

The key characteristic of hydropower is its renewable nature and the positive impact it leaves on the environment. It is regenerated thanks to the natural water cycle and has an extremely high level of efficiency in converting the kinetic energy of the water flow into electrical energy. In addition, hydropower is one of the most economical sources of energy, making it an attractive option for electricity generation.

CONTROVERSIES AND CONFLICTS

Although hydropower has many advantages, the construction of hydropower plants can cause controversy and social conflicts. One of the main challenges is the question of how to balance the benefits of hydropower with the interests of the local population and the preservation of the environment.

Large hydropower projects often require large dams that can have serious environmental and social consequences, including changes in watercourse regimes and displacement of local communities.

GREENNEWS

Uprkos tim izazovima, hidroenergija ostaje važan izvor energije, posebno u zemljama koje se oslanjaju na nju za snabdevanje električnom energijom.

Velike hidroelektrane, poput Itaipu u Brazilu, mogu da zadovolje značajan deo energetskih potreba jedne zemlje. Ova hidroelektrana ima kapacitet proizvodnje struje koji je ekvivalent dvanaest nuklearnih elektrana, ali bez emisija štetnih gasova.

HIDROPOTENCIJAL ZA MALE ELEKTRANE

Ipak, izgradnja ovakvih elektrana često zahteva značajne promene u ekosistemu i društvu, kao i preseljenje lokalnih zajednica. Napredak u izgradnji hidroelektrana može imati značajan uticaj i na ekonomiju.

Male hidroelektrane postaju sve privlačnije u mnogim delovima sveta, jer su ekološki prihvatljive i konkurentne po ceni u odnosu na termo i nuklearne elektrane. U Srbiji, na primer, postoji značajan hidropotencijal za male hidroelektrane, a razvoj ovih projekata doprinosi otvaranju radnih mesta i ekonomskom razvoju. Hidroenergija, takođe, može da igra ključnu ulogu u borbi protiv siromaštva. U mnogim ruralnim područjima širom sveta, stanovništvo se suočava sa siromaštvom i nedostatkom pristupa električnoj energiji.

BORBA PROTIV KLIMATSKIH PROMENA

Hidroenergija pruža jeftin i održiv izvor energije koji poboljšava životni standard lokalnih zajednica i otvara nove mogućnosti za razvoj. Da bismo ostvarili ciljeve održive energije i zaštite životne sredine, važno je da uložimo napore u unapređenje hidroenergije i ubrzanje izgradnje hidroelektrana.

To zahteva saradnju između vlada, industrije i lokalnih zajednica kako bi se postigla ravnoteža između energetske sigurnosti, ekonomske dobiti i očuvanja prirode. Hidroenergija ostaje ključna komponenta tranzicije ka održivijem energetskom sistemu i borbi protiv klimatskih promena.

HE ĐERDAP - Prelivna Brana

Foto: EPS

The key characteristic of hydropower is its renewable nature and the positive impact it leaves on the environment

Despite these challenges, hydropower remains an important source of energy, especially in countries that rely on it for electricity. Large hydropower plants, such as Itaipu in Brazil, can meet a significant portion of a country's energy needs. This hydropower plant has an electricity production capacity equivalent to twelve nuclear power plants, but without harmful gases emissions.

HYDROPOTENTIAL FOR SMALL POWER PLANTS

However, the construction of such power plants often requires significant changes in the ecosystem and society, as well as the relocation of local communities. Progress in the construction of hydroelectric power plants can have a significant impact on the economy as well. Small hydropower plants are becoming more and more attractive in many parts of the world, because they are environmentally friendly and competitive in price compared to thermal and nuclear power plants.

In Serbia, for example, there is significant hydro potential for small hydropower plants, and the development of these projects contributes to job creation and economic development.

Hydropower can also play a key role in the fight against poverty.

In many rural areas around the world, the population faces poverty and lack of access to electricity.

THE FIGHT AGAINST CLIMATE CHANGE

Hydropower provides a cheap and sustainable source of energy that improves the living standards of local communities and opens up new opportunities for development. In order to achieve the goals of sustainable energy and environmental protection, it is important to invest efforts in improving hydropower and accelerating the construction of hydropower plants. This requires cooperation between governments, industry and local communities to achieve a balance between energy security, economic gain and the protection of environment. Hydropower remains a key component of the transition to a more sustainable energy system and the fight against climate change.

HE ĐERDAP - Brodska prevodnica

Foto: EPS

GREENNEWS

Borba oko rezervoara

Oba projekta, Mont-Negre u provinciji Saragosa i Girones & Raimats u Taragoni, stekla su status „Projekata od zajedničkog interesa" Evropske unije

U Španiji se trenutno vodi velika trka oko tržišta hidroelekrana. Dva razvojna tima, onaj Tehničke škole univerziteta Pontificia Comillas i Grupe Romero Polo, našli su se u klinču oko vodnog toka dugačkog 39 kilometara.

Njihovi ambiciozni planovi za hidroelektrane na suprotnim krajevima rezervoara Riba-roha na reci Ebro izazvali su zabrinutost zbog kompatibilnosti, ekoloških uticaja i žestoke konkurencije.

Oba projekta, Mont-Negre u provinciji Saragosa i Girones & Raimats u Taragoni, stekla su status „Projekata od zajedničkog interesa" Evropske unije, što ih čini kvalifikovanim za finansiranje EU slično programima za interkonekciju.

Međutim, Grupa Romero Polo tvrdi da rezervoar nema dovoljan obim za podršku ovim hidroelektranama visokih kapaciteta, navodeći nespojivost u pogledu hidraulike, elektrike i okoline. Rezervoar Riba-roha deo je evropske mreže Natura 2000, što dodatno komplikuje situaciju.

Iako se ni jedan razvojni tim nije odazvao na upite, Ministarstvo za ekološki prelazak i demografski izazov Španije naznačilo je da će samo jedan od projekata, najverovatnije, biti odobren.

Ova odluka dolazi u vreme kada Španija planira da doda 3,5 GW obnovljive energije iz snage vode u narednoj deceniji, tako prestižući Austriju i Italiju, ne bi li tako postala lider u proizvodnji električne energije iz hidroelektrana u Evropi.

Međutim, borba između Mont-Negre i Girones & Raimats postavlja pitanja o putu Španije ka postizanju ovog cilja.

Analitičari sugerišu da će investitori verovatno zahtevati ugovore o zakupu na četrdeset godina kako bi ovi kapitalno-intenzivni projekti bili održivi. Štaviše, Španija mora da prilagodi aukcije posebno za hidroelektrane, kako bi uspešno privukla privatne investicije.

Hidroelektrane imaju ogroman značaj za energetski sistem Španije, budući da se očekuje da će zameniti kapacitet za proizvodnju energije izgubljen iz faze zatvaranja nuklearnih elektrana, što je cilj usklađen sa Nacionalnim planom za energetiku i klimu za period od 2021. do 2030. godine (PNIEC).

Pored toga, nove rezerve hidroelektrana

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The Battle Over Reservoirs

Both projects, Mont-Negre in the province of Zaragoza, and Girones & Raimats in Tarragona, have gained the status of „Projects of Common Interest" of the European Union

In Spain, there is currently a big race for the hydropower market. Two development teams, one of the Technical School of the Pontificia Comillas University and the Romero Polo Group, found themselves in a clinch over the 39 kilometer long waterway.

Their ambitious plans for hydropower plants at opposite ends of the Ribarroja reservoir on the Ebro River have raised concerns about compatibility, environmental impacts and fierce competition.

Both projects, Mont-Negre in the province of Zaragoza and Girones & Raimats in Tarragona, have gained the status of „Projects of Common Interest" of the European Union, making them eligible for EU funding similar to interconnection programmes.

However, the Romero Polo Group claims that the reservoir does not have sufficient volume to support these high-capacity hydropower plants, citing hydraulic, electrical and environmental incompatibilities. The Ribarroja reservoir is part of the European Natura 2000 network, which further complicates the situation.

Although no development team responded to inquiries, Spain's Ministry of Environmental Transition and Demographic Challenge indicated that only one of the projects is likely to be approved.

The decision comes at the time when Spain plans to add 3.5 GW of renewable hydropower over the next decade, overtaking Austria and Italy to become the leader in hydropower generation in Europe.

However, the battle between Mont-Negra and Girones & Raimats raises questions about Spain's path to achieving this goal.

Analysts suggest that investors are likely to demand forty-year leases to make these capital-intensive projects sustainable. Moreover, Spain must adapt the auctions specifically for hydropower plants, in order to successfully attract private investment.

Hydropower plants are of huge importance to Spain's energy system, as they are expected to replace the power generation capacity lost from the nuclear power phase-out, a goal aligned with the National Energy and Climate Plan 2021-2030 (PNIEC).

In addition, new hydropower reserves will improve Spain's ability to meet energy needs more

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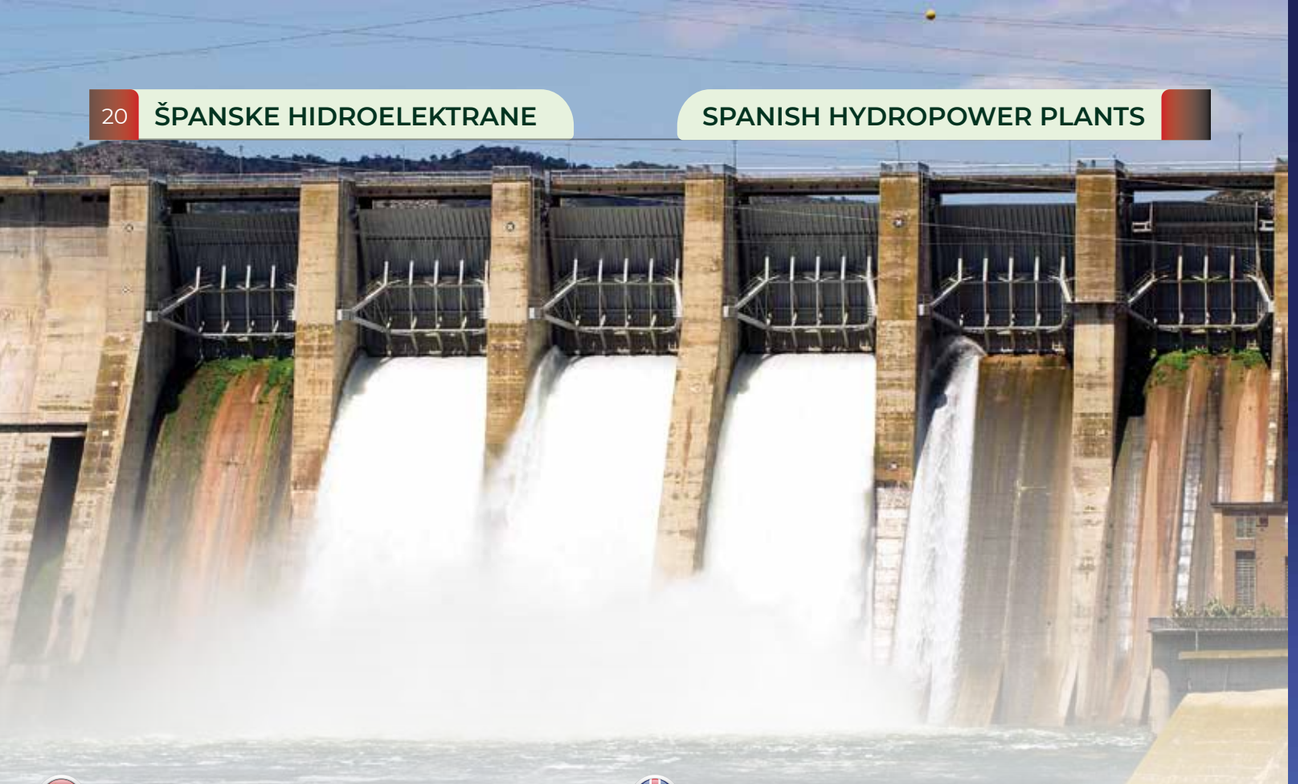

poboljšaće sposobnost Španije da na ekonomičniji način zadovolji potrebe za energijom, smanjujući zavisnost od skupih termoelektrana.

Dok Španija nastoji da integriše sve više obnovljive energije, hidroelektrane poput Mont-Negre i Girones & Raimats predstavljaju ključne komponente u procesu postizanja potpuno dekarbonizovane električne energije.

Ambiciozni ciljevi smanjenja ugljeničnog otiska u Evropi naglašavaju potrebu za većim investicijama u projekte hidroelektrana, pri čemu one igraju ključnu ulogu u balansiranju promenljive solarne i energije vetra.

Odluka Španije u vezi sa ovim konkurentnim projektima nesumnjivo će uticati na njen položaj u evropskom pejzažu obnovljivih izvora energije.

economically, reducing dependence on expensive thermal power plants.

As Spain strives to integrate more and more renewable energy, hydropower plants like Mont-Negre and Girones & Raimats are key components in the process of achieving fully decarbonized electrical energy.

Ambitious goals to reduce Europe's carbon footprint highlight the need for greater investment in hydropower projects, where they play a key role in balancing variable solar and wind power.

Spain's decision regarding these competing projects will undoubtedly affect its position in the European renewable energy landscape.

GREENNEWS

Foto: EPS

Dušan Živković

VRŠILAC DUŽNOSTI GENERALNOG DIREKTORA
AKCIONARSKOG DRUŠTVA „ELEKTROPRIVREDA SRBIJE“

EPS POVEĆAVA KAPACITETE koji koriste obnovljive energije

Dušan Živković

ACTING GENERAL DIRECTOR OF THE JOINT STOCK
COMPANY ELECTRIC POWER INDUSTRY OF SERBIA (EPS)

EPS Increases Capacities Which Use Renewable Energy

Dušan Živković

V. D. GENERALNOG DIREKTORA AKCIONARSKOG DRUŠTVA „ELEKTROPRIVREDA SRBIJE“

Foto: EPS

Energija iz hidrosektora je utkana u istoriju „Elektroprivrede Srbije“. Hidroelektrana „Pod gradom“ na Đetinji, u Užicu puštena je u rad 1900. godine i bila je prva elektrana u Srbiji koja je radila po Teslinim principima polifaznih struja. Prvi prenos električne energije u Srbiji urađen je od male hidroelektrane „Vučje“ do Leskovca, dalekovodom dužine 17 kilometara. Elektrana je počela da radi 1903. godine, za potrebe čuvenih tkačnica „srpskog Mančestera“ i osvetljavanje Leskovca. Obe ove HE, stare više od veka, u funkciji su i danas.

Hidrosektor EPS-a je ponos srpske elektroenergetike i predano radimo na tome da unapredimo rad naših hidroelektrana, da im produžimo radni vek i povećamo efikasnost. Svaki megavat-sat proizveden iz vode je višestruko koristan - kaže u razgovoru za „Green news“ Dušan Živković, v. d. generalnog direktora Akcionarskog društva „Elektroprivreda Srbije“.

Hidroelektrane su veoma važan deo energetskog sistema Srbije. Kako biste opisali njihov značaj i doprinosu proizvodnji električne energije?

„Elektroprivreda Srbije“ u svojim elektranama snage od skoro 7.400 MW proizvede oko 35 milijardi kWh električne energije godišnje i snabdeva oko 3,6 miliona kupaca. Hidroelektrane zauzimaju značajno mesto ne samo u portfoliju EPS-a, s obzirom da imaju oko 30 odsto udela u ukupnoj proizvodnji, već čine i najveći deo obnovljivih kapaciteta Srbije.

U svom sastavu EPS ima 16 hidroelektrana sa 51 hidroagregatom, jednu reverzibilnu hidroelektranu sa dva agregata, jedno pumpno postrojenje sa dve pumpe i 16 malih hidroelektrana. Ukupna instalirana snaga ovih kapaciteta koji koriste obnovljive izvore energije je više od 3.000 MW.

Kako hidroelektrane pomažu u održavanju stabilnosti elektroenergetskog sistema i u pravilnom balansiranju ponude i potražnje električne energije?

Sa sve većim učešćem obnovljivih izvora energije, sve češće se naglašava uloga baterija za skladištenje energije. Baterija ili „zlatna rezerva“ EPS-a već više od 40 godina je reverzibilna hidroelektrana „Bajina Bašta“. Ona omogućava balansiranje sistema u trenucima kada nedostaje električne energije. Reverzibilna HE „Bajina Bašta“ je izuzetno važna u sistemu „Elektroprivrede Srbije“ jer omogućava korišćenje energije onda kada je ona najpotrebnija – u intervalima sa pikovima potrošnje i kada je velika tražnja.

Koji su glavni izazovi i prepreke u proizvodnji električne energije iz hidroelektrana i kako se oni rešavaju?

Najveći izazov u proizvodnji hidroenergije je njen sezonski karakter i uslovljenost prirodnim dotocima na rekama. Najjednostavniji primer je hidrološka situacija na Dunavu. Ova godina za hidrosektor je bila veoma povoljna, za razliku od prethodne dve sušne godine kada su dotoci bili na minimumu. Zahvaljujući spremnosti i dobroj hidrologiji, naše

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Dušan Živković

ACTING GENERAL DIRECTOR OF THE JOINT STOCK COMPANY ELECTRIC POWER INDUSTRY OF SERBIA (EPS)

The revitalization of the Đerdap 1, our largest hydropower plant, which produces 5.5 billion kWh per year, has been completed, and now it has greater power and reliability, but also a longer working life for the next 30 to 40 years

Energy from the hydro sector is woven into the history of the Electric Power Industry of Serbia. The hydropower station „Pod gradom” on the Djetinja river, in Užice, was put into operation in 1900, and was the first power plant in Serbia that worked according to Tesla’s principles of polyphase currents. The first transmission of electricity in Serbia was carried out from the small hydropower plant Vučje to Leskovac, via a 17-kilometer transmission line. The power plant started operating in 1903, for the needs of the famous weaving mills of the „Serbian Manchester” and the lighting of Leskovac. Both of these HPPs, more than a century old, are still in operation today.

The hydro sector of EPS is the pride of the Serbian electric power industry and we are dedicated to improving the operation of our hydropower plants, extending their working life and increasing efficiency. Every megawatt-hour produced by a stream of water is useful in many ways - says Dušan Živković, acting General Director of the Joint Stock Company Electric Power Industry of Serbia.

Hydropower plants are very important part of the Serbian energy system. How would you describe their importance and contribution to electricity production?

The Electric Power Industry of Serbia in its power plants with a capacity of almost 7,400 MW produces about 35 billion kWh of electricity annually and supplies about 3.6 million customers. Hydropower plants occupy an important place not only in the portfolio of EPS, considering that they have a share of about 30 percent in the total production, but also make up the largest part of Serbia’s renewable capacities. EPS has 16 hydropower plants with 51 hydro aggregates, one reversible hydropower plant with two aggregates, one pumping station with two pumps and 16 small hydropower plants. The total installed power of these capacities using renewable energy sources is more than 3,000 MW.

How do hydropower plants help maintain the stability of the power system and properly balance the supply and demand of electricity?

With the increasing participation of renewable energy sources, the role of batteries for energy storage is increasingly emphasized. The battery or „golden reserve” of EPS has been the reversible hydroelectric power plant Bajina Bašta for more than 40 years. It allows balancing the system in moments when there is a lack of electricity. The reversible HPP Bajina Bašta is extremely important in the system of the Electric Power Industry of Serbia because it enables the use of energy when it is most needed - during periods with consumption peaks and when there is high demand.

What are the main challenges and obstacles in the production of electricity from hydropower plants, and how are they solved?

The biggest challenge in the production of hydropower is its seasonal nature and its dependence on the natural flow of rivers. The simplest example is the hydrological situation on the Danube. This year has been very favorable for the hydro sector, unlike the previous two dry years when the natural flow was at a minimum. Thanks to readiness and good hydrology, our hydropower plants have produced almost 42 percent more electricity in nine months of this year, which is the maximum hydro production in the last 23 years. An additional challenge for our EPS is the revitalization of hydropower plants, and the goal is for all our HPPs to be ready to work reliably in the coming decades.

What are the plans of the Electric Power Industry of Serbia to increase the share of renewable sources in the total production of electricity?

EPS strives and bases its plans on increasing capacities that use renewable sources. Among the priorities are projects for the construction of wind and solar power plants. We are already working on our projects of the wind power plant Kostolac and the solar power plant Petka.

The Kostolac wind farm is a pilot project of the Electric Power Industry of Serbia, with a capacity of 66 megawatts, and will be spread over the locations of Drmno, Petka, Ćirikovac and Klenovnik, on the site of exhausted surface mines and landfills of the Kostolac thermal power plant and mines. The project consists of 20 wind turbines, each with power of 3.3 megawatts. The planned annual production of the Kostolac wind farm is about 184 million kWh. The project is financed by a loan from KfW Bank and is implemented in accordance with the strategic goals of the Republic of Serbia in the field of renewable energy sources. Additional funds in the amount of 30 million euros from WBIF have been approved for EPS. Construction projects for foundations and platforms are in progress, and the construction of four internal access roads has been completed. It is expected that the Kostolac wind farm will be connected to the grid at the end of 2024.

The Petka solar power plant is the first photovoltaic plant in the EPS branch Kostolac Thermal Power Plants and Mines, which will be built on the external disposal site of the surface mine Petka. It will have an installed capacity of 9.75 MW and planned annual production of 15.6 GWh. The solar panels will cover an area of 11.6 hectares. The planned value of the investment is 1.36 billion dinars and is financed by EPS funds. The solar plant is expected to be on the grid at the end of 2024.

