

info

ELNOS
GROUP

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Naslovna tema / Title theme

LOV NA VJETAR 06
ISTOČNE SRBIJE
CATCHING THE
WIND OF EAST SERBIA

Elnos Grupa / Elnos Group

GODINA OBILJEŽENA 22
NOVIM TRŽIŠTIMA:
VELIKA BRITANIJA I DANSKA
YEAR MARKED BY NEW MARKETS:
GREAT BRITAIN AND DENMARK

Misija / Mission Hurva-Sege

NA KRAJU (NE)MOGUĆEG 38
ZADATKA U ŠVEDSKOJ
AT THE END OF (IM)POSSIBLE
TASK IN SWEDEN

OBLIKUJEMO BUDUĆNOST

**OBNOVLJIVIM
IZVORIMA ENERGIJE!**

SHAPING THE FUTURE
WITH RENEWABLE
ENERGY SOURCES!



220 kV DV Hólasandstína 3, Island
Izgradnja dalekovoda nove generacije na trasi dugoj 60 km
220 kV TL Hólasandslína 3, Iceland
Construction of transmission line of new generation on 60 km long route



Riječ urednika

Editors letter

 Dragi prijatelji, poštovani partneri,

Živimo u vremenu ultrabrizih promjena, koje su počele s megatrendovima, a istorijski vrhunac dostigle tokom pandemije kovida 19. Naravno, i ovaj period ima svoje nepromjenjive konstante, od kojih je energetska tranzicija među najvažnijima za ekonomski oporavak. Zeleni i karbon neutralni projekti su od krucjalne važnosti na putu bolje, održive budućnosti, a zamah njihovog razvoja, kao i novi iskoraci koje smo napravili, razlozi su za optimizam koji želimo podijeliti sa vama.

Elnos Grupa je kompanija spremna za budućnost, jer se mijenjamo, razvijamo i prilagođavamo naše poslovanje novim izazovima. Energetski pejzaž se mijenja, ali ne i naša posvećenost održivoj energiji. Za nas je ovo period u kojem smo to potvrdili kroz angažman na brojnim projektima u oblasti OIE, od izgradnje i modernizacije elektrana ili infrastrukture za prihvatanje zelene energije, do učešća u nekim od najvećih infrastrukturnih projekata u Evropi koji su karbon neutralni.

Zbog toga je da nas rad u Elnos Grupi više od samog posla. To je prilika da budete dio nečeg velikog i nevjerojatnog. O čemu je riječ i kako to uspijevamo od Islanda, preko Velike Britanije, do S. Makedonije, na dalekovodima najnovije generacije ili projektima za ultrabrzе vozove, saznajte kroz najbolje priče iz naše poslovne godine.

 Dear friends and partners,

We are living in a fast-changing world. These extremely fast changes started with megatrends and reached their historical peak during Covid 19 pandemic. Nevertheless, even a period characterized by such on-going fluctuations has its constants, something that never alters. Most important among such constants is power transition, vital for economic recovery. Green and carbon neutral projects are crucial on our road to a better and sustainable future. The swing of their development, along with new steps we made forward, are a reason for optimism we wish to share with you.

Elnos Group is a future ready company. This is because we are constantly changing, developing and adjusting the way we run our business, depending on the challenges we face. Power landscape is changing, but not our commitment to sustainable energy. We confirmed this commitment in recent period by engaging in numerous RES projects, ranging from construction and modernization of power plants or infrastructure for integration of green energy, to involvement in some of the largest carbon neutral infrastructure projects in Europe.

Knowing this, it is no surprise that working in Elnos Group is more than just a job for us. It is an opportunity to be a part of something greater. Something amazing. What is the catch and how do we make it happen, riding on state-of-the-art transmission lines and high speed rails from Iceland, across Great Britain all over to South Macedonia? Read our best business stories of the year and find out.



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SADRŽAJ CONTENT

18

INTERVJU
**BUDUĆNOST JE
DIGITALNA**

INTERVIEW
FUTURE IS DIGITAL

Marko Mijić, novi član Uprave za tehničke poslove Elnos Grupe, podijelio je sa nama svoju priču o modernim tehnologijama koje će svijet pretvoriti u veliko igralište savremenog inženjeringu.