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Dušan Živković

V. D. GENERALNOG DIREKTORA AKCIONARSKOG DRUŠTVA „ELEKTROPRIVREDA SRBIJE“

Naš zajednički cilj jeste smanjenje emisije gasova staklene bašte i povećanja udela obnovljivih izvora energije u energetskom miksu

hidroelektrane proizvele su za devet meseci ove godine skoro 42 odsto više električne energije i to je maksimalna hidroproizvodnja u poslednje 23 godine. Dodatni izazov za našu EPS je revitalizacija hidroelektrana i cilj je da sve naše HE budu spremne da pouzdano rade i u narednim decenijama.

Kakvi su planovi Elektroprivrede Srbije za povećanje udela obnovljivih izvora u ukupnoj proizvodnji električne energije?

EPS stremi i zasniva svoje planove na povećanju kapaciteta koji koriste obnovljive izvore. Među prioritetima su projekti izgradnje vetro i solarnih elektrana. Na tome već i radimo na našim projektima vetroelektrane „Kostolac“ i solarne elektrane „Petka“.

Vetropark „Kostolac“ je pilot projekat „Elektroprivrede Srbije“, snage 66 megavata i prostiraće se na lokacijama Drmno, Petka, Ćirikovac i Klenovnik, na mestu iscrpljenih površinskih kopova i odlagališta termoelektrane i kopova „Kostolac“. Projekat se sastoji od 20 vetroturbina, snage po 3,3 megavata. Planirana godišnja proizvodnja vetroparka „Kostolac“ je oko 184 miliona kWh. Projekat se finansira iz kredita KfW banke i realizuje u skladu sa strateškim ciljevima Republike Srbije u oblasti obnovljivih izvora energije. EPS-u su odobrena i dodatna sredstva u iznosu od 30 miliona evra od WBIF. U toku je izrada projekata za izvođenje za temelje i platforme, a završena je izgradnja četiri interne pristupne saobraćajnice. Očekuje se da će VE „Kostolac“ biti priključena na mrežu krajem 2024. godine.

Solarna elektrana „Petka“ prvo je fotonaponsko postrojenje u EPS-ovom ogranku „Termoelektrane i kopovi Kostolac“, koje će se graditi na spoljašnjem odlagalištu Površinskog kopa „Petka“. Imaće instalisanu snagu od 9,75 MW i planiranu godišnju proizvodnju od 15,6 GWh. Solarni paneli prostiraće se na površini od 11,6 hektara. Planirana vrednost investicije je 1,36 milijardi dinara i finansira se sredstvima EPS-a. Očekuje se da solarna elektrana bude na mreži krajem 2024. godine.

Da li planirate ulaganje u modernizaciju postojećih hidroelektrana kako biste povećali njihovu efikasnost?

Revitalizacija HE „Đerdap 1“, naše najveće hidroelektrane, koja proizvodi 5,5 milijardi kWh godišnje, završena je i sada ima veću snagu i pouzdanost, ali i duži radni vek za narednih 30 do 40 godina. Nominalna aktivna snaga agregata posle revitalizacije je 190 MW, a pre je bila 171 MW, što znači da se revitalizacijom elektrane dobila jedna nova elektrana, instalisane snage oko 100 MW. Sada HE „Đerdap 1“ ima ukupnu snagu 1.140 MW. Planirane su revitalizacije i modernizacije postojećih, ali i izgradnja novih hidroelektrana. U toku je nekoliko projekata koje EPS planira u svom zaokretu ka obnovljivim izvorima. Najznačajniji projekti su modernizacija HE „Bistrica“, „Potpeć“, „Đerdap 2“ i „Vlasinskih hidroelektrana“. Značaj revitalizacije hidroelektrana prepoznala je i Evropska Unija, koja je putem svog pograma Western Balkan Investments Framework (WBIF) dodelila EPS bespovratna sredstva u iznosu od 49 miliona evra za finansiranje četiri projekta obnovljivih izvora energije. Od toga, 16,1 milion evra namenjeno je za revitalizaciju „Vlasinskih hidroelektrana“.

I reverzibilna hidroelektrana „Bajina Bašta“, snage 614 megavata, biće obnovljena do kraja 2024. godine. Ugovor za rehabilitaciju mašinske i elektro opreme, vredan 26 miliona evra, potpisan je sa kompanijom „Tošiba“, a ugovor za revitalizaciju upravljačke opreme, opreme generatorskog napona i sistema električne zaštite potpisan je sa „Institutom Mihajilo Pupin – Automatika”. Planiramo i ulaganje u HE „Potpeć“, koja će dobiti dodatnih 12,7 MW kapaciteta. Procenjena vrednost projekta postavljanja novog hidro agregata je 13,5 miliona evra, a očekuje se da će biti završen do 2026. godine. Nakon puštanja u rad, proizvodnja električne energije u Srbiji povećaće se za oko 15,2 GWh godišnje. Hidroenergetski razvoj na reci Lim predviđa dodavanje novog bloka HE „Potpeć“, pored postojeća tri, ukupne snage 54 MW. Ranije su revitalizovane HE na Drini. HE „Zvornik“ je potpuno revitalizovana u periodu 2016. do 2020. godine. Na taj način snaga elektrane povećana je za 30 MW, a radni vek produžen za dodatnih 40 godina, a modernizovana je i HE „Bajina Bašta“. U planu je i izgradnja novih kapaciteta, poput HE na gornjem toku Drine i reverzibilne hidroelektrane „Bistrica“. Upravo je RHE „Bistrica“ ključni projekat koji će omogućiti integraciju u mrežu planiranih varijabilnih obnovljivih izvora energije. EPS učestvuje i u projektima u regionu kroz izgradnju hidroelektrana na Gornjoj Drini u Republici Srpskoj.

Koji su glavni izazovi u integraciji obnovljivih izvora energije u elektroenergetski sistem Srbije?

Energetske prilike u Evropi i svetu, energetska tranzicija, koju već živimo i neminovna dekarbonizacija, dodatno su podrška razvoja reverzibilnih hidroelektrana. Jedan od najvećih izazova u integraciji obnovljivih izvora energije jeste balansiranje varijabilnih obnovljivih izvora. Zbog toga EPS radi na razvoju projekta RHE „Bistrica“, kapaciteta 656 megavata. To je jedan od strateških projekata države Srbije i EPS-a, a posebno je važna jer se očekuje dalje povećanje učešća promenjivih obnovljivih izvora energije od možda najznačajnijeg resursa koje planeta ima - sunca. Izvesno je da će biti potrebni novi kapaciteti koji će omogućiti balansiranje i stabilnost sistema,

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ACTING GENERAL DIRECTOR OF THE JOINT STOCK COMPANY ELECTRIC POWER INDUSTRY OF SERBIA (EPS)

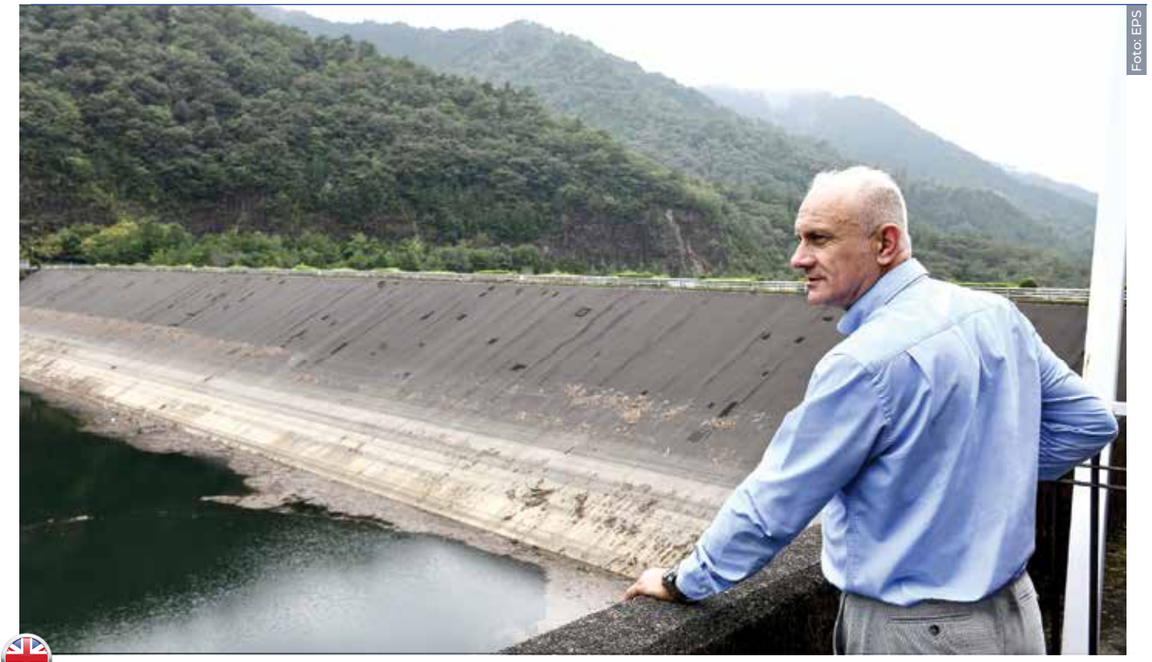

Foto: EPS

Are you planning to invest in the modernization of existing hydropower plants in order to increase their efficiency?

The revitalization of the Đerdap 1, our largest hydropower plant, which produces 5.5 billion kWh per year, has been completed and now it has strength and reliability, but also a longer working life for the next 30 to 40 years. The nominal active power of the unit after the revitalization is 190 MW, and before it was 171 MW, which means that the revitalization of the power plant resulted in a new power plant with an installed capacity of about 100 MW. Now HPP Đerdap 1 has total power of 1,140 MW. The revitalization and modernization of the existing ones, as well as the construction of new hydropower plants, are planned. Several projects are underway that EPS is planning in its turn towards renewable sources. The most significant projects are the modernization of Bistrica, Potpeć, Đerdap 2 and Vlasinska hydropower plants. The importance of the revitalization of hydropower plants was also recognized by the European Union, which through its program Western Balkans Investment Framework (WBIF) awarded grants to EPS in the amount of 49 million euros to finance four projects of renewable energy sources. Out of that, 16.1 million euros are intended for the revitalization of Vlasinske hydropower plants.

The irreversible hydropower plant Bajina Bašta, with power of 614 megawatts, will be refurbished by the end of 2024. The contract for the rehabilitation of mechanical and electrical equipment, worth 26 million euros, has been signed with the company „Toshiba”, and the contract for the revitalization of control equipment, generator voltage equipment and electrical protection systems has been signed with the Mihajilo Pupin Institute - Automation. We are also planning to invest in HPP Potpeć, which will receive an additional 12.7 MW of capacity. The estimated value of the new hydro aggregate installation project is 13.5 million euros, and it is expected to be completed by 2026. After commissioning, electricity production in Serbia will increase by about 15.2 GWh per year. Hydropower development on the Lim River includes a new block of HPP Potpeć, in addition to the existing three, with total power of 54 MW. HPPs on the Drina were revitalized earlier. The HPP Zvornik was completely revitalized in the period from 2016 to 2020. In this way, the power of the plant was increased by 30 MW, and the working life was extended by additional 40 years. The HPP BajinaBašta was also modernized. The plan also includes the construction of new capacities, such as HPP on the upper courses of the Drina and the reversible hydro power plant Bistrica. The RHE Bistrica is a key project that will enable integration into the grid of planned variable renewable energy sources. EPS also participates in projects in the region through the construction of hydropower plants on the Upper Drina in the Republic of Srpska.

What are the main challenges in the integration of renewable energy sources into the electric power system of Serbia?

The energy situation in Europe and the world, the energy transition that we are already experiencing, and the inevitable decarbonization, are additional support for the development of reversible hydropower plants. One of the biggest challenges in the integration of

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Dušan Živković

Značaj revitalizacije hidroelektrana prepoznala je i Evropska Unija, koja je putem svog pograma Western Balkan Investments Framework (WBIF) dodelila EPS bespovratna sredstva u iznosu od 49 miliona evra

ne samo Srbije već i regiona. Izgradnjom RHE „Bistrica“ Srbija bi dobila fleksibilan kapacitet u srcu elektroenergetskog sistema ne samo Srbije, već čitavog regiona. Reverzibilne HE su značajne za obezbeđivanje skladištenja, balansiranja i energetske sigurnosti u periodu ispred nas. Za RHE „Bistrica“ potpisan je ugovor o studiji za procenu uticaja na životnu sredinu, koja se očekuje do kraja septembra 2024. godine, a izrada prostornog plana je u finalnoj fazi.

Na koji način „Elektroprivreda Srbije“ može da podrži decentralizovanu proizvodnju električne energije iz obnovljivih izvora?

EPS je u prethodne dve godine predano radio na ubrzanju i pojednostavljenju procedura za zaključivanje ugovora za sticanje statusa kupca-proizvođača, podržavajući na taj način proizvođače solarne energije u kategoriji domaćinstava i privrede. Interesovanje građana i privrede za sticanje statusa kupca-proizvođača raste iz meseca u mesec, o čemu svedoči i broj podnetih zahteva za zaključenje ugovora. O tome svedoči podatak da je na distributivnu mrežu od početka 2022. godine do početka oktobra priključen 1.581 kupac-proizvođač, ukupne snage 13 megavata, jedna stambena zajednica i 572 ostalih potrošača sa 14 megavata, sa kojima je EPS sklopio ugovor.

Pored toga, s obzirom da raspolaže većinom balansnih kapaciteta u Srbiji, EPS nudi usluge balansiranja elektranama koje koriste OIE. Nakon nedavnih aukcija za dodelu premija za vetar i solar, EPS je izrazio spremnost da pobednicima aukcija ponudi ugovore o balansiranju.

S obzirom na globalni naglasak na smanjenje emisija štetnih gasova i prelazak na čistu energiju, kako vidite budućnost proizvodnje električne energije u Srbiji?

Naš zajednički cilj jeste smanjenje emisije gasova staklene bašte i povećanja udela obnovljivih izvora energije u energetskom miksu. Istina je da je naša bazna energija i dalje energija iz termokapaciteta, ali postepeno i planski možemo ostvariti ciljeve koji će biti predviđeni strateškim državnim dokumentima čije se usvajanje očekuje – Strategijom energetike i Integrisanim nacionalnim i klimatskim planom. Energetska tranzicija je neminovnost. Cilj je obezbediti energetsku nezavisnost i pouzdano snabdevanje. To definitvno nameće obavezu da se poveća učešće zelene energije i diversifikuje proizvodnja.

renewable energy sources is the balancing of variable renewable sources. That is why EPS is working on the development of the RHPP Bistrica project, with a capacity of 656 megawatts. It is one of the strategic projects of Serbia and EPS, and it is especially important because it is expected to further increase the share of variable renewable energy sources from probably the most important resource the planet has - the sun. It is certain that new capacities that will enable balancing and stability of the system will be necessary, not only in Serbia but also in the region. With the construction of RHP Bistrica, Serbia would get flexible capacity in the heart of the electric power system not only in Serbia, but in the entire region. Reversible HPPs are important for ensuring storage, balancing and energy security in the period ahead. The contract for environmental impact assessment study for RHPP Bistrica has been signed, and it is expected by the end of September 2024. The creation of a spatial plan is in the final phase.

How can the Electric Power Industry of Serbia support the decentralized production of electricity from renewable sources?

In the previous two years, EPS has worked diligently to speed up and simplify the procedures for concluding contracts for acquiring the status of buyer-producer, thus supporting solar energy producers in household and business categories. The interest of citizens and businesses in acquiring the status of buyer-producer is growing from month to month, as evidenced by the number of submitted requests for the conclusion of contracts. This is evidenced by the fact that from the beginning of 2022 until the beginning of October, 1,581 customer-producers, with total power of 13 megawatts, one housing association and 572 other consumers with 14 megawatts, with whom EPS concluded contracts, were connected to the distribution network.

In addition, considering that it has most of the balancing capacities in Serbia, EPS offers balancing services to power plants that use RES. Following the recent wind and solar premium auctions, EPS has expressed its willingness to offer balancing contracts to auction winners.

Considering the global emphasis on the reduction of harmful gas emissions and the transition to clean energy, how do you see the future of electricity production in Serbia?

Our common goal is to reduce greenhouse gas emissions and increase the share of renewable energy sources in the energy mix. It is true that our base energy is still energy from thermal capacity, but we can gradually and sticking to plans achieve the goals that will be foreseen in the strategic state documents whose adoption is expected - the Energy Strategy and the Integrated National and Climate Plan. The energy transition is inevitable. The goal is to ensure energy independence and reliable supply. This definitely imposes an obligation to increase the share of green energy and diversify production.

POPLAVE

Uzroci, posledice i uticaj na ekosistem

Poplave predstavljaju jednu od najrazornijih prirodnih katastrofa koja pogađa milione ljudi i nanosi značajnu štetu kako naseljima, tako i prirodnom okruženju.

Istražujemo glavne uzroke i efekte poplava i razmatramo kako se ova pojava sve više komplikuje usled klimatskih promena i ljudskih aktivnosti.

RAZLIČITE VRSTE POPLAVA

Pre nego što detaljnije istražimo uzroke i posledice, važno je napomenuti da postoje različite vrste poplava. Dve najčešće klasifikacije jesu brze poplave (flash floods) i poplave reka (river floods).

Brze poplave, kako im samo ime govori, karakteriše brz rast nivoa vode usled obilnih padavina u nizinskim područjima. Ove nepogode izuzetno su opasne i često dovode do gubitka ljudskih života i velike štete. Češće su u područjima sa suvom klimom i kamenitim terenom, gde nedostatak zemljišta ili vegetacije onemogućava apsorpciju velikih količina padavina.

Poplave reka, s druge strane, nastaju kada reka prelazi svoje obale. Ove nepogode karakteristične su za područja sa vlažnom klimom, dugim sezonama kiša i blizu terena gde se tope sneg i led.

GLAVNI UZROCI POPLAVA

Poplave mogu biti rezultat više faktora, a uglavnom nastaju zajedničkim delovanjem više njih. Međutim, jedan od najvećih uzroka poplava, posebno brzih poplava, jeste obilna kiša.

Kada padavine u nizinskim područjima i urbanim sredinama ubrzaju intenzitet, zemljište ne može da ih upije, nivo vode naglo raste, izazivajući poplave. Isto tako, ekstremne padavine duž rečnih tokova uzrokuju prelivanje reka preko obala na okolno zemljište. Jedan od razloga poplava predstavlja i nadliv mora, poznat kao olujni talas (storm surge). Ovo se događa tokom tropskih oluja, ciklona i uragana, gde ove vremenske nepogode uzrokuju prelivanje morske vode na obalu. Nivo mora može da se podigne i do 20 stopa tokom olujnih talasa.

TOPLJENJE SNEGA I DRUGE MUKE

Brzo topljenje snega i leda može izazvati nagli porast nivoa vode u rekama.

Blokade rečnih tokova uzrokovane topljenjem leda mogu da stvore fenomen poznat kao „ledene brane” (ice jams). Katastrofalne poplave mogu biti rezultat i pucanja brana, što dovodi do snažnog i destruktivnog talasa vode nizvodno. Primer za to je poplava u Džonstaunu, Pensilvanija, 1889. godine, kada je usled ekstremnih padavina brana popustila i oslobodila 20 miliona tona vode, prouzrokujući smrt više od 2.200 ljudi.

POSLEDICE POPLAVA

Iako su poplave prirodna pojava, njihovi efekti na ljude, ekonomiju i okolinu su ogromni. Od 1998. do 2017. godine, više od 2 milijarde ljudi širom sveta pogođeno je poplavama, a taj broj i dalje raste usled sve češćeg nestabilnog vremena.

Poplave, posebno one brze, mogu devastirati ceo grad i urbano okruženje.

Tokom istorije, mnogo ljudi je izgubilo živote usled naglih poplava ili incidenata izazvanih teškim elementarnim nepogodama, kao što su klizišta i urušavanje infrastrukture.

FLOODS

Causes, Consequences and Impact on the Ecosystem

Floods are one of the most devastating natural disasters that affect millions of people and cause significant damage to both settlements and the natural environment.

We investigate the main causes and effects of flooding and consider how this phenomenon is becoming more complicated due to climate change and human activities.

DIFFERENT TYPES OF FLOODS

Before we investigate the causes and effects in more detail, it is important to note that there are different types of floods. The two most common classifications are flash floods and river floods.

Flash floods, as their name suggests, are characterized by a rapid rise in water levels due to heavy rainfall in low-lying areas. These disasters are extremely dangerous and often lead to the loss of human life and great damage. They are more common in areas with a dry climate and rocky terrain, where the lack of soil or vegetation prevents the absorption of large amounts of precipitation.

River floods, on the other hand, occur when a river overflows its banks. These disasters are characteristic of areas with a humid climate, long rainy seasons and close to terrain where snow and ice melt.

MAIN CAUSES OF FLOODS

Floods can be the result of several factors, and mostly they are caused by the joint action of several of them. However, one of the biggest causes of flooding, especially flash flooding, is heavy rain.

When precipitation in low-lying areas and urban areas accelerates in intensity, the soil cannot absorb it, the water level rises sharply, causing floods. Likewise, extreme rainfall along river courses causes rivers to overflow their banks onto the surrounding land. One of the reasons for flooding is the overflow of the sea, known as a storm surge. This occurs during tropical storms, cyclones and hurricanes, where these weather conditions cause seawater to overflow onto the coast. Sea levels can rise up to 20 feet during storm surges.

MELTING SNOW AND OTHER TROUBLES

Rapid melting of snow and ice can cause a sudden rise in water levels in rivers.

Blockages of river flows caused by melting ice can create a phenomenon known as „ice jams”.

Catastrophic flooding can also be the result of dams bursting, leading to a powerful and destructive wave of water downstream. An example of this is the flood in Johnstown, Pennsylvania, in 1889, when due to extreme rainfall, a dam gave way and released 20 million tons of water, causing the death of more than 2,200 people.

CONSEQUENCES OF FLOODS

Although floods are a natural phenomenon, their effects on people, the economy and the environment are enormous. From 1998 to 2017, more than 2 billion people around the world were affected by floods, and that number continues to rise due to increasingly unstable weather conditions. Floods, especially rapid ones, can devastate the entire city and urban environment.

Throughout history, many people have lost their lives due to flash floods, or incidents caused by severe natural disasters, such as landslides and infrastructure collapse.

5 ključnih ekoloških pitanja

Istražujemo ključne ekološke probleme i razmatramo moguća rešenja

Savremeni svet suočava se sa ozbiljnim ekološkim izazovima koji prete dobrobiti naše planete.

Rast svetske populacije, potreba za sve većim resursima i energetskim izvorima, kao i naš odnos prema prirodi postaju gorući problemi. U ovom članku, istražićemo pet ključnih ekoloških problema i razmotriti moguća rešenja.

UNIŠTAVANJE ŠUMA

Iako je tokom poslednjih deset godina globalna stopa uništavanja šuma opala, Amazonija se suočava sa porastom od 47 odsto u 2018. godini. Ove šume igraju ključnu ulogu u proizvodnji kiseonika i održavanju ravnoteže ugljeničnog ciklusa. Uništavanje šuma i „efekat ruba" koji nastaje gubicima njihovih malih delova dovode do značajnog gubitka ugljenika, što ugrožava aktuelne politike zaštite životne sredine.

ZAGAĐENJE VAZDUHA

Najveći izvor zagađenja vazduha je ljudska aktivnost, uključujući emisije štetnih gasova iz vozila, grejanje i hlađenje domova, sagorevanje fosilnih goriva za proizvodnju električne energije i druge aktivnosti. Loše urbanističko planiranje, koje rezultira povećanom upotrebom individualnih vozila, dodatno pogoršava problem. Ovo zagađenje dovodi do ozbiljnih zdravstvenih problema, uključujući bolesti respiratornog sistema.

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Five Key Environmental Issues

We investigate key environmental problems and consider possible solutions

The modern world faces serious environmental challenges that threaten the well-being of our planet.

The growth of the world's population, the need for more and more resources and energy sources, as well as our relationship with nature, are becoming pressing problems. In this article, we will explore five key environmental problems and consider possible solutions.

DEFORESTATION

Although the global rate of deforestation has declined over the past ten years, the Amazon is facing a 47 percent increase in 2018. These forests play a key role in producing oxygen and maintaining the balance of the carbon cycle.

Deforestation and the „edge effect" resulting from the loss of small parts of forests lead to a significant loss of carbon, which threatens current environmental protection policies.

AIR POLLUTION

The largest source of air pollution is human activity, including emissions from vehicles, heating and cooling homes, burning fossil fuels for electricity generation, and other activities. Poor urban planning, which results in increased use of individual vehicles, further exacerbates the problem. This pollution leads to serious health problems, including diseases of the respiratory system.

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Zagađenje vode

Iako Zemlja obiluje vodom (oko 71 odsto površine planete pokriveno je vodom), samo 3 odsto čini slatka voda, a baš ona postaje sve više zagađena toksinima i hemikalijama iz poljoprivrede. Prema Nacionalnom savetu za prirodne resurse, oko 80 odsto otpadnih voda ispušta se nazad u okolinu bez prečišćavanja, što ozbiljno ugrožava našu vodu.

GLOBALNO ZAGREVANJE

Tokom pandemije 2020. godine, smanjenje emisija gasova koji izazivaju efekat staklene bašte privremeno je poboljšalo stanje. Međutim, i dalje se suočavamo sa ozbiljnim posledicama globalnog zagrevanja, uključujući ekstremne vremenske uslove poput poplava i požara, kao i gubitak staništa za mnoge vrste.

ISCRPLJIVANJE PRIRODNIH RESURSA

Prirodni resursi igraju ključnu ulogu u svetskom ekonomskom rastu, ali mnogi od njih su ograničeni i iscrpljuju se brže nego što mogu da se obnove. Ovo se odnosi na resurse kao što su šume, fosilna goriva, minerali i mnogi drugi.

Naša zavisnost o tim resursima zahteva promišljene mere zaštite i obnavljanja kako bismo očuvali ravnotežu.

Rešenja

- **Da bismo se suočili sa ovim izazovima, potrebna je promena načina na koji koristimo resurse i oblikujemo politike zaštite životne sredine.**
- **Razvoj održivih izvora energije, promocija energetske efikasnosti i očuvanje šuma su deo odgovora.**
- **Istraživanje i primena tehnologija koje smanjuju zagađenje vode i kontrolu kvaliteta vazduha su presudni za borbu protiv zagađenja.**
- **Poslovi u oblastima zaštite životne sredine, obnovljivih izvora energije i ekoloških nauka predstavljaju bitnu kariku u rešavanju ovih problema.**
- **Promovisanje principa „smanji, ponovo koristi, recikliraj" takođe je od suštinskog značaja kako bismo smanjili pritisak na resurse.**
- **Kroz obrazovanje i poslove usmerene ka zaštiti životne sredine, možemo postati deo rešenja i doprineti očuvanju naše planete za buduće generacije.**

Water pollution

Although the Earth is abundant with water (about 71 percent of the planet's surface is covered by water), only 3 percent is fresh water, and this water is becoming more and more polluted by toxins and chemicals from agriculture. According to the National Council for Natural Resources, about 80 percent of wastewater is released into the environment without treatment, seriously endangering our water resources.

GLOBAL WARMING

During the 2020 pandemic, reduction of greenhouse gas emissions temporarily improved the situation. However, we still face serious consequences of global warming, including extreme weather conditions such as floods and fires, as well as habitat loss for many species.

DEPLETION OF NATURAL RESOURCES

Natural resources play a key role in the world's economic growth, but many of them are finite and they are depleted faster than they can be renewed. This applies to resources such as forests, fossil fuels, minerals, and many others.

Our dependence on these resources requires thoughtful protection and restoration measures in order to maintain balance.

Solutions

- **It is necessary to change the way we use resources and shape environmental policies so as to meet these challenges.**
- **The development of sustainable energy sources, the promotion of energy efficiency and the preservation of forests are parts of the answer.**
- **Research and application of technologies that reduce water and air pollution are crucial for the fight against pollution.**
- **Jobs in the fields of environmental protection, renewable energy sources and ecological sciences represent an important link in solving these problems.**
- **Promoting the principle of „reduce, reuse, recycle" is also essential in order to reduce the pressure on resources.**
- **Through education and jobs aimed at protecting the environment, we can become part of the solution and contribute to the preservation of our planet for future generations.**

Hibridne platforme

Hibridni sistemi otvaraju novo poglavlje u potrazi za čistim i efikasnim energetskim rešenjima u svetu

Hibridne platforme za proizvodnju obnovljive energije u ofšor (morskim) okruženjima postaju sve značajnije u svetu energetike. Više od dvanaest tehnoloških kompanija, među kojima se ističu Floating Power Plant iz Danske, Marine Power Systems iz Ujedinjenog Kraljevstva i Pelagic Power iz Norveške, radi na razvoju ovih inovativnih sistema. Ideja je jednostavna, ali i revolucionarna - iskoristiti plutajuće vetroelektrane kao platforme za različite izvore obnovljive energije, uključujući talasnu energiju, solarnu energiju i konverziju energije okeanske termodinamike.

Ključna prednost hibridnih platformi leži u povećanju energetskog prinosa po jedinici površine, što može rezultirati smanjenjem ukupnih troškova električne energije.

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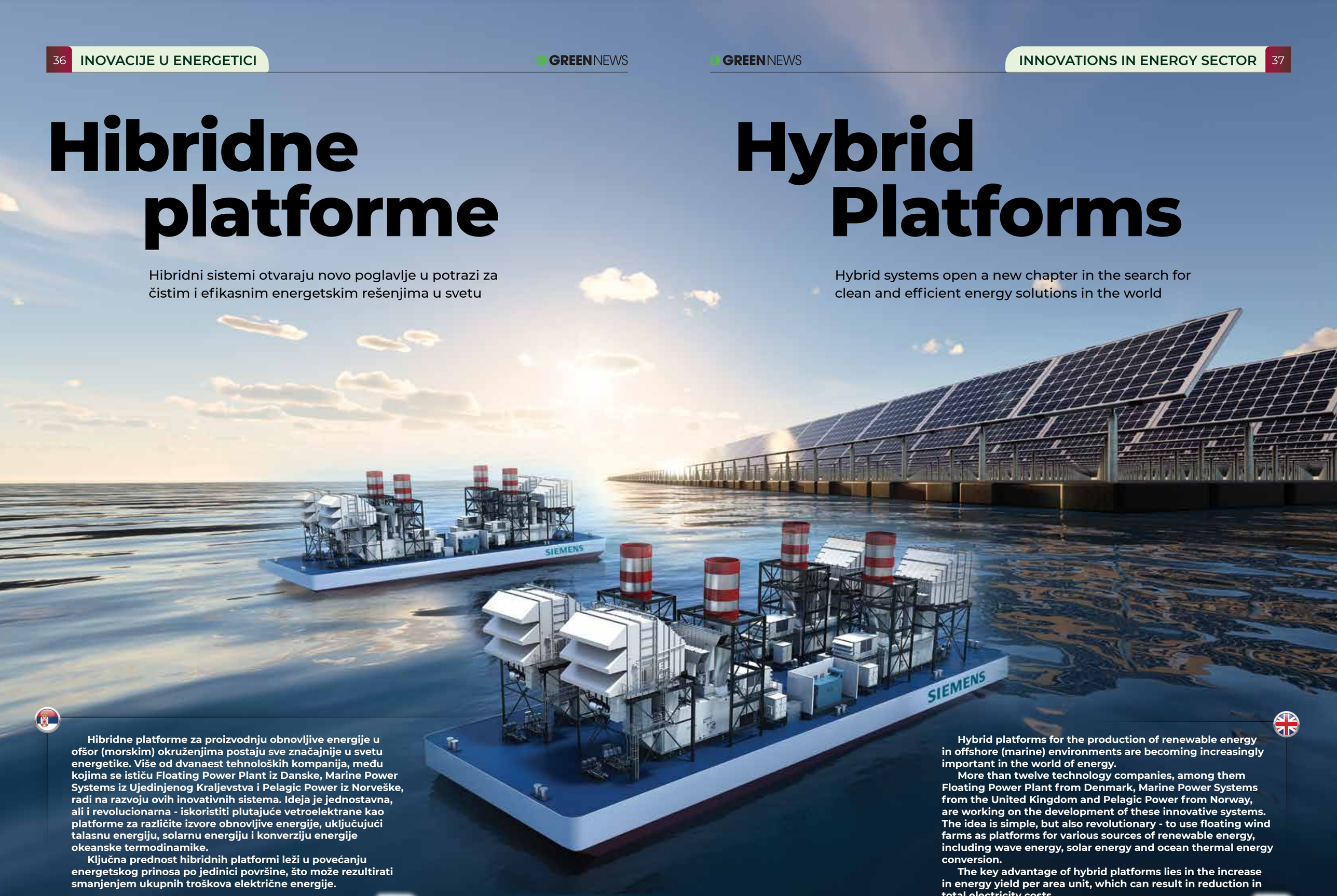
Hybrid Platforms

Hybrid systems open a new chapter in the search for clean and efficient energy solutions in the world



Hybrid platforms for the production of renewable energy in offshore (marine) environments are becoming increasingly important in the world of energy.

More than twelve technology companies, among them Floating Power Plant from Denmark, Marine Power Systems from the United Kingdom and Pelagic Power from Norway, are working on the development of these innovative systems. The idea is simple, but also revolutionary - to use floating wind farms as platforms for various sources of renewable energy, including wave energy, solar energy and ocean thermal energy conversion.

The key advantage of hybrid platforms lies in the increase in energy yield per area unit, which can result in reduction in total electricity costs.

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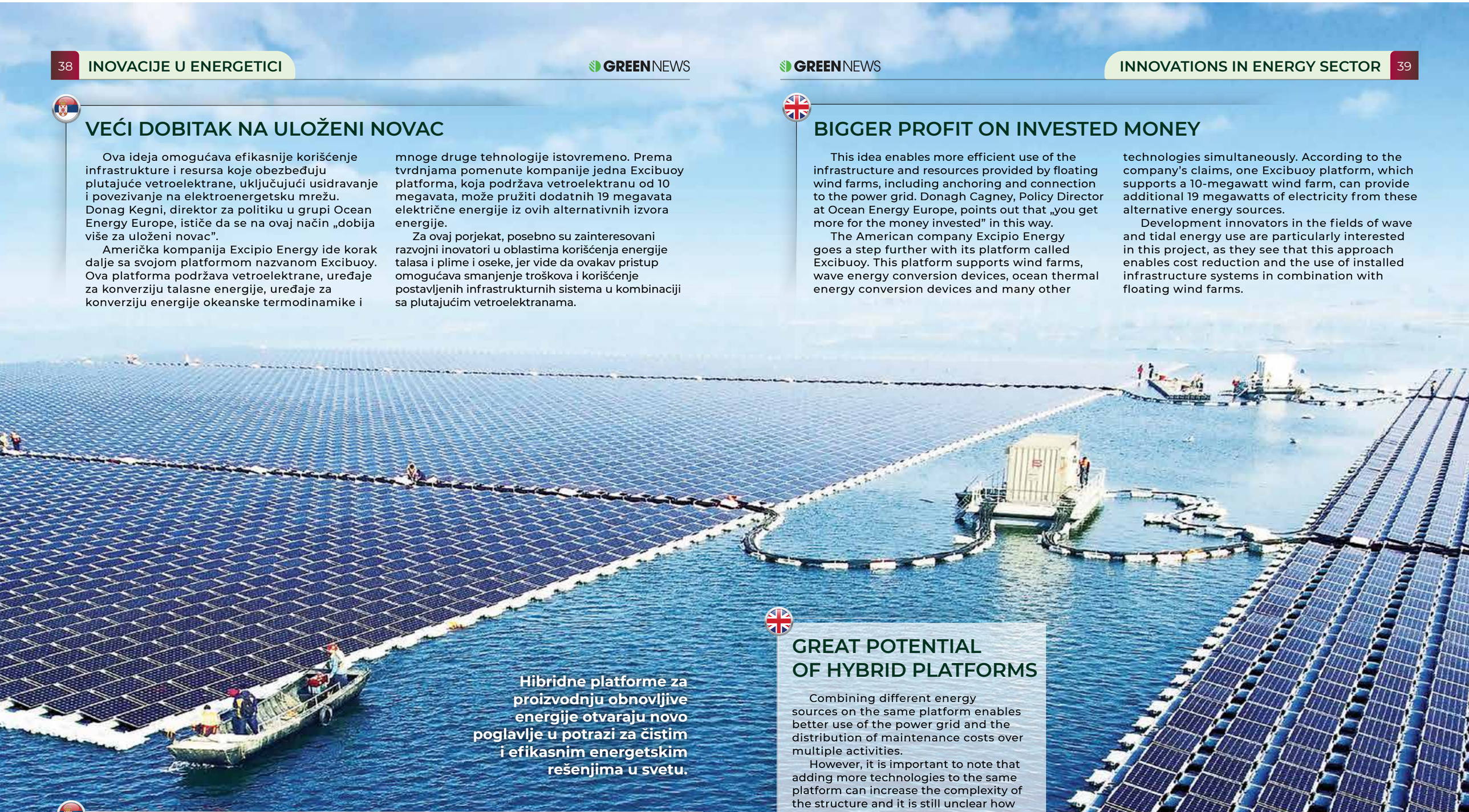
VEĆI DOBITAK NA ULOŽENI NOVAC

Ova ideja omogućava efikasnije korišćenje infrastrukture i resursa koje obezbeđuju plutajuće vetroelektrane, uključujući usidravanje i povezivanje na elektroenergetsku mrežu. Donag Kegni, direktor za politiku u grupi Ocean Energy Europe, ističe da se na ovaj način „dobija više za uloženi novac".

Američka kompanija Excipio Energy ide korak dalje sa svojom platformom nazvanom Excibuoy. Ova platforma podržava vetroelektrane, uređaje za konverziju talasne energije, uređaje za konverziju energije okeanske termodinamike i mnoge druge tehnologije istovremeno. Prema tvrdnjama pomenute kompanije jedna Excibuoy platforma, koja podržava vetroelektranu od 10 megavata, može pružiti dodatnih 19 megavata električne energije iz ovih alternativnih izvora energije.

Za ovaj porjekat, posebno su zainteresovani razvojni inovatori u oblastima korišćenja energije talasa i plime i oseke, jer vide da ovakav pristup omogućava smanjenje troškova i korišćenje postavljenih infrastrukturnih sistema u kombinaciji sa plutajućim vetroelektranama.



Hibridne platforme za proizvodnju obnovljive energije otvaraju novo poglavlje u potrazi za čistim i efikasnim energetskim rešenjima u svetu.

VELIKI POTENCIJAL HIBRIDNIH PLATFORMI

Kombinovanje različitih izvora energije na istoj platformi omogućava bolju upotrebu elektroenergetske mreže i raspodelu troškova održavanja na više aktivnosti.

Međutim, važno je napomenuti da dodavanje više tehnologija na istu platformu može povećati složenost strukture i još uvek nije jasno koliko smanjenje troškova može da se postigne. Zbog toga većina razvojnih kompanija smatra da će glavna vrednost hibridnih platformi doći iz već razvijenih tehnologija, najčešće iz oblasti plutajućih vetroelektrana.

Hibridne platforme su još uvek u razvoju, ali ukoliko se uspešno postigne ekonomska efikasnost i smanjenje troškova proizvodnje električne energije, mogu da postanu ključni faktor u proizvodnji obnovljive energije u morskim okruženjima.

BIGGER PROFIT ON INVESTED MONEY

This idea enables more efficient use of the infrastructure and resources provided by floating wind farms, including anchoring and connection to the power grid. Donagh Cagney, Policy Director at Ocean Energy Europe, points out that „you get more for the money invested" in this way.

The American company Excipio Energy goes a step further with its platform called Excibuoy. This platform supports wind farms, wave energy conversion devices, ocean thermal energy conversion devices and many other technologies simultaneously. According to the company's claims, one Excibuoy platform, which supports a 10-megawatt wind farm, can provide additional 19 megawatts of electricity from these alternative energy sources.

Development innovators in the fields of wave and tidal energy use are particularly interested in this project, as they see that this approach enables cost reduction and the use of installed infrastructure systems in combination with floating wind farms.

GREAT POTENTIAL OF HYBRID PLATFORMS

Combining different energy sources on the same platform enables better use of the power grid and the distribution of maintenance costs over multiple activities.

However, it is important to note that adding more technologies to the same platform can increase the complexity of the structure and it is still unclear how much cost reduction can be achieved. Therefore, most development companies believe that the main value of hybrid platforms will come from already developed technologies, most often from the field of floating wind farms.

Hybrid platforms are still under development, but if economic efficiency and reduction of electricity production costs can be successfully achieved, they can become a key factor in the production of renewable energy in marine environments.

EFIKASNO ENERGETSKO REŠENJE

Ovaj razvoj ukazuje na potencijalnu revoluciju u energetskoj industriji koja bi koristila resurse vetrova, talasa, plime i oseke, i sunca kako bi obezbedila održivu energiju za budućnost. Hibridne platforme za proizvodnju obnovljive energije otvaraju novo poglavlje u potrazi za čistim i efikasnim energetskim rešenjima u svetu.

EFFECTIVE ENERGY SOLUTION

This development indicates a potential revolution in the energy sector that would use wind, wave, tidal, and solar resources to provide sustainable energy for the future. Hybrid platforms for the production of renewable energy open a new chapter in the search for clean and effective energy solutions in the world.

Borko Torbica

PREDSEDNIK UPRAVE IEE CORPORATION

Održivost je početna tačka svega

„Zemlju nismo nasledili od predaka, već smo je posudili od svoje dece. Ova duboka istina uvek je prisutna u mom umu i vodi svaku odluku koju donosim” - ističe u intervjuu za Green News Borko Torbica, predsednik Uprave IEE Corporation

Ovaj intervju se odvija u posebnom trenutku - obeležavanju 15 godina postojanja korporacije na čijem je čelu. Tokom ovog perioda, IEE Corporation je ostvario značajne uspehe u energetici i zaštiti životne sredine, realizujući više od 200 projekata uz strogo poštovanje principa održivosti.

Gospodin Torbica je čvrsti pobornik ideje da energetski održivi projekti, koji ispunjavaju najviše ekološke standarde i ESG zahteve, trebaju biti deo naše budućnosti.

Pridružite nam se u razgovoru o poslovnom putu kompanije IEE Corporation i viziji modernog doba energetike.