Marko Mijić, a new Member of the Elnos Group Board Member for Technical Affairs, shared with us his story on modern technologies, which shall turn the world into a big playground of modern engineering.



24

DVIJE DECENIJE IZVRSNOSTI
**ONI SU EKSPERTI SAVREMENOG
INŽENJERINGA**

TWO DECADES OF EXCELLENCE
**THEY ARE EXPERTS OF MODERN
ENGINEERING**

Elnos Srbija, u godini svog 20. jubileja, novim uspjesima svakodnevno potvrđuje zašto kotira kao jedna od vodećih elektroenergetskih kompanija u Srbiji.

Elnos Serbia, in the year of their 20th jubilee, affirms why it stands at the position of one of leading electrical engineering companies in Serbia by new successes on daily basis.



32

JAČANJE PRENOSNE MREŽE
KOD KUĆE, ŠIROM EVROPE

STRENGTHENING
TRANSFER NETWORK
AT HOME, ACROSS THE EUROPE

Nizom projekata izgradnje i rekonstrukcije dalekovoda, ekipa Elnos Grupe nastavljaju potvrđivati najviši nivo profesionalizma od Islanda do S. Makedonije.

Elnos Group teams continue to affirm the top level of professionalism from Iceland to N. Macedonia by a series of transmission line construction and reconstruction projects.



42

EKSPERTIZA
NA MJESTU GDJE JE
ROĐENA IKEA

EXPERTISE
WHERE IKEA WAS BORN

Realizovali smo dio velike rekonstrukcije 130/50/10 kV trafostanice Älmhult, koja napaja istoimeni malo grad na jugu Švedske, u kojem svi radno sposobni stanovnici grade jedan od najpoznatijih svjetskih brendova.

We performed a part of a big reconstruction of 130/50/10 kV Älmhult substation, which powers a small town of the same name in South of Sweden, where all working active inhabitants build one of the best-known world brands.



56

KORIDOR 10 KROZ SRBIJU
POVEZUJUĆI DRŽAVE,
LJUDE I MJESTA

CORRIDOR 10 THROUGH SERBIA
CONNECTING STATES,
PEOPLE AND PLACES

Rekonstrukcija željezničke dionice Jajinci-Mala Krsna je živopisna priča o maloj pruzi koja postaje dio važne evropske željezničke trase. Naši timovi su važna karika ove kompleksne infrastrukturne misije.

Reconstruction of railway section Jajinci-Mala Krsna is a picturesque story on a small railway becoming a part of an important European railway route. Our teams are a vital link in this complex infrastructure mission.



68

POGLED U BUDUĆNOST
OD TALENTA DO EKSPERTA

LOOK INTO THE FUTURE
FROM TALENT TO EXPERT

Elnos Grupa podržava mlade ljudе spremne da život i karijeru grade u našoj zemlji. Naše prakse do sada je pohađalo više od 200 srednjoškolaca, a ove godine rođena je i prva generacija inženjera pripravnika.

Elnos Group supports young people ready for building their lives and career in our country. So far, our practical classes have been attended by 200 secondary school students, and, this year, the first generation of trainee engineers was born.



OBLIKUJEMO BUDUĆNOST

OBNOVLJIVIM IZVORIMA ENERGIJE

SHAPING THE FUTURE WITH
RENEWABLE ENERGY SOURCES



SR Da bi usporila proces globalnog zagrijavanja i trend negativnih klimatskih promjena, Evropa posljednjih godina pravi sve značajniji strateški zaokret ka efikasnijem korištenju energije i njenoj proizvodnji iz obnovljivih izvora.

Zbog ozbiljnosti trenutne situacije, evropske energetske i klimatske politike redefinisele su svoje ciljeve do 2030. godine i insistiraju na povećanju učešća obnovljivih izvora u proizvodnji energije kako bi emisija CO₂ bila smanjena za 55 odsto u odnosu na 1990. godinu.

Investiranje u proizvodnju energije iz obnovljivih izvora je put ka postizanju klimatskog i energetskog balansa u budućnosti, a primjena novih tehnologija u projektima koji zahtijevaju dostizanje visokih standarda kvaliteta je odlična prilika za sve kompanije koje predano rade na ovom putu.

Elnos Grupa davno je prepoznaala ovu šansu i godinama unazad je akter projekata koji su mijenjali zelenu mapu regije i Evrope. I ove godine nastavili smo realizaciju naše misije usmjerene ka oblikovanju budućnosti uz obnovljive izvore energije.

Godinu na izmaku za Elnos Grupu obilježilo je učešće u projektima koji će donijeti nove vrijedne zelene megavate u oblasti vjetra i hidro elektrana. To su izgradnja vjetroparkova Krivača u Srbiji i Bogoslovec u Sjevernoj Makedoniji, revitalizacija starih MHE u zapadnoj Srbiji i izgradnja MHE Jablanica u BiH.

EN In order to slow down the process of global warming and a trend of negative climatic changes, Europe makes more important strategic turn towards more efficient consummation of energy and its production from renewable sources in recent years.

Due to severity of the current situation, European energy and climatic politics redefined their goals up to 2030 and they insist on increasing participation of renewable sources in production of energy so that CO₂ emission would decrease for 55 percent compared to 1990.

Investment in producing energy from renewable sources is the road towards achieving climatic and energy balance in future, and application of these technologies in projects demanding achievement of high-quality standards is an excellent opportunity for all the companies devoted to this goal.

Long ago, Elnos Group recognized this opportunity, and it has been an actor of projects changing regional and European green map for years back. This year, we have also continued realization of our mission directed towards shaping future with renewable energy sources.

As for Elnos Group, year that is almost over is characteristic for participation in projects to bring new valuable green megawatts in the fields of hydro and wind plants. Those are constructions of Wind Park Krivača in Serbia and Bogoslovec in North Macedonia, revitalization of old SHPP in West Serbia as well as construction of SHPP Jablanica in BiH.

POČETKOM IZGRADNJE VJETROPARKA

KRIVAČA (103 MW), Srbija je ove godine napravila još jedan nov i važan korak na strateškom putu tranzicije zemlje ka obnovljivim izvorima energije. Ovaj projekat je za timove Elnos Srbije nova i važna prilika za potvrdu najviših standarda inženjeringu u oblasti obnovljivih izvora energije.

BY STARTING CONSTRUCTION OF WIND PARK

KRIVAČA (103 MW), Serbia has made another and important step forward on the strategic road of the country's transition towards renewable energy sources this year. For Elnos Serbia teams, this project is a new and important opportunity to affirm the highest engineering standards in the field of renewable energy sources.

VJETROPARK KRIVAČA WIND PARK KRIVAČA

ULOVUNA VJETAR ISTOČNE SRBIJE

CATCHING THE WIND OF
EAST SERBIA



SR Još se veoma živo sjećamo vremena kada su naše ekipe prije dvije godine uspješno završile niz kompleksnih projektnih zadataka u okviru izgradnje najvećeg vjetroparka na zapadnom Balkanu – Čibuk 1 (158 MW). Ovog ljeta naši timovi našli su se na početku novog zahtjevnog OIE zadatka, ovoga puta u istočnoj Srbiji. Zajedno sa ostalim operativcima na terenu, oni su započeli lov na zelene megavate iz energije vjetra u okviru projekta izgradnje vjetroparka Krivača – prve vjetroelektrane u Srbiji koja nastaje južno od Save i Dunava.

RADOVI ELNOS SRBIJE

Elnos Srbija će tokom ove i sljedeće godine realizovati izgradnju važnih elektroenergetskih objekata zahvaljujući kojima će se energija proizvedena u budućem vjetroparku Krivača isporučivati u 110 kV elektroenergetsku mrežu. Naša kompanija angažovana je kao glavni ugovarač koji će izgraditi Balance of plant – BoP te priključke ovog vjetroparka na prenosnu mrežu u prvoj fazi projekta.

To podrazumijeva izgradnju 13 km puteva, objekta transformacije 33/110 kVVE Krivača,

proširenje dvije postojeće 110/35 kV trafostanice Veliko Gradište i Neresnica, kao i polaganje 10 kV kabla za napajanje postrojenja sopstvene potrošnje budućeg priključno-razvodnog postrojenja (PRP) 110 kV Krivača.