GN ***Svaka poslovna priča počinje idejom. Kada i kako je rođena ideja o osnivanju IEE Corporation?***

Naša poslovna priča ima svoje korene u 2008. godini, vremenu koje je bilo ključno za oblikovanje naše budućnosti. U to doba, bili smo angažovani na revitalizaciji rasklopnog postrojenja 400/220/110/x kV u Trebinju, što je bio projekat od velikog značaja. Postoje upravo ti ključni trenuci na projektu za koje shvatite da su odlučujući - za vreme izgradnje trafostanice u Trebinju donosili smo važna tehnička rešenja koja su uticala ne samo na uspeh projekta, već i na našu celokupnu organizaciju. Tada smo shvatili da je potrebno napraviti korak dalje - preći iz izvođenja u inženjering. Ova odluka se pokazala kao prekretnica u našem razvoju. Od tog trenutka, postavili smo novu viziju razvoja, viziju koja je bila inicijalna iskra u početku rada IEE Corporation.

GN ***Gde je IEE Corporation danas? Koji su ključni aspekti vašeg poslovanja?***

IEE Corporation danas je globalni partner za razvoj investicija u oblasti čiste energije. Proteklih 15 godina, posvećeni smo stvaranju inovativnih rešenja za budućnost u oblasti čiste energije i racionalne upotrebe resursa.

Ponekad volimo da kažemo da smo arhitekte održive budućnosti. Sedište kompanije nalazi se u Londonu, a naša ekspertiza obuhvata segmente energetike od hidro, vetro i solarnih postrojenja, do termoenergetike i naprednih pametnih infrastrukturnih projekata, kao i industrijskih rešenja bez emisije CO2. Naš multidisciplinarni tim poseduje ‚know-how’ i integritet za razvoj celokupnog životnog ciklusa projekta i ekspertizu evropske klase sa više od 200 referenci. IEE Corporation je od svojih početaka do danas postao sinonim za inovacije, integritet i izuzetnost u svetu obnovljive energije.

GN ***Koji su vaši najveći aktuelni projektni izazovi? I na koje projekte iz vašeg portfolija ste posebno ponosni?***

Imamo privilegiju da radimo na nekoliko izuzetno izazovnih projekata u ovom trenutku. Jedan od najkompleksnijih je svakako razvoj, projektovanje i tehnička harmonizacija dokumentacije za projekat izgradnje hidroelektrane Dabar snage 159 MW, pod rukovodstvom tima IEE-a Consult. Paralelno s tim, vršimo složeni proces revitalizacije Tehničko-ekonomskog bloka Univerzitetskog Kliničkog centra Banjaluka, kojim rukovodi IEE Technology. Ova dva izazova su tek deo od ukupno 35 projekata koje trenutno imamo u realizaciji.

Reference su potvrda snage i stručnosti - one govore sve. Kada se osvrnemo unazad, s posebnim ponosom gledamo na činjenicu da smo bili važan link u realizaciji projekata izgradnje solarne elektrane Morgavel (49 MW) u Portugalu, vetroelektrane Čibuk 1 (158 MW) u Srbiji, trafostanice Vietas u Švedskoj, revitalizacije hidroelektrane Zvornik (130 MW) i mnogih drugih projekata koji danas uspešno pulsiraju na energetskoj mapi Evrope.

Svaki novi projekat je izazov, on je prilika da rastemo, inoviramo i nastavljamo da pružamo izuzetnu vrednost našim poslovnim partnerima. Jedno je sigurno, bez poverenja i saradnje sa našim investitorima i dobavljačima, s kojima kontinuirano razmenjujemo znanje, ne bismo mogli da postignemo ovakav obim posla.

GN ▶▶▶

Na projektu High Speed 2 / On the High Speed 2 project

Foto: IEE Corporation


Foto: IEE Corporation

Borko Torbica, predsednik Uprave IEE Corporation /
Borko Torbica, President of the Board of IEE Corporation

Borko Torbica

PRESIDENT OF THE BOARD OF IEE CORPORATION

Sustainability is the Starting Point of Everything

„We did not inherit the earth from our ancestors, but have borrowed it from our children. This deep truth is always present in my mind and guides every decision I make" - points out in an interview for Green News Borko Torbica, President of the Board of IEE Corporation.

This interview takes place at a special moment – marking the 15th anniversary of the corporation he heads. During this period, IEE Corporation has achieved significant successes in the energy sector and environmental protection, realizing more than 200 projects with strict adherence to sustainability principles.

Mr. Torbica is a firm supporter of the idea that energy sustainable projects that meet the highest environmental standards and ESG requirements should be part of our future.

Join us in conversation about the business journey of IEE Corporation so far and the vision of the modern energy era.

GN ***Every business story starts with an idea. When and how was the idea of founding IEE Corporation born?***

Our business story had its roots in 2008, a time that was crucial for shaping our future. At that time, we were engaged in the revitalization of the switching facility 400/220/110/x kV in Trebinje, which was a project of great importance. There are those key moments on the project that you realize are decisive - during the construction of the substation in Trebinje, we brought important technical solutions that affected not only the success of the project, but also our entire organization. Then, we realized that it was necessary to take a step further - to move from performing to engineering. This decision proved to be a turning point in our development. From that moment, we set a new vision for development, a vision that was the initial spark at the beginning of IEE Corporation.

GN ***Where is IEE Corporation today? What are the key aspects of your business?***

Today, IEE Corporation is global partner for the development of clean energy investments. For the past 15 years, we have been dedicated to creating innovative solutions for the future within clean energy and rational use of resources.

We sometimes like to say that we are architects of a sustainable future. The company's headquarters is located in London, and our expertise includes energy segments from hydro, wind and solar plants, to thermal energy and advanced smart infrastructure projects, as well as industrial solutions without CO2 emissions. Our multidisciplinary team has the know-how and integrity to develop the entire project life cycle and European-class expertise with more than 200 references. From its beginnings, IEE Corporation has become a synonym for innovation, integrity and excellence in the world of renewable energy.

GN ***What are your current biggest project challenges? Which projects from your portfolio are you particularly proud of?***

We are privileged to be working on several extremely challenging projects at the moment. One of the most complex is certainly the development, design and technical documentation harmonization for the project of construction of Dabar hydropower plant of 159 MW, under the leadership of the IEE Consult team. At the same time, we are carrying out a complex process of revitalization of the technical-economic block of the University Clinical Center of Banja Luka, managed by IEE Technology. These two challenges are only part of a total of 35 projects that we are currently realising.

References are a confirmation of strength and expertise - they say everything. When we look back, we are especially proud of the fact that we were an important link in the implementation of the construction projects of the Morgavel solar power plant (49 MW) in Portugal, the Čibuk 1 wind power plant (158 MW) in Serbia, the Vietas substation in Sweden, the revitalization of the Zvornik hydropower plant (130 MW) and many other projects that successfully pulsate on the energy map of Europe today.

Borko Torbica

PREDSEDNIK UPRAVE IEE CORPORATION

Svaka uspešna kompanija nosi u sebi poseban element koji je izdvaja od konkurencije. Šta je komparativna prednost IEE Corporationa?

Mi smo fokusirani na održivu budućnost. Naša jedinstvena snaga proizlazi iz našeg pristupa učenju kroz projekte i bogatog iskustva koje smo stekli suočavajući se s brojnim tehničkim izazovima u njihovoj realizaciji. Ovo nam daje duboko razumevanje i sveobuhvatnu sliku svakog objekta na kome radimo, što je nešto što ne možete postići ako ste samo projektant ili samo izvođač. Ovakva perspektiva omogućava nam da pružimo izuzetnu vrednost našim klijentima, jer smo u stanju da sagledamo sve aspekte projekta i prilagodimo se bilo kojem izazovu koji se pojavi. Ova sposobnost prilagođavanja i fleksibilnost i čini nas istinski jedinstvenim na tržištu. Naša strast za stalnim učenjem i usavršavanjem je ono što nas pokreće. To je ono što nas izdvaja.

ESG standard (enviromental, social i governance) su prioritet u vašoj kompaniji. Kako to postižete?

Tokom prethodnih 15 godina, imali smo priliku da razvijamo, projektujemo i izgradimo više od 200 značajnih projekata u energetici i zaštiti životne sredine, stavljajući održivost u prvi plan. Čvrsto verujemo da samo energetski održivi projekti, sa najvišim ekološkim standardima koji ispunjavaju sve ESG zahteve, mogu biti deo naše odobrene liste projekata.

Balansirati poslovne ciljeve i ESG standarde jeste izazov, ali vrednosti održivosti su duboko ukorenjene u našem radu i kulturi. Ovakav pristup zahteva vrhunski tim, a mi smo izuzetno ponosni na naše kolege koje svakodnevno čine taj balans mogućim. Njihova stručnost je ključna u ostvarivanju naših ciljeva bez kompromisa u domenu ESG standarda.

U našem ESG portfoliju posebno mesto pripada projektu izgradnje toplane na biomasu Eko toplane Banjaluka, snage 49 MW. O značaju projekta možda najbolje govori činjenica da je njegovom implementacijom emisija CO2 smanjena za 500.000 tona. Ponosni smo na to što je projekat, koji je i naša investicija, osvojio brojne međunarodne nagrade u oblasti održive energije i zvanično u Štokholmu pozicionirao Banjaluku među evropske “zelene” metropole.

Ovdje bih istakako još i to da posvećenost ESG principima nije samo deo naše strategije za uspeh, već i naša obaveza prema budućim generacijama. Stvaranju održive budućnosti pristupamo sa posebnom motivacijom i to je ono što nas vodi napred.

Vaša kompanija ima izutetno širok portfolio u oblastima energetike i ekologije...

Da, naše kompanije IEE Consult i IEE Technology, koje su deo IEE holdinga, zaista imaju širok portfolio u oblastima energetike i ekologije. IEE Consult je naša vodeća elektroenergetska kompanija koja pokriva širok spektar sektora, uključujući hidroenergiju, vetroenergiju, solarnu energiju, trafostanice, dalekovode, industriju i digitalne tehnologije. Snažnom posvećenošću izgradnji produktivnih partnerstava sa investitorima, ona razvija i upravlja projektima sa energijom koja daleko nadmašuje uobičajene poslovne norme.

Sa druge strane, IEE Technology je naša inovativna snaga koja donosi inovacije u termoenergetici, hidroenergetici, ekologiji i mehatronici. Ona je naša prva linija u pružanju rešenja koja ne samo da zadovoljavaju trenutne energetske potrebe, već i pomažu u oblikovanju održive energetske budućnosti.

Naš široki portfolio u ovim oblastima je odraz naše sposobnosti da se prilagodimo, inoviramo i vodimo. Predano radimo na tome da budemo korak ispred, pružajući rešenja koja su u skladu sa trenutnim i budućim potrebama sektora energetike i ekologije.

Kako IEE Corporation pristupa izazovima zelene tranzicije u Evropi i kakva je vaša OIE strategija?

U IEE Corporationu smo snažno posvećeni zelenoj tranziciji Evrope i postizanju ciljeva energetske zajednice EU, te se svakodnevno borimo protiv globalnog zagrevanja planete. Ovi principi su duboko ukorenjeni u našoj Strategiji razvoja do 2030. i vode nas ka ostvarivanju naše misije.
Svesni smo da potreba za obnovljivom energijom rapidno raste. Nema nikakvog spora oko toga da energetska budućnost planete mora biti zelena i mi svaki dan radimo na povećanju kapaciteta obnovljivih izvora energije.

Naša stručnost u oblasti obnovljivih izvora energije prepoznata je na domaćem i evropskom tržištu, što nas čini ponosnim. Održivost! Ona je za nas u IEE Corporation početak svega. Ona je temelj na kojem gradimo našu viziju, misiju i svaki projekat kojim doprinosimo zelenijoj i održivijoj budućnosti.

Kada pogledate u budućnost gde vidite IEE?

Uvek volimo da gledam tri koraka ispred sebe, tako da je i misija naše kompanije jasna - kreiramo projekte koji će biti temelji za budućnost generacija koje dolaze. U doba kada su moderne tehnologije transformisale našu svakodnevicu u arenu inovacija, osećaj da smo njen važan deo je zaista neizmerno vredan.

Ta prilika da oblikujemo budućnost je naša najveća motivacija i izazov. Kroz naše radove, usredsređeni smo na čiste energetske tehnologije, na dolazak digitalnog doba, na elektromobilnost i upotrebu energije vodoničkih ćelija.

Vidimo sebe kao predvodnike u integraciji našeg znanja i stručnosti u veliki projekat digitalne energetike - ENYDEX. Svesni smo izazova koje nam postavljaju deregulisana proizvodnja energije, dinamično tržište koje ne prepoznaje nacionalne granice i energetski uslovi koji zahtevaju stabilno, sigurno i kvalitetno napajanje bez naponskih i strujnih distorzija, stabilne frekvencije bez flikera i viših harmonika. Ali upravo su to izazovi za koje mi u IEE-u stvaramo rešenja. Naša budućnost leži u stalnom inoviranju i prilagođavanju, sa ciljem da stvorimo energetske sisteme za vreme koje dolazi.

Borko Torbica

PRESIDENT OF THE BOARD OF IEE CORPORATION

Foto: IEE Corporation

IEE tim na proslavi jubileja kompanije / The IEE team at the company’s jubilee celebration

Every new project is a challenge, it is an opportunity to grow, innovate and continue to provide exceptional value to our business partners. One thing is certain, without trust and cooperation with our investors and suppliers, with whom we continuously exchange knowledge, we would not be able to manage this workload.

Every successful company has a special element that sets it apart from the competition. What is IEE Corporation’s comparative advantage?

We are focused on a sustainable future. Our unique strength comes from our approach to learning through projects and the rich experience we have gained by facing numerous technical challenges in their implementation. This gives us deep understanding and a comprehensive picture of every facility we work on, which is something you cannot achieve if you are just a designer or just a contractor. This perspective allows us to provide exceptional value to our clients, as we are able to look at all aspects of a project and adapt to any challenge that arises. This adaptability and flexibility makes us truly unique in the market. Our passion for constant learning and improvement is what drives us. That’s what sets us apart.

ESG (environmental, social and governance) standards are a priority in your company. How do you achieve it?

Over the past 15 years, we have had the opportunity to develop, design and build more than 200 significant projects in the energy sector and environmental protection, putting sustainability at the forefront. We firmly believe that only energetically viable projects, with the highest environmental standards that meet all ESG requirements, can be part of our approved list of projects.

The balancing of business goals and ESG standards is a challenge, but sustainability values are deeply rooted in our work and culture. This approach requires a top team, and we are extremely proud of our colleagues who make this balance possible every day. Their expertise is crucial in achieving our goals without compromise in the field of ESG standards.

In our ESG portfolio, there is a special place for the construction of a biomass project of Eco Heating Plant of Banja Luka of 49 MW. The importance of the project is perhaps best illustrated by the fact that its implementation has reduced CO2 emissions by 500,000 tons. We are proud that the project, which is also our investment, has won numerous international awards in the field of sustainable energy and officially

Borko Torbica

PRESIDENT OF THE BOARD OF IEE CORPORATION

positioned Banja Luka among the European „green" metropolises in Stockholm.

I would also like to point out here that the commitment to ESG principles is not only part of our strategy for success, but also our obligation to future generations. We approach the creation of a sustainable future with special motivation and that is what drives us forward.

GN ***Your company has an exceptionally broad portfolio in the fields of energy and ecology...***

Yes, our companies IEE Consult and IEE Technology, which are part of IEE Holding, really have a broad portfolio in the fields of energy and ecology. IEE Consult is our leading power company covering a wide range of sectors, including hydropower, wind power, solar power, substations, transmission lines, industry and digital technologies. With a strong commitment to building up productive partnerships with investors, it develops and manages energy projects that by far exceed usual business norms.

On the other hand, IEE Technology is our innovative force that brings innovations in thermoenergetics, hydroenergetics, ecology and mechatronics. It is first line in providing solutions that not only meet current energy needs, but also help shape a sustainable energy future.

Our broad portfolio in these areas is a reflection of our ability to adapt, innovate and lead. We are dedicated to being one step ahead, providing solutions that are in accordance with the current and future needs of the energy and environmental sectors.

GN ***How does IEE Corporation approach the challenges of the green transition in Europe, and what is your RES strategy?***

At IEE Corporation, we are strongly committed to the green transition of Europe and the achievement of the goals of the EU Energy Community, and we fight against global warming every day. These principles are deeply rooted in our Development Strategy until 2030 and guide us towards achieving our mission.

We are aware that the need for renewable energy is growing rapidly. There is no dispute that the energy future of the planet must be green and we work every day to increase the capacity of renewable energy sources. Our expertise in the field of renewable energy sources is recognized on the domestic and European markets, which makes us proud. Sustainability! It is the beginning of everything for us at IEE Corporation. It is the foundations on which we build our vision, mission and every project by which we contribute to a greener and more sustainable future.

GN ***When you look into the future, where do you see IEE Corporation?***

We always like to look three steps ahead, so the mission of our company is clear - we create projects that will be the foundations for the future of generations to come. In an age when modern technologies have transformed our everyday life into an arena of innovation, the feeling that we are an important part of it is truly invaluable. This opportunity to shape the future is our greatest motivation and challenge. Through our work, we are focused on clean energy technologies, the arrival of the digital age, electromobility, and the use of hydrogen cell energy.

We see ourselves as leaders in the integration of our knowledge and expertise into a large digital energy project - ENYDEX. We are aware of the challenges posed by deregulated energy production, a dynamic market that does not recognize national borders, and energy conditions that require stable, safe and quality power supply without voltage and current distortions, stable frequency without flicker, and higher harmonics. But these are precisely the challenges for which we create solutions at IEE Corporation. Our future lies in constant innovation and adaptation, with the aim of creating energy systems for the time to come.

GN

Renewable energy sources are not only cleaner, but also cheaper and easier to produce than any fossil fuel

Renewable Energy

DID YOU KNOW?

Obnovljivi izvori energije nisu samo čistiji, već i jeftiniji i lakši za proizvodnju od bilo kojeg fosilnog goriva

Obnovljiva energija

DA LI STE ZNALI?

GN

Obnovljiva energija

Obnovljivi izvori energije su neiscrpni. Za razliku od fosilnih goriva čija proizvodnja zahteva ogromne napore, vreme i skupu tešku mehanizaciju, oni direktno pretvaraju prirodne resurse poput sunca, vetra, vode ili biomase u električnu energiju. Još jedan bitan faktor koji obnovljivu energiju čini mnogo privlačnijom od uglja, nafte i prirodnog gasa je njihov znatno manji ekološki otisak. Obnovljivi izvori energije nisu samo čistiji već i jeftiniji i lakši za proizvodnju od bilo kojeg fosilnog goriva. Nudimo vam sedam zanimljivih činjenica o obnovljivoj energiji u vezi sa trenutnim stanjem na tržištu i kakvu će ulogu ovi čisti izvori igrati u budućnosti.

DA LI STE ZNALI?

38%

SVETSKE ELEKTRIČNE ENERGIJE GENERISALI SU OBNOVLJIVI IZVORI

U 2021. godini, svi glavni čisti izvori - hidroelektrična, solarna, energija vetra, biomasa i geotermalna energija - zajedno su generisali 38 odsto svetske električne energije, obeležavajući rekordnu godinu za čiste izvore energije. Premašili su količinu energije proizvedene od uglja - koja se zaustavila na 36,5 odsto iste godine, uprkos rekordnom rastu od 9 odsto, najbržem godišnjem rastu u proizvodnji energetike na bazi uglja od 1985. godine.

Međutim, većina svetske električne energije i dalje dolazi iz neobnovljivih izvora. U 2021. godini, globalna potražnja za električnom energijom povećala se za 5,4 odsto, najveći rast od 2010. godine. Bez obzira na rekordan rast proizvodnje energije iz vetra i solarnih panela, čista električna energija nije se dovoljno brzo razvijala da bi sustigla brzi rast globalne potražnje, veći deo koji je opet zadovoljen fosilnim gorivima. Samo proizvodnja uglja činila je 59 odsto ukupnog rasta. Stručnjaci tvrde da to pokazuje koliko je daleko prelazak na obnovljivu energiju.

VETAR I SOLARNA ENERGIJA SU NAJBRŽE RASTUĆI OBNOVLJIVI IZVORI

U 2021. godini, najbrže rastući izvori čiste energije bili su vetar i solarna energija, čiji se udeo udvostručio od kada je potpisan Pariski sporazum 2015. godine. Samo u roku od godinu dana, solarna energija porasla je za 23 odsto u odnosu na 2020. godinu, dok je električna energija proizvedena vetroelektranama doživela rast od 14 odsto. Prvi put su solarni paneli i vetroelektrane generisali više od 10 odsto globalne potražnje za električnom energijom. Prema istraživanju kompanije Ember, ova dva čista izvora energije doživela su prosečan godišnji rast od 20 odsto. Da bi se postigao put od 1,5°C do 2030. godine, tvrde istraživači kompanije Ember, takve visoke stope rasta treba održavati tokom tekuće decenije.

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Renewable Energy

Renewable energy sources are inexhaustible. Unlike fossil fuels, whose production requires enormous efforts, time and expensive heavy machinery, they directly convert natural resources such as sun, wind, water or biomass into electricity. Another important factor that makes renewable energy much more attractive than coal, oil and natural gas is their significantly smaller environmental footprint. Renewable energy sources are not only cleaner but also cheaper and easier to produce than any fossil fuel. We offer you seven interesting facts about renewable energy regarding the current state of the market and what role these clean sources will play in the future.

DID YOU KNOW?

38%

OF THE WORLD'S ELECTRICITY WAS GENERATED FROM RENEWABLE ENERGY SOURCES

In 2021, all major clean sources - hydropower, solar, wind, biomass, and geothermal energy - together generated 38 percent of the world's electricity, marking a record year for clean energy sources. They surpassed the amount of power generated by coal - which stalled at 36.5 percent in the same year, despite record growth of 9 percent, the fastest annual growth in coal-fired power generation since 1985.

However, most of the world's electricity still comes from non-renewable sources. In 2021, global electricity demand increased by 5.4 percent, the largest increase since 2010. Despite the record growth in energy production from wind and solar panels, clean electricity has not developed fast enough to keep up with the rapid growth in global demand, much of which is again met by fossil fuels. Coal production alone accounted for 59 percent of the total growth. Experts say this shows how far the transition to renewable energy is.

WIND AND SOLAR ENERGY ARE THE FASTEST GROWING RENEWABLE SOURCES

In 2021, the fastest growing sources of clean energy were wind and solar energy, whose share has doubled since the Paris Agreement was signed in 2015. In just one year, solar energy grew by 23 percent compared to 2020, while electricity generated by wind farms experienced a 14 percent increase. For the first time, solar panels and wind farms generated more than 10 percent of global electricity demand. According to research by the company Ember, these two clean energy sources have experienced average annual growth of 20 percent. To achieve the 1.5°C pathway by 2030, Ember researchers argue, such high growth rates need to be sustained over the current decade.

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Obnovljiva energija

PROIZVODNJA VETROELEKTRANA I SOLARNE ENERGIJE U EU DOSEGLA REKORD TOKOM ENERGETSKE KRIZE

Evropska unija je tokom 2022. godine dostigla rekordnih 12 odsto u proizvodnji solarne energije od maja do avgusta i 13 odsto iz vetra. Osim toga, 19 od 27 članica EU ostvarile su rekordnu proizvodnju vetroelektrana i solarne energije od marta prošle godine. Rast kapaciteta obnovljivih izvora energije uštedeo je EU oko 99 milijardi evra (97 milijardi dolara) u izbegnutim uvozima gasa između marta i septembra, pokazalo je izveštaj.

Podaci su objavljeni u Izveštaju o stanju Unije u energetici za 2022. godinu, koji je objavila Evropska komisija. Podaci ukazuju da je Unija uspela da poveća udeo obnovljivih izvora energije u energetskoj mešavini na 43 odsto u drugom kvartalu 2022. godine, prestigavši fosilna goriva koja su stala na 36 odsto. Poljska je zabeležila najveći rast obnovljivih izvora energije (48,5%) od marta do septembra u poređenju s prošlom godinom.

DA LI STE ZNALI?

98,4 % ENERGETIKE NORVEŠKE DOLAZI IZ OBNOVLJIVIH IZVORA

Norveška je daleko najveći proizvođač čiste energije, za njom slede Brazil sa 84,1 i Novi Zeland sa 80 odsto. Pedeset zemalja sada je prešlo prag od 10 odsto vetra i solara, a sedam novih zemalja to je postiglo samo u 2021. godini: Kina, Japan, Mongolija, Vijetnam, Argentina, Mađarska i Salvador. Najbrži prelazak na vetar i solarnu energiju dogodio se u Holandiji, Australiji i Vijetnamu. Sve tri zemlje uspele su da prebace preko 8 odsto ukupne potražnje za električnom energijom sa fosilnih goriva na vetar i solar između 2020. i 2021. godine. Samo je Vijetnam doživeo neviđen rast solarnih energija, koja je porasla za preko 300 odsto u samo jednoj godini.

Daleko iza su azijske zemlje poput Kine i Indije. Iako je Kina doprinela najvećem rastu kapaciteta solarne i energije vetra u poslednjih nekoliko godina, takođe je doživela rekordni rast uglja u 2021. godini petu godinu zaredom. Kina je bila jedina zemlja koja je značajno povećala proizvodnju nuklearne energije. Slično tome, i Indija se oslanja na fosilna goriva: drugi je najveći proizvođač električne energije iz uglja na svetu i koristi ovaj energetski izvor da bi pokrila 74 odsto svoje ukupne potražnje za električnom energijom.

Renewable Energy

THE PRODUCTION OF WIND AND SOLAR ENERGY IN THE EU REACHED A RECORD DURING THE ENERGY CRISIS

During 2022, the European Union reached a record 12 percent in solar energy production from May to August, and 13 percent from wind. In addition, 19 out of 27 EU member states have achieved record production of wind and solar energy since March last year. The growth in renewable energy capacity saved the EU around 99 billion euros ($97 billion) in avoided gas imports between March and September, the report found.

The data was published in the State of the Energy Union report for 2022, by the European Commission. The data indicate that the Union managed to increase the share of renewable energy sources in the energy mix to 43 percent in the second quarter of 2022, overtaking fossil fuels that stood at 36 percent. Poland recorded the highest growth in renewable energy sources (48.5%) from March to September compared to last year.

DID YOU KNOW?

98.4% OF NORWAY'S ENERGY COMES FROM RENEWABLE SOURCES

Norway is by far the largest producer of clean energy, followed by Brazil with 84.1 percent, and New Zealand with 80 percent. Fifty countries have now passed the 10 percent wind and solar threshold, with seven new countries achieving this in 2021 alone: China, Japan, Mongolia, Vietnam, Argentina, Hungary, and El Salvador. The fastest transition to wind and solar energy occurred in the Netherlands, Australia and Vietnam. All three countries managed to shift over 8 percent of total electricity demand from fossil fuels to wind and solar between 2020 and 2021. Vietnam alone has seen unprecedented growth in solar energy, which has increased by over 300 percent in just one year.

Asian countries, such as China and India, are far behind. While China has contributed to the largest growth in solar and wind power capacity in recent years, it also saw record coal growth in 2021 for the fifth year in a row. China was the only country to significantly increase nuclear power production. Similarly, India is also reliant on fossil fuels: it is the second largest producer of coal-fired electricity in the world, and uses this energy source to meet 74 percent of its total electricity demand.

Obnovljiva energija

OBNOVLJIVI IZVORI POSTAJU JEFTINIJI

Prema Agenciji za obnovljive izvore energije (IRENA), obnovljivi izvori energije bili su najjeftiniji izvor energije na svetu u 2020. godini. Najnoviji izveštaj Agencije pokazuje da pad troškova obnovljivih tehnologija - posebno u vezi sa vetrom i solarom - značajno pada. Brzi pad troškova ovih tehnologija u poslednjih nekoliko godina omogućio je zemljama širom sveta da povećaju svoje kapacitete za proizvodnju obnovljive energije. To, zajedno sa visokim cenama fosilnih goriva, poboljšava konkurenciju ova dva obnovljiva izvora energije.

U svom Izveštaju o Svetskoj energetskoj perspektivi za 2020. godinu, Međunarodna agencija za energetiku (IEA) potvrdila je da solarni energetski projekti sada nude najjeftiniju električnu energiju u istoriji i predvidela je da će do 2050. godine obnovljena proizvodnja energije nastaviti da raste, a proizvodnja solarne energije će naglo porasti i postati primarni izvor svetske električne energije. Solarna energija je pohvaljena zbog relativno niskih troškova za održavanje i rad panela. Godine 2020, prosečni trošak solarnih fotonaponskih panela - koji su nekada smatrani finansijskim teretom - bio je 7 odsto manji od prethodne godine. Troškovi velikih solarnih projekata su, čak, pali za 85 odsto u protekloj deceniji, a troškovi koncentrovanog solarnog sistema (CSP) - pristup proizvodnji električne energije putem ogledala - su smanjeni za 16 odsto u 2020. godini.

OBNOVLJIVI IZVORI U ENERGIJA SA NISKIM EMISIJAMA UGLJENIKA

Obnovljivi izvori energije su jedan od naših najvećih saveznika u trci da se dostignu nulte emisije, zbog njihovih niskih emisija ugljen-dioksida u poređenju s fosilnim gorivima. Naime, energija dobijena iz vetra, sunca, hidroelektrane i geotermalne energije ima posebno nisku ekološku stopu tokom svog životnog ciklusa.

Naročito, životni ciklus solarnih panela generiše minimalne emisije gasova sa efektom staklene bašte, koje uglavnom potičuod fotonaponskih (PV) modula i drugih komponenti, jer su materijali od kojih su napravljeni iskopavani i obrađeni. Slično tome, tokom životnog ciklusa vetrenjačke energije dolazi do nekih emisija, uključujući građenje i konstrukciju tornjeva za turbine. Pravljenje materijala koji se koriste u turbinama, kao što su čelik, beton, stakloplastika i bakar, proizvodi neke stakleničke gasove. Međutim, u oba slučaja, ukupne emisije su znatno niže od onih koje stvaraju elektrane na bazi uglja i prirodnog gasa, koje čine tri četvrtine globalnih emisija gasova staklene bašte. Što se tiče geotermalne energije, elektrane mogu ispoštovati najstrože standarde za čist vazduh, jer emituju malo ugljen-dioksida, vrlo malu količinu sumpor-dioksida i nimalo azotnih oksida. Procenjuje se da je prosečna globalna emisija CO2 iz geotermalnih elektrana 122 g/kWh, otprilike 10 puta manja nego kod uglja i nafte.

DA LI STE ZNALI?

Renewable Energy

The fastest growing sources of clean energy have been wind and solar energy, whose share has doubled since the Paris Agreement was signed in 2015

RENEWABLE SOURCES ARE BECOMING CHEAPER

According to the International Renewable Energy Agency (IRENA), renewable energy sources were the cheapest energy source in the world in 2020. The Agency's latest report shows that the cost of renewable technologies - especially wind and solar - is falling significantly. The rapid decline in the cost of these technologies over the past few years has allowed countries around the world to increase their capacity to produce renewable energy. This, together with high fossil fuel prices, enhances the competition of these two renewable energy sources.

In its report World Energy Outlook 2020, the International Energy Agency (IEA) confirmed that solar power projects now offer the cheapest electricity in history, and predicted that by 2050, renewable energy production will continue to grow. The production of solar energy will grow rapidly and become the primary source of the world's electricity. Solar energy has been praised for a relatively low cost of maintaining and operating the panels. In 2020, the average cost of solar photovoltaic panels - once considered a financial burden - was 7 percent lower than the previous year. The cost of large solar projects has even fallen by 85 percent in the past decade, and the cost of concentrating solar power (CSP)—a mirror-based approach to electricity generation—was reduced by16 percent in 2020.

Similarly, wind energy has experienced a rapid decline in costs. In 2020, the costs of onshore wind energy fell by about 13 percent, while the costs of offshore „wind" decreased by about 9 percent. The IEA estimates that the cost of generating energy from wind could fall by as much as 40 percent in the next decade, based on current technology and market growth; offshore wind energy projections have the potential to generate 425,000 TWh of electricity annually worldwide, more than 18 times the current global electricity demand. Also, the capacity of onshore wind farms is predicted to increase by 57 percent by 2024.

RENEWABLE SOURCES REPRESENT ENERGY WITH LOW CARBON EMISSIONS

Renewable energy sources are one of our greatest allies in the race to reach zero emissions, due to their low carbon dioxide emissions compared to fossil fuels. Namely, the energy obtained from wind, sun, water, or geothermal energy, has a particularly low environmental footprint throughout their life cycles.

In particular, the life cycle of solar panels generates minimal greenhouse gas emissions that mainly come from photovoltaic (PV) modules and other components, because the materials from which they are made are mined and processed. Similarly, there are some emissions during the life cycle of wind energy, including the construction of turbine towers. The making of the materials used in turbines, such as steel, concrete, fiberglass and copper, produces some greenhouse gases. However, in both cases, the total emissions are significantly lower than those generated by coal and natural gas-fired power plants, which account for three-quarters of global greenhouse gas emissions. As for geothermal energy, power plants can meet the strictest clean air standards, emitting little carbon dioxide, very little sulfur dioxide, and no nitrogen oxides. The average global CO2 emission from geothermal power plants is estimated to be 122 g/kWh, roughly 10 times less than coal and oil.

DID YOU KNOW?

Civilizacije

KOJE SU UNIŠTENE I ONE KOJE SU PREŽIVELE

Rimsko carstvo je propalo pre više od 1.500 godina, ali njegov uticaj na popularnu maštu i dalje je jak, što se vidi u nedavnom trendu na TikToku. Žene su počele da snimaju svoje muškarce kako bi dokumentovale njihove odgovore na pitanje: „Koliko često razmišljate o Rimskom carstvu?".

„Pa, tehnički, kao, svakog dana", rekao je jedan momak, dok je njegova devojka iznenađeno uzviknula:"Šta?!" Nije bio jedini, kako su to pokazali mnogi tvitovi, Instagram Reels-ovi i novinski članci. Dok su vozili auto putem, neki muškarci nisu mogli da ne razmišljaju o obimnoj mreži puteva koje su Rimljani izgradili, neki od njih se i danas koriste. Razmišljali su o sistemu akvadukata koji je izgrađen cementom koji se stvrdnjavao u kontaktu sa vodom.

LAVA, KUGA, SUŠA, MONSUNI

Postoji mnogo razloga zašto su ljudi fascinirani usponom i padom starih carstava. Deo onoga što pokreće tu zainteresovanost je pitanje: „Kako nešto tako veliko i napredno može propasti?". I, što je još bitnije: „Može li se nešto slično dogoditi nama?". Između besnih požara, porasta političkog nasilja i rekordno niskog poverenja javnosti u vladu, ne čini se previše nerealnim da Amerika može nestati u dimu, napominje se u tekstu internet magazina Grist.

Civilizations

That Were Destroyed and Those That Survived

The Roman Empire fell more than 1,500 years ago, but its influence on the popular imagination has remained strong, as seen in a recent trend on TikTok. Women started filming the men in their lives to document their answers to the question, „How often do you think about the Roman Empire?".

„Well, technically, like every day," said one guy, as his girlfriend exclaimed in surprise, „What?!" He was not the only one, as many tweets, Instagram Reels and newspaper articles have shown. As they were driving along the highway, some men couldn't help but think about the extensive network of roads built by the Romans, some of which are still in use today. They thought about a system of aqueducts that was built with cement that hardened in contact with water.

LAVA, THE PLAGUE, DROUGHT, MONSOONS

There are many reasons why people are fascinated by the rise and fall of ancient empires. Part of what drives that interest is the question, „How can something so big and advanced fail?". And, what is even more important: „Could something similar happen to us?". Between raging wildfires, an increase in political violence and record low public trust in government, it does not seem too unrealistic that America could disappear in smoke, it has been noted in the text of the online magazine Grist.

Theories of the climate change-induced extinction have developed recently, fueled by books such as Jared Diamond's 2005 Collapse: How Societies Choose to Fail or Succeed. For example, the Roman Empire collapsed during a series of volcanic eruptions that cooled the climate and caused the first bubonic plague pandemic. The decline of the ancient Maya in Central America is linked to a great drought. The collapse of Angkor Wat in present-day Cambodia is associated with a period of wild oscillations between drought and monsoon floods.

GREENNEWS

Ako su manje promene klime dovele do propasti velikih društava, kako ćemo preživeti mnogo radikalnije promene današnjice?

Teorije o slomu pod uticajem klimatskih promena razvile su se u poslednje vreme, podstaknute knjigama poput „Krah: Kako društva biraju da propadnu ili uspeju" Džerada Dajmonda iz 2005. godine. Na primer, Rimsko carstvo se raspalo tokom serije vulkanskih erupcija koje su dovele do hlađenja klime i prouzrokovale prvu pandemiju bubonske kuge. Pad drevnih Maja u Centralnoj Americi je povezan sa velikom sušom. Propast Angkor Vata u današnjoj Kambodži se dovodi u vezu s periodom divljih oscilacija između suše i monsunskih poplava. Ako su manje promene klime dovele do propasti ovih velikih društava, kako ćemo preživeti mnogo radikalnije promene današnjice?

Preterano fokusiranje na katastrofe može izazvati iskrivljen pogled na prošlost, jer zanemaruje društva koja su se suočavala sa ekološkom katastrofom i ostala netaknuta. Pregled literature iz 2021. godine pokazao je da je 77 odsto studija koje su analizirale interakciju između klimatskih promena i društava naglašavalo katastrofu, dok je samo 10 odsto bilo usmereno na otpornost. Istoričari, antropolozi i arheolozi su nedavno pokušali da popune tu prazninu. Najnoviji doprinos je studija koja analizira 150 kriza iz različitih vremenskih perioda i regiona, koristeći obimni set podataka koji obuhvata više od 5.000 godina ljudske istorije, sve do neolitskog perioda. Ispostavilo se da su ekološke sile često igrale ključnu ulogu u padu društava, ali same to nisu mogleda postignu.

SUŠA UBIJA JEDNE, ALI NE I DRUGE NARODE

Istraživači iz „Complexity Science Hub"-a, organizacije sa sedištem u Beču, koja koristi matematičke modele za razumevanje dinamike kompleksnih sistema, pronašli su mnoge primere društava koja su preživela glad, hladne talase i druge oblike ekološkog stresa. Nekoliko mesoameričkih gradova, uključujući naselja Zapoteka Mitla i Jagul u današnjoj Oaksaki, „ne samo da su preživeli već su napredovali u istim uslovima suše", koji su doprineli propasti Maja u 8. veku. A Maje su, pre tog trenutka, preživele pet prethodnih suša i nastavile da rastu.

Novo istraživanje, objavljeno u biološkom časopisu „The Royal Society" sugeriše da je otpornost sposobnost koju društva mogu steći i izgubiti tokom vremena. Istraživači su zaključili da stabilno društvo može izdržati čak i dramatičan klimatski šok, dok mali šok može dovesti do haosa u ranjivom društvu.

Ova saznanja podudaraju se sa drugim istraživanjima, kao što je studija iz 2021. godine objavljena u časopisu „Nature" koja analizira 2.000 godina kineske istorije, razlažući odnos između klimatskih poremećaja i propasti dinastija. Utvrdilo se da su velike vulkanske erupcije, koje često uzrokuju hladnija leta i slabije monsune, oštećivale useve i doprinele porastu ratovanja. Ali nije veličina erupcije bila najvažnija: dinastije su preživele neke od najvećih, klimatski poremećujućih erupcija, uključujući erupciju Tambora 1815. godine u današnjoj Indoneziji i erupciju Huajnaputina 1600. godine u današnjem Peruu.

If minor changes in the climate led to the collapse of large societies, how will we survive today's more radical changes?

If minor changes in climate led to the collapse of these large societies, how will we survive today's more radical changes?

An excessive focus on disasters can cause a distorted view of the past, as it ignores societies that faced environmental disaster and remained intact. A 2021 literature review found that 77 percent of studies analyzing the interaction between climate change and societies emphasized disaster, while only 10 percent focused on resilience. Historians, anthropologists and archaeologists have recently tried to fill that gap. The latest contribution is a study that analyzes 150 crises from different time periods and regions, using an extensive data set spanning more than 5,000 years of human history, all the way back to the Neolithic period. It turns out that ecological forces often played a key role in the decline of societies, but they could not achieve this alone.

DROUGHTS KILL SOME NATIONS, BUT NOT OTHERS

Researchers at the Complexity Science Hub, a Vienna-based organization that uses mathematical models to understand the dynamics of complex systems, have found many examples of societies that have survived famine, cold waves and other forms of environmental stress. Several Mesoamerican cities, including the Zapotec settlements of Mitla and Yagul in modern-day Oaxaca, „not only survived but thrived under the same drought conditions" that had contributed to the downfall of Maya in the 8th century. And Maya, before that moment, had survived five previous droughts and continued to grow.

New research, published in the Royal Society's peer-reviewed Biological Sciences Journal, suggests that resilience is a capability that societies can acquire and lose over time. Researchers have concluded that a stable society can withstand even a dramatic climate shock, while a small shock can lead to chaos in a vulnerable society.

These findings are consistent with other research, such as a 2021 study published in the journal Nature that analyzes 2,000 years of Chinese history, unraveling the relationship between climate disturbances and the fall of dynasties. Large volcanic eruptions, which often cause cooler summers and weaker monsoons, have been found to damage crops and contribute to increased warfare. But it was not the size of the eruption that mattered: the dynasties survived some of the largest, climate-disrupting eruptions, including the 1815 Tambora eruption in present-day Indonesia, and the 1600 Huanputina eruption in present-day Peru.

What matters most, according to the Complexity Science Hub study, is inequality and political polarization. Declining standards of living lead to discontent among the masses, while

Niz klimatskih katastrofa, oružanih napada i terorističkih napada u vestima je dovoljan da vas navede da razmislite o pakovanju stvari i odlasku da živite van grada

Ono što je najvažnije, kako tvrdi studija „Complexity Science Hub", jeste nejednakost i politička polarizacija. Opadanje životnih standarda često dovodi do nezadovoljstva među celokupnom populacijom, dok se bogata elita takmiči za prestižne pozicije. Kako pritisci rastu i društvo se cepa, vlada gubi legitimitet, što otežava zajedničko rešavanje izazova.

„Nejednakost je jedan od najvećih negativaca u istoriji", rekao je Daniel Hojer, koautor studije i istoričar koji proučava kompleksne sisteme. „Ona je srž mnogih drugih problema."