U okviru projekta izgradnje ovih objekata ekipe Elnos Grupe biće uključene u sve etape radova.

EKIPE NA DJELU

O veličini i budućoj dinamici ovog projekta možda najbolje govori činjenica da će za vrijeme njegove realizacije na terenu biti angažovan najveći dio operative Elnos Srbije: timovi za elektrane, trafostanice i građevinski tim, uz podršku tima za reljefnu zaštitu i upravljanje.

„Do sada smo u okviru prve etape radova gotovo u potpunosti realizovali radove probijanja 13 kilometara duge trase pristupnih puteva te oko 70 odsto kompletnih građevinskih radova na trasi. U okviru ove faze započeli smo i radove na proširenju trafostanica Veliko Gradište i Neresnice te izgradnji novog objekta transformacije VP Krivača“, rekao je

Stefan Golubović, vodeći inženjer Elnos Srbije. On je istakao da će značajan fokus rada u nastavku projekta biti na elektroenergetskim elementima koji će biti u funkciji isporuke električne energije u elektroprenosnu mrežu.

„Energija iz vjetroparka Krivača isporučivaće se preko objekta transformacije 33/110 kV VE Krivača, koja će biti povezana na 110/35 kV transformatornicu Veliko Gradište i Neresnica posredstvom dva nova 110 kV dalekovoda, a mi smo veoma važan akter građenja upravo te poveznice“, rekao je Golubović.

On je istakao i to da zadatak Elnos Srbije podrazumejava i izradu projektne dokumentacije, nabavku i isporuku cijelokupne opreme, gradivinske i elektromontažne radove, ispitivanje i puštanje u rad.

„Kao kompanija sa potvrđenim kredibilitetom u sferi visokih investicionih zahtjeva današnjice, sa nestrupljenjem očekujemo zahuktavanje ovog, ali i svih drugih projekata iz oblasti obnovljivih izvora energije u Srbiji“, rekao je Golubović.

O VJETROPARKU KRIVAČA

Izgradnja vjetroparka Krivača u aktuelnom trenutku još više dobija na značaju zbog toga što je ovaj projekat prva velika investicija na polju obnovljivih izvora energije čija realizacija počinje nakon usvajanja novog Zakona o obnovljivim izvorima Srbije, ali i prvi vjetropark čija gradnja počinje nakon velikog buma u izgradnji iz 2017. godine.

Vjetropark Kirvača nastaje na 242,16 hektara brdovitog Braničevskog okruga. Područje na kojem će se budući vjetropark prostirati zahvata oblasti tri opštine ovog kraja – Golubac, Kučevo i Veliko Gradište.

U vjetroparku će biti izgrađene 22 vjetroturbine snage 4,8 MW, čija će maksimalna visina biti 180 metara.

Planirana godišnja proizvodnja ovog vjetroparka biće 310 GWh električne energije, što je oko jedan odsto ukupne godišnje potrošnje Srbije. Radovi na izgradnji vjetroparka Krivača trebalo bi da budu okončani u drugoj polovini 2023. godine, kada bi vjetroelektrana trebalo da počne plasiranje električne energije u prenosnu mrežu Srbije.

RIJEĆ INVESTITORA

Investitor izgradnje vjetroelektrane Krivača je projektna kompanija „Ivicom Energy“, u vlasništvu kompanija „Ivicom Holding“ i „H-Planet“, koja je regionalno aktivna učesnik na planu ulaganja u projekte iz oblasti zelene energije.

Dušan Muškatirović, savjetnik u kompaniji „Ivicom Energy“, istakao je da je realizacija ovog projekta počela nakon decenije veoma detaljnih ispitivanja, što njenom početku daje još veći značaj.

„Ovaj projekat realizuje se u dijelu Srbije koji, nažalost, nije dovoljno razvijen, ali posjeduje veoma veliki potencijal. Upravo zato smo ponosni što smo baš u ovom dijelu Srbije našli mjesto gdje možemo da spojimo dvije na prvi pogled

nespojive stvari – proizvodnju energije koja nam je potrebna za svakodnevni život, ali u uslovima u kojima čuvamo prirodnu okolinu. Vjetropark Krivača sasvim sigurno će donijeti višestruku dobit lokalnim zajednicama ove regije, što će na najbolji način pokazati budućnost“, rekao je Muškatirović.