Sa druge strane, saradnja može dati društvima dodatni podstrek da izdrže ekološke pretnje. „Zato kultura toliko znači", rekao je Hojer. „Potrebno je da postoji društvena kohezija, potrebno je da postoji nivo saradnje, kako bi se sproveli postupci koji se skaliraju - da se vrše reforme, da se prave adaptacije, bilo da se radi o odustajanju od fosilnih goriva ili promeni načina funkcionisanja prehrambenih sistema."

PRILAGOĐAVANJE KROZ MILENIJUME

„Sasvim je opravdano zapitati se kako se pouke iz drevnih društava mogu primeniti danas, kada je tehnologija toliko napredovala da možete preleteti pola sveta za jedan dan ili „autsorsovati" bolni zadatak pisanja eseja na fakultetu ChatGPT-u.

„Šta moderni svet može naučiti od, na primer, majanskih gradova-država ili Amsterdama iz 17. veka?, zapitao se Dagomar Degrot, ekološki istoričar na Univerzitetu Džordžtaun. Prema Degrotovom mišljenju, istoričari mogu pronaći proverene strategije kao polaznu tačku za politike koje će nam pomoći da preživimo klimatske promene danas - zadatak na kojem trenutno radi sa Programom za razvoj Ujedinjenih nacija.

Degrot je identifikovao niz načina na koje su se društva prilagodila promenljivom okruženju kroz milenijume: Migracija omogućava ljudima da se presele na plodnije predele; fleksibilne vlade uče iz prošlih katastrofa i usvajaju nove politike kako bi sprečile ponavljanje istih stvari; uspostavljanje trgovinskih mreža čini zajednice manje osetljivim na promene temperature ili padavine. Društva koja imaju veću socijalno-ekonomsku jednakost, ili barem pružaju podršku svojim najsiromašnijim članovima, takođe su otpornija, objasnio je Degrot.

Prema tim merilima, Sjedinjene Američke Države ne slede baš put ka uspehu. Prema standardu nazvanom Gini koeficijent - gde je 0 savršena jednakost, a 1 potpuna nejednakost - SAD se loše kotiraju za bogatu zemlju, sa indeksom od 0,38 na skali, što je lošije od Norveške (0,29) i Švajcarske (0,32), ali bolje od Meksika (0,42). Nejednakost je „van kontrole", rekao je Hojer.

„Nije samo da se ne nosimo dobro sa tim. Ponašamo se na isti način na koji su se ponašala mnoga društva u prošlosti."

Jedan od glavnih zagovornika te teme je Peter Turkin, jedan od koautora studije koju je sproveo Hojer, rusko-američki naučnik koji proučava kompleksne sisteme. Nekada ekolog koji je analizirao rast i pad populacija borovih kornjača, Turkin je promenio oblasti kasnih 1990-ih i počeo da primenjuje matematički okvir na rast i pad ljudske populacije. Oko 2010. godine predvideo je da će nemiri u Americi početi da postaju ozbiljni oko 2020. godine. Zatim, tačno prema rasporedu, stigla je pandemija COVID-19, podsećajući nas da moderno društvo nije imuno na velike katastrofe koje su oblikovale prošlost.

A string of climate disasters, gun attacks and terrorist attacks in the news is enough to make you think about packing up and moving out of the city

wealthy elites compete for prestigious positions. As pressures increase and society breaks down, governments lose legitimacy, making it harder to collectively address challenges.

„Inequality is one of history's greatest villains", said Daniel Hoyer, a study co-author and historian who studies complex systems. „This actually leads to and is at the root of many other issues. „

On the other hand, cooperation may provide additional incentives for societies to confront environmental threats. „That's why culture matters so much", Hoyer said. „You need social solidarity, you need that level of collaboration, you need to do things that can lead to improvements, to adaptation, whether it's divestment from fossil fuels or changing the way food systems work. „

ADJUSTMENT THROUGH MILLENNIA

It is fair to wonder how the lessons of ancient societies can be applied today, when technology has advanced so far that you can fly halfway around the world in a day or „outsource" the painful task of writing a college essay to ChatGPT.

For exmple, what can the modern world learn from the Maya city-states or the 17th century Amsterdam?" asked Dagomar Degroot, an environmental historian at Georgetown University. According to Degroot, historians can find proven strategies as a starting point for policies that will help us survive climate change today - a task he is currently working on with the United Nations Development Programme.

Degroot has identified a number of ways in which societies have adapted to changing environments over millennia: Migration allows people to move to more fertile areas; flexible governments learn from past disasters and adopt new policies to prevent the same thing from happening again; establishing trade networks makes communities less sensitive to changes in temperature or precipitation. Societies that have greater socioeconomic equality, or at least support their poorest members, are also more resilient, Degroot explained.

By these standards, the United States is not exactly on the path to success. According to a standard called the Gini coefficient - where 0 means perfect equality and 1 means complete inequality - the US ranks poorly for a rich country, with an index of 0.38 on the scale, worse than Norway (0.29) and Switzerland (0.32), but better than Mexico (0.42). Inequality is "out of control", Hoyer said.

"It's not just that we don't handle it well. We are dealing with it just as badly as so many societies have handled things badly in the past."

One of the main proponents of the topic is Peter Turchin, one of the co-authors of the study conducted by Hoyer, a Russian-American scientist who studies complex systems. Once an ecologist who analyzed the growth and decline of pine beetle populations, Turchin switched fields in the late 1990s and began applying a mathematical framework to human population growth and decline. Around 2010, he predicted that the unrest in America would start to get serious around 2020. Then, right on schedule, the COVID-19 pandemic arrived, reminding us that modern society is not immune to the great disasters that shaped the past.

"America is on the verge of collapse" read the headline of an article in The Atlantic this summer, adapted from Turchin's book End Times: Elites, Counter-elites and the Path to Political Disintegration.

Stabilno društvo može izdržati čak i dramatičan klimatski šok, dok mali šok može dovesti do haosa u ranjivom društvu

„Amerika ide prema kolapsu", glasio je naslov članka u časopisu The Atlantic ovog leta, izdvojen iz Turkinove knjige „Kraj vremena: Elita, kontra-elita i put političkog raspada".

KOLAPS DRUŠTVA NIJE HOROR FILM

Niz klimatskih katastrofa, oružanih napada i terorističkih napada u vestima je dovoljan da vas navede da razmislite o pakovanju stvari i odlasku da živite van grada. Nedavni viralni video postavio je pitanje: „Da li i vaši prijatelji pričaju o kupovini zemlje i osnivanju zajedničkog domaćinstva gde svako uzgaja svoje useve, gde možemo svi da pomognemo jedni drugima i imamo podržavajuću zajednicu, jer se čini da se naše društvo raspada pod našim nogama?"

Prema Turkinu, Amerika je već bila na ivici kolapsa dva puta, jednom tokom Građanskog rata i ponovo tokom Velike depresije. Nije uvek jasno kako se „kolaps" razlikuje od opštih društvenih promena. Neki istoričari ga definišu kao gubitak političke složenosti, dok se drugi fokusiraju na pad broja stanovnika ili na to da li je očuvana kultura društva.

„Mnogi ljudi više vole izraz, opadanje", rekao je Degrot, „delimično zato što se istorijski primeri kolapsa složenih društava zaista odnose na proces koji se odvijao tokom vekova i možda čak nije bio primećen od strane ljudi koji su tada živeli. Život kroz period društvenog kolapsa može se doživeti drugačije nego što ste zamislili, baš kao što je i život tokom pandemije - možda manje kao u horor filmu, a više kao dosadni, svakodnevni život kada se naviknete na to".

Studija „Complexity Science Hub" sugeriše da bi se sam kolaps mogao smatrati adaptacijom u posebno teškim situacijama.

„Postoji opšta ideja da je kolaps zastrašujuć i loš i da to trebamo izbeći", rekao je Hojer. „U tome ima mnogo istine, posebno zato što kolaps uključuje nasilje, uništavanje i nemire."

Ali ako način na koji je vaše društvo postavljeno čini da svi budu nezadovoljni, oni bi možda bili srećniji sa novim sistemom. Na primer, arheološki dokazi pokazuju da su ljudi postali veći i zdraviji nakon što je Rimsko carstvo izgubilo kontrolu nad Britanskim ostrvima, tvrdi Degrot.

„Kolaps ne utiče automatski loše za one koji ga prežive - zapravo, često se dešava suprotno", rekao je.

NIŠTA NIJE ZAGARANTOVANO

Naravno, nema garancija da će nakon kolapsa ranjiv sistem biti zamenjen boljim.

„I dalje morate uložiti napor da uvedete reforme i da imate podršku onih na vlasti kako biste mogli da postavite i ojačate ovakve promene", rekao je Hojer. „Po meni, ako postoji opasnost od kolapsa društva, hajde da ga preživimo bez nasilja, ako je ikako moguće."

A stable society can withstand even a dramatic climate shock, while a small shock can lead to chaos in a vulnerable society

THE COLLAPSE OF SOCIETY IS NOT A HORROR FILM

A string of climate disasters, gun attacks, and terrorist attacks in the news is enough to make you think about packing up and moving out of the city. A recent viral video asked the question, „Are your friends also talking about buying land and starting a joint household where everyone grows their own crops, where we can all help each other and have a supportive community, because our society seems to be crumbling under our feet?"

According to Turchin, America has already been on the brink of collapse twice, once during the Civil War, and again during the Great Depression. It is not always clear how „collapse" differs from general social change. Some historians define it as a loss of political complexity, while others focus on population decline or whether the culture of the society was preserved.

"Many people prefer the term 'decline,'" Degroot said, "in part because historical examples of the collapse of complex societies actually refer to a process that sometimes occurred over centuries" and might even go unnoticed by living people at the time. Living through a time of societal collapse might feel different than you imagined, just like living through a pandemic — possibly less like a zombie movie and more boring everyday life as soon as you get it used to it".

The Complexity Science Hub study suggests that collapse itself could be considered an adaptation in particularly difficult situations.

"There is a general idea that a collapse is scary and bad and that we need to avoid it," Hoyer said. "There's a lot of truth in that, especially because collapse brings violence, destruction and unrest."

But if the way your society is set up makes everyone unhappy, they might be happier with the new system. For example, archaeological evidence shows that people got bigger and healthier after the Roman Empire lost control of the British Isles, Degroot said.

"In no way would a collapse automatically be something that would be devastating to survivors – often quite the opposite," he said.

NOTHING IS GUARANTEED

Of course, there are no guarantees that after a collapse a vulnerable system will be replaced by a better one.

"You still have to do the reform work and have the support of those in power to actually implement and strengthen these types of revisions," Hoyer said. "So I would argue: If that's the case, let's just do it without the violence."

Vazdušni brodovi na solarni pogon

Očekuje se da izgradnja „Solar Airship One“ počne ove godine, a let „bez zaustavljanja“ će se odvijati 2026. godine

The construction of Solar Airship One is expected to begin this year, and the non-stop flight will take place in 2026

Francuska kompanija „Euro Airship” ima za cilj da završi proces neprekidnog kruženja oko Zemlje, koristeći vazdušni brod na solarni pogon, a sve u pokušaju da testira novi oblik putovanja sa nultom emisijom.

U pitanju je brod „Solar Airship One“, pomoću kojeg bi trebalo da se završi put oko sveta bez upotrebe fosilnih goriva, i to za manje od mesec dana.

Leteći na visini od oko 20.000 stopa (6.000 metara), futuristička letelica koristi kućište od solarnih panela, baterija i vodoničnih gorivnih ćelija da isporučuje energiju danju i noću, što čini da, teoretski, može da leti zauvek, odnosno bez ograničenja.

NIJE SAMO AVANTURA

„Dobra stvar je što ne idemo na ovo svetsko putovanje samo zbog pokazivanja ili avanture... Posle toga, postoji dodatni proces za našu tehnologiju“, rekla jefrancuski akrobatski pilot Dorine Bourneton, u razgovoru za časopis Flying.

„Radili smo poslednjih 20 godina na ovom istraživanju i razvoju, i sami smo to finansirali. Od jula 2020. potpisali smo partnerstvo sa Capgemini, i oni nam pomažu u razvoju faze industrijalizacije“, kaže Bourneton.

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Solar-Powered Airships

The French company Euro Airship aims to complete the process of continuously circling the Earth using a solar-powered airship, all in an attempt to test a new form of zero-emission travel.

The ship in question is Solar Airship One, which should be used to complete the trip around the world without the use of fossil fuels, and in less than a month.

Flying at an altitude of about 20,000 feet (6,000 meters), the futuristic aircraft uses a solar panel frame, batteries and hydrogen fuel cells to deliver power day and night, making it theoretically able to fly forever, i.e. without limit.

IT IS NOT JUST AN ADVENTURE

„The good thing is that we are not going on this world trip just for showing off or adventure... After that, there is an additional process for our technology,” said Dorine Bourneton, a French aerobatic pilot, speaking to Flying Magazine.

„We have worked on this research and development for the last 20 years, and we have financed it ourselves.” In July 2020, we signed a

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Osnivač Gugla, Sergej Brin, gradi svoj vazdušni brod „Pathfinder 1“, kao deo projekta „Lakši od vazduha“

Google co-founder Sergey Brin builds his airship Pathfinder 1 as part of Lighter Than Air project

Njihovi inženjeri su radili na dizajnu, proizvodnji i procesu montaže.

„Projekat Solar Airship pokazuje da je moguće katalizovati ekosistem, kako bi se podstakla pojava održivih rešenja za vazdušni transport“, navodi Corinne Jouanny iz kompanije Capgemini Engineering.

Izgradnja „Solar Airship One“-a bi trebalo da počne ove godine, a let „bez zaustavljanja“ će se odvijati 2026. Projekat je deo nove generacije ekološki prihvatljivih vazdušnih brodova, koji imaju za cilj da ponude alternativu konvencionalnim avionima. Britanski proizvođač Hybrid Air Vehicles, takođe, ima za cilj da 2026. godine započne letove svog vazdušnog broda „Airlander 10“, dok osnivač Gugla, Sergej Brin, uporedo sa svim ovim gradi svoj vazdušni brod „Pathfinder 1“, kao deo njegovog projekta „Lakši od vazduha“ (eng. Lighter Than Air). GN

partnership with Capgemini, and they have helped us to develop the industrialization phase,” says Bourneton.

Their engineers worked on the design, production and assembly process.

„The Solar Airship project shows that it is possible to catalyze the ecosystem to encourage the emergence of sustainable solutions for air transport,” said Corinne Jouanny from Capgemini Engineering.

The construction of Solar Airship One is scheduled to begin this year, and the non-stop flight will take place in 2026. The project is part of a new generation of environmentally friendly airships, which aim to offer an alternative to conventional aircrafts.

The British manufacturer Hybrid Air Vehicles also aims to start flights of its airship Airlander 10 in 2026, while Google founder Sergey Brin is simultaneously building his airship Pathfinder 1 as part of his Lighter Than Air project. GN

Šta je reciklaža E-otpada i kako se obavlja?

Toksični materijali mogu biti oslobođeni u atmosferu, infiltrirati se u zemlju i dospevati u vodene tokove u blizini, što utiče na javno zdravlje

Reciklaža E-otpada

Recikliranje elektronskog otpada (E-otpada) je proces izdvajanja vrednih materijala nakon što se E-otpad izreže na male delove koji mogu biti ponovo korišćeni u novom elektronskom uređaju. Međutim, nekoliko trenutnih izazova sprečava elektronsku industriju za reciklažu da se širi. Istražujemo kako se vrši recikliranje E-otpada i zašto treba da radimo na njegovom proširenju.

Elektronski otpad ili E-otpad odnosi se na odbačene električne aparate. Svake godine generiše se oko 50 do 60 miliona tona E-otpada, što je ekvivalentno samo 2-3 odsto godišnjeg globalnog otpada. Ipak, šteta koju ova količina otpada nanosi na naše zdravlje i životnu sredinu može premašiti destruktivnu moć svih drugih otpada zajedno. Budući da E-otpad sadrži toksične materijale kao što su olovo, kadmijum i berilijum, kada je izložen snažnom UV zračenju ili korodira zbog drugih fizičkih ili hemijskih razloga, toksični materijali mogu biti oslobođeni u atmosferu, infiltrirati se u zemlju i dospevati u vodene tokove u blizini, što utiče na javno zdravlje.

Samo to bi trebalo da podstakne ljude da ne bacaju E-otpad u smeće; trebali biste proveriti da li neke vladine ili privatne organizacije nude usluge, ponekad besplatno, za prikupljanje E-otpada iz vaših domova. To uključuje velike elektronske uređaje poput klima uređaja, frižidera i televizora. Često te organizacije ili preduzeća obezbeđuju izdvajanje vrednih delova vašeg E-otpada za potencijalnu drugu upotrebu, a štetni materijali se odvajaju pre nego što se ostatak baci na deponije.

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What is E-Waste Recycling and How is It Done?

Toxic materials can be released into the atmosphere, they can infiltrate the soil and flow into nearby waterways, affecting public health

E-Waste Recycling

Electronic waste (E-waste) recycling is the process of extracting valuable materials after the E-waste is cut into small parts that can be reused in a new electronic device. However, several current challenges are preventing the electronics recycling industry from expanding. We investigate how e-waste recycling is done and why we should work to expand it.

Electronic waste or E-waste refers to discarded electrical appliances. About 50 to 60 million tons of E-waste are generated every year, which is equivalent to only 2-3 percent of the annual global waste. However, the damage this amount of waste causes to our health and the environment can exceed the destructive power of all other waste combined. Since E-waste contains toxic materials such as lead, cadmium, and beryllium, when exposed to strong UV radiation or corroded for other physical or chemical reasons, the toxic materials can be released into the atmosphere, infiltrate the soil and flow into nearby waterways, which affects public health.

That alone should encourage people not to throw E-waste in the trash; you should check whether any governmental or private organizations offer services, sometimes free of charge, to collect E-waste from your homes. This includes large electronic devices such as air conditioners, refrigerators and televisions. Often these organizations or businesses ensure that the valuable parts of your E-waste are separated for potential other uses, and harmful materials are separated before the rest is thrown into landfills.

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Toner koji se može naći u fotokopirima je izuzetno zapaljiv i eksplozivan, i može da raznese opremu za preradu

RECIKLAŽOM DO ZAŠTITE ZDRAVLJA

Recikliranje E-otpada je veoma je korisno za zaštitu ljudskog zdravlja i životne sredine. Većina materijala koji čine naše računare i pametne telefone potiču od neobnovljivih minerala; recikliranje ovih materijala može sprečiti njihovu potrošnju kroz sve oblike potrošakog društva. Iako u određenim slučajevima neobnovljivi resursi nisu nužno retki, recikliranje i čestih minerala ima ekonomsku korist.

Na primer, cena litijuma, neobnovljivog ali relativno čestog minerala koji se može naći gotovo svuda, je u porastu. Litijum se široko koristi u različitim industrijama, ali je najpoznatiji po svojoj važnosti u proizvodnji punjivih baterija za električna vozila. Povećano javno interesovanje za električna vozila kao način za dekarbonizaciju transporta dovelo je do naglog porasta potražnje za litijumom. Ipak, tržište nije uspelo da se nosi s ovim iznenadnim porastom potražnje, što je dovelo do nestašice litijuma - ne zbog retkosti, već zbog sporog tempa eksploatacije i prerade. Recikliranje litijum-jonskih baterija će omogućiti dodatno snabdevanje tržišta litijumom, što će omogućiti preduzećima da proizvode baterije i električna vozila koja su prijateljski nastrojena prema korisnicima i prijateljski nastrojena prema životnoj sredini - po nižoj ceni.

KAKO SE VRŠI RECIKLIRANJE

Recikliranje E-otpada je mnogo komplikovanije od konvencionalnog recikliranja otpada. Obično, prvi korak u procesu reciklaže je ručno sortiranje. Nakon što se prikupi E-otpad i preveze do reciklažnih postrojenja, radnici sortiraju E-otpad prema njihovim vrstama i modelima. Zatim se svi elektronski uređaji pregledaju, a delovi koji još uvek funkcionišu izdvajaju se za ponovnu upotrebu; ili se mogu prodati kao pojedinačni delovi ili se mogu kombinovati da bi se formirao novi telefon ili računar. E-otpad koji nije funkcionalan šalje se na reciklažu.

Ovde se E-otpad baca u ogromnu mašinu i melje na male komade, ali pre toga mora da prože kroz proces zvani demontaža, što se odnosi na postupak rastavljanja proizvoda na komponente. Ovaj postupak predstavlja uklanjanje svih potencijalno opasnih

The toner found in photocopiers is extremely flammable and explosive, and can blow up the processing equipment

HEALTH PROTECTION BY RECYCLING

E-waste recycling is very beneficial for the protection of human health and the environment. Most of the materials that make up our computers and smartphones come from non-renewable minerals; recycling these materials can prevent their consumption through all forms of consumer society. Although in certain cases non-renewable resources are not necessarily scarce, the recycling of even common minerals has economic benefits.

For example, the price of lithium, a non-renewable but relatively common mineral that can be found almost everywhere, is on the rise. Lithium is widely used in various industries, but is best known for its importance in the production of rechargeable batteries for electric vehicles. Increased public interest in electric vehicles as a way to decarbonize transportation has led to a sharp increase in demand for lithium. However, the market has been unable to cope with this sudden increase in demand, leading to a shortage of lithium - not because of rarity, but because of the slow pace of mining and processing. The recycling of lithium-ion batteries will provide additional lithium supply to the market, allowing companies to produce batteries and electric vehicles that are user-friendly and environmentally friendly - at a lower price.

HOW IS RECYCLING DONE?

E-waste recycling is much more complicated than conventional waste recycling. Usually, the first step in the recycling process is manual sorting. After the E-waste is collected and transported to recycling facilities, workers sort the E-waste according to their types and models. All electronic devices are then inspected, and the parts that are still functional are separated for reuse; they can either be sold as individual parts or combined to form a new phone or computer. E-waste that is not functional is sent for recycling.

Here, E-waste is thrown into a huge machine and shredded into small pieces, but before that it has to go through a process called de-manufacturing, which refers to the process of disassembling a product into

Odbačeni E-otpad samo u 2019. godini vredeo je više od 57 milijardi dolara

Discarded E-waste was worth more than $57 billion in 2019 alone

materijala u elektronskim uređajima koji će uništiti mašinu ili kontaminirati okolinu kad se odlaže na deponije. Na primer, toner koji se može naći u fotokopirima je izuzetno zapaljiv i eksplozivan, i može da raznese opremu za preradu ako se naseče, s obzirom na to da mnoge stvari mogu delovati kao izvor goriva, kao što je plastika. Ovaj postupak je od izuzetne važnosti i mora ga obavljati vešto osoblje.

Nakon što otpad bude samleven, metali, vredni delovi koji čine reciklažu E-otpada profitabilnom industrijom, biće odvojeni. Za razliku od prethodnih sesija, ovaj postupak ne zahteva ručno sortiranje. Veliki magnet će prvo privući sve feromagnetne materijale poput gvožđa i čelika, koji imaju visoku podložnost magnetizaciji. Zatim, dalja mehanička obrada razdvaja druge metale i legure na osnovu fizičkog zakona nazvanog Eddy Current, gde će paramagnetni materijali, materijali koji su slabo privučeni magnetima, biti odbijeni kad se indukuje električna struja putem promenljivog magnetskog polja sa repulsivnom silom, dok će drugi nemagnetni materijali, poput plastike, jednostavno prolaziti.

Nakon toga, otpad se dodatno separira pomoću vode. U ovoj fazi, gotovo sve što preostane su nemagnetni materijali; prolaziće kroz još jednu mašinu ispunjenu vodom, gde će materijali niske relativne gustine, uglavnom plastika, plivati, dok će drugi materijali, poput stakla, potonuti. Na kraju, pre nego što se reciklirani materijali prodaju, proverava se da li ima preostalih vrednih materijala koji su se zadržali na plastici.

components. By this procedure, all potentially hazardous materials in electronic devices that will destroy the machine or contaminate the environment when disposed of in landfills are removed. For example, the toner that can be found in photocopiers is extremely flammable and explosive, and can blow up the processing equipment if it is ignited, since many things can act as a fuel source, such as plastic. This procedure is extremely important and must be performed by skilled personnel.

After the waste is shredded, the metals, the valuable parts that make e-waste recycling a profitable industry, will be separated. Unlike previous sessions, this procedure does not require manual sorting. A large magnet will first attract all ferromagnetic materials such as iron and steel, which have a high susceptibility to magnetization. Then, further mechanical processing separates other metals and alloys based on a physical law called Eddy Current, where paramagnetic materials, materials that are weakly attracted to magnets, will be repelled when electric current is induced through a alternating magnetic field with a repulsive force, while other non-magnetic materials will , like plastic, simply pass through.

After that, the waste is further separated using water. At this stage, almost all that remains are non-magnetic materials; it will pass through another machine filled with water, where low-density materials, mostly plastics, will float, while other materials, such as glass, will sink. Finally, before the recycled materials are sold, they are checked to see if there are any remaining valuable materials left on the plastic.

GREENNEWS

Reciklaža E-otpada

TRENUTNI IZAZOVI U RECIKLAŽI

Samo 17,4 odsto dokumentovanog E-otpada reciklirano je 2019. godine, prema statisti. To se delimično može pripisati činjenici da mnogi elektronski uređaji danas nisu dizajnirani za reciklažu. Pametni telefoni postaju lakši i tanji, a njihove baterije više nisu zamenjive, što reciklažu čini mnogo težom i radno intenzivnijom. Ručno sortiranje zahteva da radnici budu neprestano izloženi toksičnim supstancama, iako u maloj meri, tokom dugog vremenskog perioda, dok ovi teško reciklirani elektronski uređaji zahtevaju od postrojenja da stalno ažurira svoje mašine kako bi održavalo korak sa promenljivom tehnologijom, što smanjuje podsticaj za preduzeća da recikliraju E-otpad koji je težak za rastavljanje.

Još jedan problem s kojim se suočava industrija recikliranja je taj što trenutno samo 10 od 60 hemijskih elemenata prisutnih u E-otpada može biti reciklirano putem mehaničke obrade: zlato, srebro, platina, kobalt, kalaj, bakar, gvožđe, aluminijum i olovo.

Recikliranje E-otpada ne samo da sprečava ulazak toksičnih supstanci u naša tela i u životnu sredinu, već proces takođe smanjuje štetne ekonomske uticaje koji nastaju ekstrakcijom i rudarenjem retkih materijala. Osim toga, ogromne su potencijalne ekonomske koristi koje se mogu ostvariti u ovoj industriji. Odbačeni E-otpad samo u 2019. godini vredeo je više od 57 milijardi dolara. Ipak, mnogo problemo treba prevazići pre nego što industrija dostigne svoj pun potencijal, uključujući proizvođače elektronike koji dizajniraju proizvode koji su prijateljski nastrojeni prema reciklaži i dalja istraživanja mehaničke obrade u reciklaži ostalih hemijskih elemenata.

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E-Waste Recycling

CURRENT CHALLENGES IN RECYCLING

Only 17.4 percent of documented E-waste was recycled in 2019, according to Statista. This can be attributed in part to the fact that many electronic devices today are not designed for recycling. Smartphones are becoming lighter and thinner, and their batteries are no longer replaceable, making recycling much more difficult and labor-intensive. Manual sorting requires workers to be continuously exposed to toxic substances, albeit in small amounts, over long period of time, while these difficult-to-recycle electronic devices require the facility to constantly update its machines to keep up with changing technology, reducing the incentive for businesses to recycle E-waste that is difficult to disassemble.

Another problem the recycling industry faces is that currently only 10 of 60 chemical elements present in E-waste can be recycled through mechanical processing: gold, silver, platinum, cobalt, tin, copper, iron, aluminum, and lead.

E-waste recycling not only prevents toxic substances from entering our bodies and the environment, but the process also reduces the harmful economic impacts that result from the extraction and mining of rare materials.

In addition, the potential economic benefits that can be realized in this industry are enormous.

Discarded E-waste was worth more than $57 billion in 2019 alone. However, many problems need to be overcome before the industry reaches its full potential, including electronics manufacturers designing recycling-friendly products and further research into mechanical processing in the recycling of other chemical elements.

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PERSPEKTIVA STAROSEDELAČKIH PREHRAMBENIH SISTEMA PRUŽA HOLISTIČKI PRISTUP PROIZVODNJI HRANE, DISTRIBUCIJI I POTROŠNJI KOJI STAVLJA U CENTAR PAŽNJE SUŽIVOT LJUDI S DRUGIM ŽIVIM BIĆIMA

Starosedelački narodi znaju tajnu

Indigenous Peoples Know the Secret

AN INDIGENOUS FOOD SYSTEMS LENS PROVIDES A HOLISTIC APPROACH TO FOOD PRODUCTION, DISTRIBUTION, AND CONSUMPTION THAT FOCUSES ON PEOPLE'S COEXISTENCE WITH OTHER LIVING BEINGS

Indigenous food systems and traditional land management techniques represent the best options for dealing with ecological restoration. However, outdated scientific models and conservative views of ecology have led many researchers to ignore and underestimate traditional ecological knowledge held by indigenous peoples, according to new research in the journal Frontiers.

Researchers from the Indigenous Ecology Laboratory at the University of British Columbia, and the Historical Ecological Laboratory at Simon Fraser University looked at two efforts to restore the indigenous territories of St'at'imc and Quw'utsun and described a method known as „pop-up restoration," used by non-governmental environmental organizations, extraction industries and government agencies to offer recommended techniques for land restoration and healing without taking into account the local scientific practices of indigenous communities. The authors of the research suggest that the pop-up restoration stems from deep-rooted misconceptions about the way of life of Indigenous Peoples and their knowledge due to long-standing prejudices and racist ideas. According to the researchers, pop-up restoration or restoration initiatives that impose injustices on unceded or stolen territories often ignore traditional food systems and indigenous history.

In the report, the authors define two cycles of post-disturbance restoration and the ways in which indigenous food systems approach restoration ecology and indigenous land, particularly when restoration erases long-standing land management and stewardship efforts.

„An indigenous food systems lens provides a holistic approach to food production, distribution, and consumption, that centers humans' coexistence with other living beings and prioritizes a cultural-ecological equilibrium over exploitation or fixed restoration goals," the authors wrote.

The first example comes from the St'at'imc Territory in British Columbia, where the voices of the St'at'imc community were ignored by government, hunters and farmers while providing traditional knowledge for rebuilding fire-ravaged land.

In June 2021, a heat wave in the region resulted in record temperatures that caused 619 heat-related deaths and created extreme fire conditions across the Pacific Northwest, ultimately leading to the McKay Creek Fire that burned about 85 miles of forests.

REZULTATI SUGERIŠU DA PRIMENA PERSPEKTIVE STAROSEDELAČKIH PREHRAMBENIH SISTEMA NA EKOLOŠKU OBNOVU MOŽE PRUŽITI KONKRETAN OKVIR ZA REŠAVANJE NEKIH PROBLEMA KOJI SE SUSREĆU U POLITIKAMA KOLONIJALIZMA

Starosedelački prehrambeni sistemi i tradicionalne tehnike upravljanja zemljom predstavljaju najbolje opcije za suočavanje sa ekološkom obnovom. Međutim, zastareli naučni modeli i konzervativni pogledi na ekologiju su doveli do toga da mnogi istraživači zanemaruju i potcenjuju tradicionalno ekološko znanje koje poseduju autohtoni narodi, kako navodi novo istraživanje u časopisu Frontiers.

Istraživači iz Laboratorije za starosedelačku ekologiju Univerziteta Britanske Kolumbije i Laboratorije za istorijsku ekologiju na Univerzitetu Simon Fraser proučavali su dva napora za obnovu starosedelačkih teritorija St'at'imc i Quw'utsun i opisali metod poznat kao „pop-up obnova", koji koriste nevladine organizacije za zaštitu životne sredine, industrije eksploatacije resursa i vladine agencije kako bi ponudili preporučene tehnike za obnovu i isceljenje zemlje bez uzimanja u obzir lokalne naučne prakse autohtonih zajednica. Autori istraživanja sugerišu da pop-up obnova proizilazi iz duboko ukorenjenih zabluda o načinu života autohtonih naroda i njihovim saznanjima zbog dugogodišnjih predrasuda i rasističkih ideja.

Prema istraživačima, pop-up obnova ili inicijative za obnovu koje nameću nepravde na teritorijama koje nisu ustupljene ili ukradene često zanemaruju tradicionalne prehrambene sisteme i starosedelačku istoriju.

U izveštaju, autori su definisali dva ciklusa obnove nakon poremećaja i načine na koje starosedelački prehrambeni sistemi pristupaju ekologiji obnove i starosedelačkoj zemlji, posebno kada obnova briše dugogodišnje napore za upravljanjem zemljištem i starateljstvo.

„Perspektiva starosedelačkih prehrambenih sistema pruža holistički pristup proizvodnji hrane, distribuciji i potrošnji koji stavlja u centar pažnje suživot ljudi s drugim živim bićima i daje prednost kulturno-ekološkoj ravnoteži nad eksploatacijom ili fiksnim ciljevima obnove", napisali su autori.

Prvi primer dolazi iz teritorije St'at'imc u Britanskoj Kolumbiji, gde su glasovi St'at'imc zajednice bili zanemareni od strane vlade, lovaca i farmera dok su

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RESULTS SUGGEST THAT APPLYING AN INDIGENOUS FOOD SYSTEMS PERSPECTIVE TO ECOLOGICAL RESTORATION CAN PROVIDE A CONCRETE FRAMEWORK FOR ADDRESSING SOME OF THE PROBLEMS ENCOUNTERED IN THE POLICIES OF COLONIALISM\

In response, a technical body was formed to facilitate communication between affected indigenous and settler communities, the Canadian government and farmers. The St'at'imc nation was given the opportunity to participate in the work of this body and share its ideas on the best ways to rebuild the country.

However, government-led recovery from forest fire in the region was largely driven by the values, goals and priorities of only a few interest groups. Farmers wanted to reseed much of the land with crop types that would introduce non-native plants, reducing the native vegetation needed to sustain the mammals, birds, and other wildlife that many rely on in the St'at'imc Nation.

"We observed how government policy and decision-making overlooked, and in some cases outright dismissed, St'at'imc voices, knowledge, and expertise at the table," the authors wrote.

The authors point out that the history of colonialism in the St'at'imc region began in the late 1850s during the Fraser River Gold Rush, which led to the establishment of cattle farming in the forests and grasslands of the area. The clearing of land for cattle farming, introduction of invasive species through fodder, wildfire suppression, land ownership by settlers, and the removal of St'at'imc peoples from their territories resulted in damage to the region, contributing to the McKay Creek wildfire, climate change, and the suffering of St' at'imc people

Finally, the authors of the research emphasized that it is important to recognize the effects of past and current waves of colonialism, to be genuinely open and flexible to the changing needs of the community, to know past failures and mistreatments, and to understand and empathize with different levels of interest, knowledge, resources and skills in supporting soil healing initiatives.

"Results suggest that applying an indigenous food systems lens to ecological restoration may provide a tangible framework for resolving some of the issues faced in top-down colonial policies common in pop-up restoration contexts," the authors wrote.

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pružali tradicionalna saznanja za obnovu zemlje uništene požarom.

U junu 2021. godine, talas vrućine u regionu je rezultirao rekordnim temperaturama koje su izazvale 619 smrtnih slučajeva povezanih s vrućinom i stvorile ekstremne uslove za požare širom Pacifičkog severozapada, što je na kraju dovelo do požara na teritoriji McKay Creek koji je spalio oko 85 milja šume.

Kao odgovor, formirano je tehničko telo koje je olakšavalo komunikaciju između pogođenih starosedelačkih i naseljenih zajednica, kanadske vlade i farmera. St'at'imc nacija je dobila priliku da učestvuje u radu ovog tela i podeli svoje ideje o najboljim načinima obnove zemlje.

Međutim, sanacija šumskih požara, koju je vodila vlada u regionu, bila je uglavnom vođena vrednostima, ciljevima i prioritetima samo nekoliko interesnih grupa. Farmeri su želeli da ponovo zaseju veći deo zemlje sa vrstama useva koje bi uvele neautohtone biljke, smanjujući autohtonu vegetaciju potrebnu za opstanak sisavaca, ptica i drugih divljih životinja, na koje se mnogi oslanjaju u St'at'imc naciji.

„Aktivno smo posmatrali kako su vlada i donošenje odluka potcenjivali, a u nekim slučajevima potpuno ignorisali glasove, saznanja i ekspertizu St'at'imc zajednice", napisali su autori.

Autori ističu da je istorija kolonijalizma u St'at'imc regionu započela kasnih 1850-ih godina tokom Zlatne groznice na reci Fraser, što je dovelo do uspostavljanja stočarstva u šumama i travnjacima tog područja. Krčenje zemlje za stočarstvo, unošenje invazivnih vrsta preko stočne hrane, suzbijanje požara, posedovanje zemljišta od strane naseljenika i proterivanje St'at'imc naroda sa njihovih teritorija rezultiralo je oštećenjem regiona, što je doprinelo požaru na McKay Creek, klimatskim promenama i patnji St'at'imc naroda.

Na kraju, autori istraživanja su istakli da je važno prepoznati efekte prošlih i aktuelnih talasa kolonijalizma, biti iskreno otvoren i fleksibilan prema promenljivim potrebama zajednice, poznavati prošle neuspehe i loša postupanja, i razumeti i saosećati sa različitim nivoima interesa, znanja, resursa i veština u podršci inicijativama za isceljenje zemljišta.

„Rezultati sugerišu da primena perspektive starosedelačkih prehrambenih sistema na ekološku obnovu može pružiti konkretni okvir za rešavanje nekih problema koji se susreću u politikama kolonijalizma, koje su česte u kontekstima pop-up obnove", napisali su autori. GN

Šokantne činjenice o bacanju hrane

25

Rasipanje hrane je sveprisutan problem širom sveta, dakle, ne samo u razvijenim zemljama. Trenutno, više od 800 miliona ljudi pati od sindroma teške pothranjenosti, što je šokantna činjenica, ako uzmemo u obzir da se jedna trećina svetske hrane - namenjene za ljudsku ishranu - baca ili „izgubi“.

Ovaj negativni trend loše utiče na životnu sredinu, privredu, sigurnost hrane i ishranu, dok uspešno rešavanje ovog pitanja ostaje veliki izazov u narednim godinama. Predstavljamo vam 25 šokantnih činjenica o bacanju hrane koje treba da znate, da biste se sa više svesti odnosili prema tome, i kako bi svet, konačno, krenuo boljim putem.

činjenice

1. Otprilike jedna trećina proizvedene hrane koja je namenjena za ljudsku ishranu svake godine – oko 1,3 milijarde tona, vrednosti od 1 bilion dolara – bude bačena ili izgubljena. Ova količina je dovoljna da prehrani tri milijarde ljudi.

2. Zbog otpada od hrane na kraju gubimo četvrtinu naših zaliha vode u obliku „nepojedene hrane“. To je jednako 172 milijarde dolara potrošenih u„otpadnoj vodi“.

3. Uzimajući u obzir sve resurse koji se koriste za uzgoj hrane, otpad od hrane koristi do 21 odsto slatke vode, 19 odsto đubriva, 18 odsto obradive zemlje i 21 odsto zapremine deponije.

4. Vodu koja se koristi za proizvodnju otpadne hrane, moglo bi da koristi devet milijardi ljudi, sa oko 200 litara po osobi dnevno.

5. Hrana koja se trenutno baca u Evropi mogla bi da nahrani 200 miliona ljudi, a u Latinskoj Americi i Africi po 300 miliona ljudi.

6. Godišnji otpad po glavi stanovnika - od strane potrošača - iznosi između 95-115 kiograma godišnje za Evropljane i stanovnike Severne Amerike, dok je u južnoj i jugoistočnoj Aziji ta količina šest do jedanaest kilograma.

7. Gubitak hrane i otpad čine oko 4,4 gigatone emisija gasova staklene bašte godišnje.

8. Da je gubitak hrane država, bila bi treći najveći emiter gasova staklene bašte, iza Kine i SAD.

9. Razvijene zemlje i zemlje u razvoju bacaju ili gube otprilike istu količinu hrane svake godine, 670 odnosno 630 miliona tona. Od toga je samo u EU ta brojka oko 88 miliona tona.

10. Ako pogledamo razvrstavanje po grupama namirnica, gubici i otpad godišnje izgledaju otprilike ovako: 30 odsto su žitarice, 40-50 odsto su korenasti usevi, kao i voće i povrće, 20 odsto su uljarice i meso, odnosno mlečni proizvodi, a 35 odsto se odnosi na ribu.

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Shocking Facts About Food Waste

Food waste is a pervasive problem all around the world, not just among developed nations. Currently, over 800 million people are suffering from severe malnutrition, which is a shocking fact if we consider that one-third of all the food that is intended for human consumption is wasted or 'lost'

This trend negatively affects the environment, the economy, food security, and nutrition while successful dealing with the issue remains a great challenge in the coming years. We present to you 25 shocking facts about food waste that you need to know, so that you can relate to it with more awareness, and the world can finally take a better path.

facts

1. Approximately one-third of the food produced that is intended for human consumption every year- around 1.3 billion tons and valued at $1 trillion- is wasted or lost. This amount is enough to feed 3 billion people.

2. Due to food waste, we lose a quarter of our water supply in the form of 'uneaten food'. That is equated to $172 billion in 'wasted water'.

3. Taking into account all the resources used to grow food, food waste uses up to 21% of freshwater, 19% of fertilizers, 18% of cropland, and 21% of landfill volume.

4. The water used to produce the food wasted could be used by 9 billion people at around 200 liters per person per day.

5. The food currently wasted in Europe could feed 200 million people, in Latin America 300 million people, and in Africa 300 million people.

6. Annual per capita waste by consumers is between 95-115 kilograms a year for Europeans and North Americans, while in the south and southeastern Asia, it is 6-11kgs.

7. Food loss and waste account for about 4.4 gigatonnes of greenhouse gas emissions annually.

8. If food loss was a country, it would be the third-largest greenhouse gas emitter, behind China and the US.

9. Developed and developing countries waste or lose roughly the same amount of food every year, at 670 and 630 million tons respectively. Around 88 million tons of this is in the EU alone.

10. Breaking it down by food group, losses, and waste per year are roughly 30% for cereals, 40-50% for root crops and fruit and vegetables, 20% for oil seed and meat and dairy, and 35% for fish.

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GREENNEWS

činjenice

11. Kada bi se sačuvalo 25 odsto hrane koja se trenutno gubi ili baca na globalnom nivou, to bi bilo dovoljno da se prehrani 870 miliona ljudi širom sveta.

12. Treba istaći i da će do sredine veka svetska populacija dostići 9 milijardi ljudi; drugim rečima, do tada bi proizvodnja hrane morala biti povećana za 70% u odnosu na sad, da bi se zadovoljila ova potražnja.