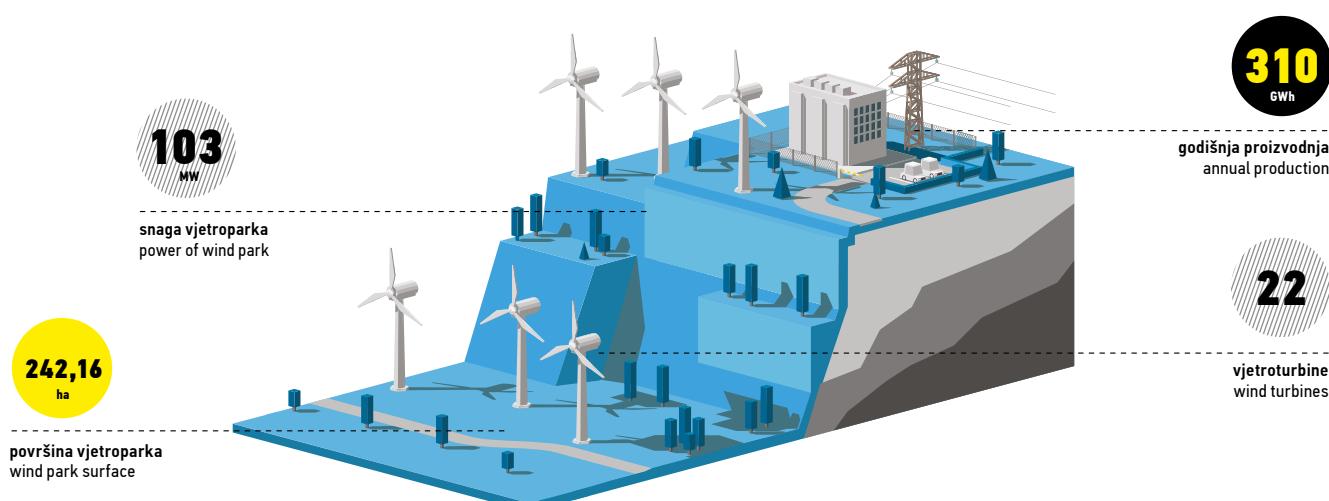
EN We still have vivid memories of times when our teams successfully completed a series of complex project tasks within construction of the biggest wind park in West Balkans – Čibuk 1 (158 MW) two years ago. This summer, our teams found themselves at the beginning of a new RES task, in East Serbia this time. Along with other members of operation team, they started hunting green megawatts from wind energy within the project of constructing Wind Park Krivača – the first wind power plant in Serbia established southern from the Sava and Danube.

ELNOS SERBIA WORKS

During this and next year, Elnos Serbia shall perform construction of important electrical power facilities thanks to which the energy produced in future Wind Park Krivača shall be delivered to 110 kV electrical power network. Our company is engaged as the Main Contractor for constructing Balance of plant – BoP, as well as for connection of this wind park to transfer network in the first phase of the project, which includes construction of 13 km of roads, 33/110 kV transformation facility

Vjetroelektrana Krivača

Wind park Krivača





Na zadatku proširenja TS 110/35 kV Veliko Gradište On the task of expanding SS 110/35 kV Veliko Gradište

"WPP Krivača", expanding of two existing 110/35 kV substations - Veliko Gradište and Neresnica, as well as laying 10 kV cables for powering in-house plant of the future connection-distribution plant (110 kV „Krivača").

In the frame of the construction project of these facilities, Elnos Group teams shall be included in all work phases.

TEAMS AT WORK

Size and future dynamics of this project might be best described by fact that, during its realization on site, most of Elnos Serbia operation team shall be engaged: teams for power plants, substations and construction team supported by team for relay protection and control.

"So far, within the first phase of works, we have almost performed trenching works on 13 kilometers long route of access roads as well as about 70 percent of all construction works on the route. Within this phase, we also started works on expanding substations Veliko Gradište and Neresnica as well as construction of new transformation facility WPP Krivača", stated Stefan Golubović, Senior project engineer in Elnos Srbija.