13. Imajmo u vidu i da se gubici u hrani pretvaraju u izgubljeni prihod za farmere i veće cene za potrošače, dajući društvu dodatni ekonomski podsticaj da smanjuje rasipanje hrane, koje svakako nikome ne ide u prilog.

14. U zemljama u razvoju, 40 odsto gubitaka nastaje u fazama nakon žetve i prerade, dok se više od 40 odsto gubitaka u razvijenim zemljama dešava na maloprodajnom i potrošačkom nivou.

15. Na nivou maloprodaje, velike količine hrane se bacaju zbog „izgleda", polovina svih proizvoda u SAD takođe se baca, jer se smatra previše „ružnim" za jelo; sve to zajedno iznosi čak 60 miliona tona voća i povrća.

16. Dolazimo do još jedne u nizu šokantnih činjenica, a to je: 25 odsto svetskih zaliha slatke vode koristi se za uzgoj hrane koja se nikada ne jede.

17. U Kini,više od 35 miliona tona hrane – što je ekvivalentno oko 6 odsto ukupne proizvodnje hrane u toj zemlji – godišnje se izgubi ili rasipa. To se prvenstveno dešava urestoranima i domaćinstvima.

18. Ciljevi održivog razvoja UN-a imaju za cilj da prepolove globalni otpad hrane po glavi stanovnika na maloprodajnom i potrošačkom nivou, i da smanje gubitke hrane duž lanaca proizvodnje i snabdevanja, uključujući gubitke nakon žetve.

19. Promocije u supermarketima, piše portal Earth. org, mogu dovesti do većeg bacanja hrane, jer možemo kupiti više hrane, one koja nam nije nužno potrebna, ako mislimo da dobijamo više za svoj novac.

20. Prema istraživanju koje je sproveo Respect Food, 63 odsto ljudi ne zna razliku između oznaka „iskoristiti do" i „najbolje upotrebiti do", tako da se neretko dešava da se baca potpuno jestiva hrana.

21. Zbog standarda o kvalitetu koji se previše „oslanjaju" na izgled namirnica, usevi se neretko ni ne uberu i ostaju da trunu.

22. Dok se u Evropi 40-60 odsto ulovljene ribe odbacuje jer, navodno, ne ispunjava standarde o kvalitetu koje traže supermarketi.

23. U SAD, organski otpad je najveći izvor emisije metana, što je gas staklene bašte koji ima 80 puta veću snagu zagrevanja od ugljen-dioksida.

24. Novi internet trendovi u nastajanju kao što je „Mukbang", gde slavne ličnosti i uticajni ljudi na društvenim mrežama uživo emituju video snimke o sebi kako jedu, takođe dovode do suvišnog bacanja hrane.

25. Dodatno se apeluje da, ako prestanemo da bacamo hranu, možemo uštedeti ekvivalent od 17 metričkih tona CO_2.

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Bačena hrana u Evropi

Europe wasted food

MOGLA BI DA NAHRANI

300 MILIONA LJUDI

U LATINSKOJ AMERICI ILI AFRICI

COULD FEED

300 MILLION PEOPLE

IN LATIN AMERICA OR AFRICI

facts

11. If 25% of the food currently being lost or wasted globally was saved, it would be enough to feed 870 million people around the world.

12. It should be pointed out that by the mid-century, the world population will hit 9 billion people; in other words, by then, food production must be increased by 70% from today's levels to meet this demand.

13. Let's keep in mind that food losses turn into lost income for farmers and higher prices for consumers, giving us an economic incentive to reduce food waste.

14. In developing countries, 40% of losses occur at the post-harvest and processing stages, while more than 40% of losses in developed countries occur at the retail and consumer levels.

15. At the retail level, large quantities of food are wasted because of an emphasis on appearance half of all produce is thrown away in the US because it is deemed too "ugly" to eat; this amounts to 60 million tons of fruits and vegetables.

16. We come to another in a series of shocking facts that 25% of the world's freshwater supply is used to grow food that is never eaten.

17. In China, more than 35 million tonnes of food – equivalent to about 6% of the country's total food production – are lost or wasted in the country annually. Food loss primarily occurs in restaurants and households.

18. The UN's Sustainable Development Goals aim to halve per capita global food waste at the retail and consumer level and reduce food losses along production and supply chains, including post-harvest losses.

19. Promotions in supermarkets, as the portal Earth. org writes, may lead to more food waste; we may buy more food that we do not necessarily need if we think we are getting more for our money.

20. According to a survey conducted by Respect Food, 63% of people do not know the difference between the "use by" and "best before" dates so it often happens that completely edible food is thrown away.

21. Because of quality standards that 'rely' too much on appearance, crops are sometimes left unharvested and rot.

22. In Europe, 40-60% of fish caught are discarded because they do not meet supermarket quality standards.

23. In the US, organic waste is the largest source of methane emissions, which is a greenhouse gas that has 80 times the warming power of carbon dioxide.

24. Emerging new internet trends such as "Mukbang", where personalities and social media influencers livestream videos of themselves binge-eating, are leading to excess food waste.

25. It is further requested that, if we stop throwing food away, we can save the equivalent of 17 metric tonnes of CO_2.

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Robot na četiri točka

ARCHAX je poseban po tome što može da pređe iz režima stajanja u režim vožnje

A Four-Wheeled Robot

ARCHAX has a special feature that it can switch from a standing mode to a driving mode

The robot can switch from a standing mode to a driving mode, and this ability of transformation is its most attractive feature

Japanese startup Tsubame Industries has presented a prototype four-wheeled robot named ARCHAX on YouTube, which is inspired by the country's popular animation TV series. According to the company, the working version of the robot should be officially presented at the Tokyo Motor Show in November, and it will be sold at a purchase price of as much as 2.8 million euros.

IMPRESSIVE DIMENSIONS

ARCHAX is 4.5 meters high and has a built-in cabin to accommodate a pilot who controls it, and the entire mechanism „draws" energy from a 300-volt battery. It weighs, believe it or not, 3.5 tons. As for the basic features, it has four legs with wheels, then functional hands with jointed fingers that allow it to handle objects weighing up to 15 kilograms.

THE POWER OF TRANSFORMATION

The Japanese robot can switch from standing mode to driving mode, and this ability of transformation is actually its most appealing feature. In standing mode, the maximum speed of ARCHAX is 1.9 kilometers per hour, and on four wheels it can move at a maximum speed of 10 kilometers per hour.

„Japan is very good at animation, video games, robots and cars, so I thought it would be great if I could create a product that would combine all these elements into one," said Ryo Yoshida, the CEO of the start-up.

Robot može da pređe iz režima stajanja u režim vožnje, a ta sposobnost transformacije je njegova najprivlačnija funkcija

Japanski startap „Tsubame Industries" je na svom Jutjubu predstavio prototip robota na četiri točka po imenu ARCHAX, koji je inspirisan popularnim anime TV serijama iz te zemlje. Inače, prema navodima kompanije, radna verzija robota bi trebalo da bude zvanično predstavljena na novembarskom Sajmu automobila u Tokiju, a prodavaće se po nabavnoj ceni od čak 2,8 miliona evra.

IMPRESIVNE DIMENZIJE

ARCHAX je visok 4,5 metara i ima ugrađenu kabinu za smeštaj pilota koji ga pokreće, a ceo mehanizam "crpi" energiju iz baterije od 300 volti. Težak je, verovali ili ne, 3,5 tone. Što se tiče osnovnih karakteristika, ima četiri noge sa točkovima, zatim funkcionalne ruke sa zglobnim prstima koji mu omogućavaju da upravlja predmetima težine do 15 kilograma.

MOĆ TRANSFORMACIJE

Japanski robot može da pređe iz režima stajanja u režim vožnje, a ta sposobnost transformacije je, zapravo, njegova najprivlačnija funkcija. U stojećem režimu, maksimalna brzina ARCHAX-a je 1,9 kilometara na sat, a na četiri točka može da se kreće maksimalnom brzinom od 10 kilometara po času.

„Japan je veoma dobar u animaciji, video igrama, robotima i automobilima, te sam pomislio da bi bilo sjajno kada bih mogao da stvorim proizvod koji bi sjedinio sve ove elemente u jedan", rekao je izvršni direktor ovog startapa Rio Jošida.

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Severna Makedonija postaje lider energetske tranzicije

Dimitar Kovačevski:
„Naša zemlja postaje hab zelene energije u Evropi"

Pred celom Evropom, suočenom sa energetskom krizom izazvanom sukobom u Ukrajini i velikim tumbanjima na globalnom tržištu energenata, nadvija se zima puna izazova i strahova.

Veliki broj zemalja još uvek traži način da obezbedi dovoljno energenata za funkcionisanje bitnih institucija i privrede, ali i individualne potrebe stanovništva. Premijer Severne Makedonije Dimitar Kovačevski nedavno je obznanio da je njegova zemlja energetsku krizu pretvorila u mogućnost, postvaši lider u energetskoj tranziciji i postavši „hab" zelene energije u Evropi.

„I ove godine je pred nama teška zima, ali ulazimo spremni kada je u pitanju snabdevanje električnom energijom. Pretvorili smo tu krizu u mogućnost, a Severna Makedonija je lider u energetskoj tranziciji i postajemo hab zelene energije u Evropi", rekao je Kovačevski na sastanku sa oko 500 predstavnika poslovne zajednice korisnika vladine podrške.

NOVIH 600 DOZVOLA ZA ELEKTRANE

Po njemu, u Severnoj Makedoniji je 2016. bilo instalirano 16 megavata fotonaponskih elektrana, a samo za godinu i po mandata njegove vlade, od januara 2022. godine do danas, izdato je 600 dozvola za elektrane na obnovljive izvore energije.

„Danas imamo 450 megavata obnovljivih izvora energije na mreži, a do kraja godine će biti instalirano i pušteno u mrežu 600 megavata obnovljivih izvora energije. To je više od kapaciteta cele (termoelektrane) REK Bitolj, ali to je čista zelena energija koja ne zagađuje životnu sredinu", rekao je Kovačevski.

Istakao je da je „konačno, posle 30 godina, izabran privatni investitor za izgradnju najveće pumpne hidroelektrane na Balkanu Čebren, koja je od velikog značaja za dekarbonizaciju i pravednu energetsku tranziciju".

North Macedonia is Becoming a Leader in the Energy Transition

Dimitar Kovačevski:
„Our country is becoming a green energy hub in Europe"

A winter full of challenges and fears is looming before Europe, faced with the energy crisis caused by the conflict in Ukraine and major upheavals on the global energy market.

A large number of countries are still looking for a way to provide enough energy for the functioning of important institutions and the economy, as well as individual needs of the population.

Dimitar Kovačevski, the Prime Minister of North Macedonia, has recently announced that his country has turned the energy crisis into an opportunity, becoming the leader in the energy transition and becoming a „hub" of green energy in Europe.

„A difficult winter is ahead of us this year as well, but we are prepared when it comes to electricity supply. We have turned the crisis into an opportunity, and North Macedonia is the leader in the energy transition, and we are becoming the green energy hub in Europe," Kovačevski said at the meeting with around 500 representatives of the business community - beneficiaries of government support.

NEW 600 PERMITS FOR POWER PLANTS

According to him, 16 megawatts of photovoltaic power plants were installed in North Macedonia in 2016, and during his government's mandate, from January 2022 until today, 600 permits have been issued for power plants based on renewable energy sources.

„Today we have 450 megawatts of renewable energy sources on the grid, and by the end of the year 600 megawatts of renewable energy sources will be installed and exported to the grid. That is more than the capacity of the entire (thermal power plant) REK Bitolj, but it is clean green energy that does not pollute the environment," Kovačevski said.

He pointed out that „finally, after 30 years, a private investor was chosen for the construction of Čebren, the largest pumped hydropower plant in the Balkans, which is of great importance for decarbonization and fair energy transition."

GREENNEWS

Dimitar Kovačevski:
„We have 450 MW of renewable energy on the grid, and another 600 MW will be installed and exported to the grid by the end of the year”

Dimitar Kovačevski:
„Imamo 450 MW obnovljivih izvora energije na mreži, a do kraja godine će biti instalirano i pušteno u mrežu još 600 MW”

VELIKE INOSTRANE INVESTICIJE

Kako kaže Kovačevski, priprema se i izgradnja najveće agro-solarne elektrane, kapaciteta 400 megavata i najvećeg vetroparka, koji će isto imati kapacitet 400 megavata.

„Severna Makedonija ima ambiciozan plan – izgradnju najvećeg agrovoltaičkog parka Stipion francuske kompanije AKIO, kapaciteta 400 megavata i najveći vetropark od 400 megavata Virovi nemačke kompanije ViPiDi”, rekao je Kovačevski i dodao da taj plan predviđa i novu kogeneracionu elektranu na prirodni gas grčke kompanije Mitilioneos.

„Ovi projekti, zajedno sa ogromnim brojem fotonaponskih elektrana koji se svakodnevno grade, omogućiće nam energetsku tranziciju na srednji rok i, što je najvažnije, omogućiće energetski rast, jer nijedna privreda ne može da se razvija bez energije”, rekao je premijer Severne Makedonije.

PRVA ENERGETSKA TRANZICIJA

Kovačevski je istakao da je njegova zemlja napravila prvu energetsku tranziciju termoelektrane na ugalj u REC Oslomej i da su, po istom principu, u završnoj fazi studije izvodljivosti nove fotonaponske elektrane snage preko 300 megavata na starom kopu u REK Bitolj. GN

BIG FOREIGN INVESTMENTS

According to Kovačevski, the construction of the largest agro-solar power plant, with a capacity of 400 megawatts, and the largest wind farm, which will also have a capacity of 400 megawatts, is also being prepared.

„North Macedonia has an ambitious plan - the construction of Stipion, the largest agrovoltaic park of the French company AKIO, with a capacity of 400 megawatts, and Virovi, the largest wind farm of 400 megawatts of the German company ViPiDi”, Kovačevski said, and added that the plan also envisages a new natural gas cogeneration plant of the Greek company Mitilioneos .

„These projects, together with the huge number of photovoltaic power plants that are being built every day, will enable us to make the energy transition in the medium term and, most importantly, will enable energy growth, because no economy can develop without energy,” said the Prime Minister of North Macedonia.

THE FIRST ENERGY TRANSITION

Kovačevski pointed out that his country made the first energy transition of a coal-fired thermal power plant in REC Oslomej and that, according to the same principle, new photovoltaic power plants with power of over 300 megawatts are in the final phase of the feasibility study in an old mine in REC Bitolj.

Požari, poplave i uragani

Leto koje je za nama obeleženo je ekstremnim vremenskim događajima širom sveta, potvrđujući zabrinjavajuće trendove u vezi sa klimatskim promenama.

Prema podacima Evropske agencije za praćenje klimatskih promena Copernicus, leto 2023. bilo je najtoplije zabeleženo u istoriji, sa temperaturama koje su, kako kažu, „znatno" premašile uobičajene proseke. Toplotni talasi bili su posebno izraženi tokom jula i avgusta meseca. Međutim, temperature su čak i u junu prelazile 0,5 stepeni Celzijusa iznad proseka za period 1991-2020, duplo oborivši prethodni rekord iz 1940. i 1975. godine od globalno prosečnih 14,9 stepeni. Jul je postao rekordni mesec kad su vrućine u pitanju, postajući najtopliji mesec u poslednjih, najmanje, 120.000 godina! Vrućine su posebno šokirale evropske zemlje, a Sredozemlje je osetilo velike posledice ovogodišnjih toplotnih talasa.

„GORELE" SICILIJA I SARDINIJA

Sredinom jula, na vrhuncu turističke sezone u Italiji, lokalne vlasti u 16 gradova izdale su crveno upozorenje zbog vrućine. Ostrva Sicilija i Sardinija zabeležila su maksimalne temperature od 49 stepeni!

Evropa je najbrže zagrevajući kontinent na svetu i ovaj proces dvostruko je brži od bilo kog drugog kontinenta

Fires, Floods and Hurricanes

Europe is the fastest warming continent in the world, and this process is twice as fast as the one on other continents

Last summer was marked by extreme weather conditions around the world, confirming worrying trends related to climate change.

According to the European Union's Copernicus Climate Change Service, the summer of 2023 was the hottest on record, with temperatures that „significantly" exceeded usual average temperatures. Heat waves particularly occured during the months of July and August. However, even in June, temperatures exceeded the 1991-2020 average by 0.5 degrees Celsius, as twice as previous records set in 1940 and 1975 of a global average of 14.9 degrees. July was the hottest month on record and likely for at least 120,000 years!

European countries were particularly shocked by the heat, and the Mediterranean suffered great consequences of this year's heat waves.

SICILY AND SARDINIA „BURNED"

In mid-July, at the peak of Italy's tourist season, local authorities in 16 cities issued a red alert due to the heat. The islands of Sicily and Sardinia recorded maximum temperatures of 49 degrees!

GREENNEWS

Nedavna istraživanja Svetske meteorološke organizacije (WMO) pokazala su da je Evropa najbrže zagrevajući kontinent na svetu i da je ovaj proces dvostruko brži od bilo kog drugog kontinenta od 1980-ih godina. Osim kopnenih temperatura, i temperature okeana su u porastu. Početkom avgusta, temperatura površine Sredozemnog mora dostigla je rekordnih 28,7 stepeni Celzijusa. Zagrevali su se i okeani. Na primer, okeanske vode kod Floride su takođe bile izuzetno tople. Ekstremne temperature ovog leta povezuju se sa El Ninjom, klimatskim fenomenom povezanim sa zagrevanjem površinskih temperatura okeana u centralno-istočnom ekvatorskom Tihom okeanu.

RAZORNE POPLAVE ŠIROM SVETA

Poplave i uragani pogađali su različite delove sveta ovog leta, sa skupim posledicama po ekonomije ovih zemalja, budući da su potrebne ogromne količine sredstava za popravku oštećene infrastrukture.

U septembru je Libija doživela najrazornije poplave u istoriji zemlje, koje su odnele više od 6.000 života, dok se više od 10.000 ljudi još uvek vodi kao nestalo.

Početkom oktobra, razorne poplave izazvane ciklonom zahvatile su 60 gradova u južnom Brazilu, ubivši desetine ljudi i raselivši više od 2.300 osoba širom zemlje.

Kina je nekoliko puta bila pogođena poplavama ovog leta, pri čemu je najznačajnija bila u jugoistočnom regionu u septembru.

Recent research by the World Meteorological Organization (WMO) has shown that Europe is the fastest warming continent in the world and this process has been twice as fast as the one on other continents since the 1980s. In addition to land temperatures, ocean temperatures are also on the rise. At the beginning of August, the sea surface temperature of the Mediterranean Sea reached record 28.7 degrees Celsius. The oceans also warmed up. For example, the ocean waters off Florida were also extremely warm. Last summer's extreme temperatures were linked to El Niño, a climate phenomenon associated with warming ocean surface temperatures in the central-eastern equatorial Pacific Ocean.

DESTRUCTIVE FLOODS AROUND THE WORLD

Floods and hurricanes hit different parts of the world last summer, with costly consequences for the economies of these countries, as huge amounts of funds are needed to repair damaged infrastructure.

In September, Libya experienced the most devastating floods in the country's history, which killed more than 6,000 people, while more than 10,000 people are still missing.

At the beginning of October, devastating floods caused by the cyclone swept through 60 cities in southern Brazil, killing dozens of people and displacing more than 2,300 people across the country.

China was hit by floods several times last summer, with the most significant one being in the southeast region in September.

Početkom avgusta, temperatura površine Sredozemnog mora dostigla je rekordnih 28,7 stepeni Celzijusa

At the beginning of August, the sea surface temperature of the Mediterranean Sea reached record 28.7 degrees Celsius

NAUČNICI SIGURNI ŠTA JE UZROK

Šumski požari zadesili su različite delove sveta ovog leta, prouzrokujući milionske štete ekonomijama zemalja i zagađenje vazduha. Naučnici nemaju dilema oko toga šta je glavni uzrok ovih katastrofa: reč je o klimatskim promenama! One su jedan od glavnih uzroka izuzetnih vrućina. Ekstremne temperature dovode do dugotrajnih suša i pogubnih šumskih požara.

Naučnici su otkrili da su klimatske promene doprinele smrtonosnoj suši na Rogu Afrike koja traje tri godine.

Enormne količine padavina takođe su direktna posledica klimatskih promena.

Pogoršavanje klimatskih promena sve više se manifestuje kroz učestalost ekstremnih klimatskih događaja tokom ovog leta.

Zaključak je jasan i vrlo hitan: vlasti i vlade širom sveta moraju što pre da smanje emisije štetnih gasova kako bi se izbegle sve češće i intenzivnije prirodne katastrofe.

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SCIENTISTS ARE SURE ABOUT THE CAUSE

Forest fires hit different parts of the world last summer, causing millions of dollars damage to countries' economies and air pollution. Scientists have no dilemma about what the main cause of these disasters is: it is climate change! They are one of the main causes of extreme heat. Extreme temperatures lead to prolonged droughts and devastating forest fires.

Scientists have found out that climate change has caused a deadly three-year drought in the Horn of Africa. Enormous amounts of rainfall are also a direct consequence of climate change.

The worsening of climate change is increasingly manifested through the frequency of extreme weather conditions during last summer.

The conclusion is clear and very urgent: authorities and governments around the world must reduce emissions of harmful gases as soon as possible in order to avoid more frequent and more intense natural disasters.

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