He stated that significant works focus of the project to come shall be on power engineering elements, which shall serve for delivering electrical power to the power transfer network.

"Power from the Wind Park Krivača shall be supplied through 33/110 kV transformation facility "WPP Krivača", which shall be conne-

ceted to 110/35 kV substations Veliko Gradište and Neresnica via two new 110 kV transmission lines, and we are very strong construction factor of the very connection", stated Golubović.

He also stated that Elnos Serbia's task understood making of project documentation, supply and delivery of entire equipment, construction and electrical assembly works, testing and commission.

"Being a company with affirmed credibility in the field of today's high investment demands, we are eager to welcome heating of this, as well as all the other, projects in the field of renewable energy sources in Serbia", stated Golubović.

ABOUT WIND PARK KRIVAČA

Construction of Wind Park Krivača in the current moment is more significant due to the fact that this project is the first big investment in the field of renewable energy sources, whose realization starts after adopting the new Serbian Law on renewable energy sources, and it is the first wind park whose construction starts after a big construction boom in 2017.

Wind Park Krivača covers 242.16 hectares of Braničevski county. Area of the future wind park covers areas of three regional municipalities – Golubac, Kučevac and Veliko Gradište.

There will be 22 wind turbines of 4.8 MW built in the wind park, whose maximum height shall be 180 meters.

Planned annual production of this wind park shall be 310 GWh of electrical power, which represents about one present of total annual consumption in Serbia. Works on construction of Wind Park Krivača should be completed in the second half of 2023, when the wind power plant should start supply of electrical power to Serbian transmission network.

A WORD BY INVESTOR

Project company "Ivicom Energy" is the Investor of the construction for the Wind Power Plant "Krivača", owned by companies "Ivicom Holding" and "H-Planet", which is regional active participant of the investment plan of the green energy projects.

Dušan Muškatirović, Advisor at Ivicom Energy, stated the realization of this project started after a decade of very detailed testing, which is even more significant for its beginning.

"This project is being performed in the part of Serbia, which, unfortunately, is not developed enough, but it has a huge capacity. This is the reason we are proud we found a location in this part of Serbia, where we can connect two things, which, apparently, cannot be connected – production of power we need for everyday life, but in conditions we preserve environment. Wind Park Krivača surely shall provide multiple benefit to local communities of this region, which, in the best way, shall show future", stated Muškatirović.

VJETROPARK BOGOSLOVEC WIND PARK BOGOSLOVEC

S. MAKEDONIJA OSLOBAĐA ZELENI POTENCIJAL

**NORTH MACEDONIA
RELEASES GREEN CAPACITY**

SA VJETROPOTENCIJALOM koji se procjenjuje na 6,2 MW po kilometru kvadratnom, Sjeverna Makedonija spada u krug država sa najvećim potencijalom za proizvodnju energije iz vjetra u jugoistočnoj Evropi. Oslobođanje velikog zelenog potencijala je strateški cilj ove zemlje, a bitan korak u njegovoј realizaciji je izgradnja vjetroparka Bogoslovec (36 MW).

HAVING WIND CAPACITY estimated to 6.2 MW per square kilometer, North Macedonia falls into a group of countries with highest capacity for production of power from wind in Southeast Europe. Releasing great green capacity is a strategic aim of this country and an important step in its realization is construction of Wind Park Bogoslovec (36 MW).

SR Osam godina nakon što su, zajedno sa brojnom operativom, uspješno završile izgradnju prvog vjetroparka u Sjevernoj Makedoniji – vjetroparka Bogdanci (36,8 MW) – naše ekipe su sa mnogo entuzijazma zakoračile u poduhvat izgradnje drugog vjetroparka u ovoj zemlji.

Vjetropark Bogoslovec će se graditi na površini od 70 hektara, na lokaciji između opština Štip i Sv. Nikole. Imaće osam vjetrenjača instalisane snage 4,5 MW i u budućnosti će proizvoditi električnu energiju za 20.000 domaćinstava. Ekološke studije predviđaju da će njegova izgradnja doprinijeti smanjenju emisije ugljen-dioksida za 87.000 tona godišnje.

GRADIMO „KRVOTOK“ NOVOG VJETROPARKA

Ekipama Elnosa povjereni su zadaci na izgradnji elektroenergetskih elemenata koji će u budućnosti imati funkciju „krvotoka“ novog vjetroparka Bogoslovec.

Naime, od ovog do narednog ljeta one će graditi 4,6 kilometara 2×110 kV priključnog dalekovoda na trasi od 33/110 kV trafostанице Bogoslovec do postojećeg 110 kV dalekovoda TS Štip–TS Ovče Polje, te srednjena-



ponsku mrežu za povezivanje vjetroturbina sa novom trafostanicom Bogoslovec.

Prema trenutnim procjenama, timovi naše kompanije će u okviru ovog projekta položiti 39 kilometra SN kablova, koji će formirati veliku mrežu za napajanje vjetroparka. Naše ekipe će takođe realizovati radove na izradi uzemljenja za temelje vjetroturbina.

Od samog početka realizacija radova krenula je ubrzanim tempom.

„Već na samom startu radovi na terenu izgledali su dinamično tako da smatram da će praćenje razvoja ovog projekta u perspektivi biti izazov samo po sebi. Svaka faza izvođenja projekta isplanirana je tako da ima najmanji mogući uticaj na životnu sredinu. Ovo



U okviru ovog projekta čemo položiti 39 km SN kablova
We will lay 39 km of MV cables within this project

znači da su svi pristupni putevi za kretanje te lokacije za odlaganje striktno definisani i da se svaki naš korak pomno prati", precizirao je Martin Spasovski, tehnički direktor Elnos Sjeverne Makedonije.

Na mjestu rođenja novog vjetroparka za vrijeme izvođenja radova biće angažovana mala armija, koja će brojati između 30 i 40 ljudi.

„Pred sve nas koji smo dio ovog velikog projekta postavljen je izazov besprijekornog profesionalizma kakav smo dugo priželjkivali“, istakao je Spasovski.

U svjetlu strategije za proizvodnju električne energije iz zelenih izvora i napuštanja proizvodnje električne energije iz „prljavih“



Gradilište iz ptičije perspektive
Bird's eye view of the site

vih“ energetika do 2030, realizacija projekta izgradnje vjetroparka Bogoslovec od velikog je značaja.

Vjetropark Bogoslovec je prva privatna investicija ovakvog tipa u S. Makedoniji, a u rad će biti pušten 2023. godine.

EN Very enthusiastic, our teams entered endeavor of constructing the second wind park in this country eight years after successfully completing, with numerous operation staff, the first wind park in North Macedonia – Wind Park Bogdanci (36.8 MW).

Wind Park Bogoslovec shall be constructed on the area of 70 hectares, at the location between Municipalities of Štip and Saint

Nicola (Sv. Nikola). There will be eight wind turbines of 4.5 MW installed power and shall produce electrical power for 20,000 households in the future. Environmental studies anticipate that its construction shall contribute decrease of carbon dioxide emission for 87,000 tons a year.

WE BUILD “BLOODSTREAM” OF NEW WIND PARK

Elnos teams were entrusted with tasks for constructing electrical power elements, which would have a role of “Bloodstream” of the new Wind Park Bogoslovec in future.

Namely, from this till next summer, Elnos teams shall construct 4.6 kilometers of 2 × 110 kV connecting transmission line of the section of 33/110 kV Bogoslovec substation to the existing 110 kV transmission line SS Štip-SS Ovče Polje, as well as medium voltage network for connecting wind turbines with new Bogoslovec substation.

According to the current estimates, within this project, our company teams shall lay 39 kilometers of MV cables, which shall form a big network for powering wind park. Our teams shall also perform works of installation of grounding of wind turbines.

From the very beginning, works performance started in fast tempo.

“At the very beginning, field works were dynamic, so I believe that supervision of this project development in perspective shall be challenge itself. Each project performance stage has been planned so it has the least possible ecological affect. This means that all access roads for this location movement for deposition have been strictly defined and that each and every step of ours is closely supervised”, Martin Spasovski, DOO of Elnos North Macedonia, precisely stated.

At the location of the new wind park, a small army, between 30 and 40 people, shall be engaged.

“A challenge of impeccable professionalism, which we longed for, has been set before all of us being a part of this big project”, stated Spasovski.

In the light of strategy for production of electrical power from green sources and abandonment of production of electrical power from “dirty” energy sources up to 2030, realization of the project of constructing Wind Park Bogoslovec is of great importance.

Wind Park Bogoslovec is the first privately funded investment of this kind in North Macedonia and shall be commissioned in 2023.



Ugradnja turbine i generatora u mašinskoj zgradi MHE Jablanica Installation of turbine and generator in mechanical building of SHPP Jablanica

MHE JABLICA SHPP JABLICA

Mala elektrana, **VELIKI PODVIG**

SMALL PLANT, BIG ENDEAVOR

BITI ZNATIŽELJAN, željeti da doživiš potencijal nove tehnologije, tragati za najboljim rješenjem i na kraju mu „dati život“ proces je oblikovanja novih postignuća modernog inženjeringu.

Prije početka izgradnje MHE Jablanica, naš tim inženjera osjetio je upravo ovakvu znatiželju i upustio se u avanturu zahvaljujući kojoj je, kroz izgradnju jedne male elektrane, realizovao veliki inženjerski poduhvat.

TO BE CURIOUS, wish to experience capacity of new technology, search for the best solution and “provide life” to it at the end, is the process of shaping new endeavors in modern engineering.

Before construction of the SHPP Jablanica started, our team of engineers was just this curious and started adventure thanks to which, through construction of a small power plant, performed a big engineering endeavor.

SR Mala hidroelektrana Jablanica rođena je u Donjem Vardištu, kod Višegrada, na rijeci po kojoj je dobila ime. Kao daljinski upravljava elektrana derivacionog tipa, snage jednog MW, izgrađena je da bi proizvodila četiri GWh električne energije godišnje.

Timovi našeg inženjeringu izgradnju MHE Jablanica vidjeli su kao priliku za novi iskorak u realizaciji višeg nivoa projektnih zadataka po sistemu „ključ u ruke“. Koristeći najmoderne tehnologije, oni su, prvi put gradeći jednu hidroelektranu sopstvenim kapacitetima, realizovali građevinsku fazu radova te izveli kompleksne etape planiranja, projektovanja i upravljanja elektranom.

Sredinom oktobra, MHE Jablanica počela je da piše svoj radni dnevnik, a ispred vas je naša priča o tome kako smo, gradeći nju, oblikovali jedan od budućih pravaca razvoja inženjeringu Elnos Grupe.

DIGITALNO UPRAVLJANJE GRAĐEVINSKIM PROJEKTOM

Realizacija građevinske etape radova u MHE Jablanica u samostalnoj režiji bila je misija visokog nivoa kompleksnosti. Preusmjeravanja toku rijeke, izgradnja 8,5 metara visoke brane i dva vodozahvata... sve su to zadaci na kojima su naše ekipe pokazale vrhunski profesionalizam. U okviru ove faze naša partnerska firma „Siming“ iz Foče je izgradila 4,5 kilometara cjevovoda.

Ipak, zadatak za „pet plus“ bio je izvođenje složene etape izgradnje mašinske zgrade, u okviru kojeg je u njenu kompleksnu geometriju trebalo uklopiti zahtjevnu hidromašinsku opremu. Ovaj posao tražio je nova i efikasna rješenja, a građevinci Elnosa našli su ih u upotrebi digitalne platforme – BIM (Building Information Modeling). Šta je u stvari BIM?

BIM je novi termin koji opisuje način na koji svi učesnici izgradnje objekta mogu razumjeti objekat kroz korištenje digitalnog 3D modela. Ova platforma oslanja se na niz podataka sastavljenih zajedničkim dizajniranjem prije, za vrijeme i nakon izgradnje objekta. BIM sadrži sve informacije o projektu koje unose svi njegovi akteri koji svakog trenutka na svojim tabletima i telefonima mogu da ažuriraju važne podatke i prate njegov razvoj.

Primjenom ove tehnologije građevinarstvo prolazi kroz digitalnu revoluciju, a Elnos je postao dio nje.

„Projektovanje konstruktivne faze mašinske zgrade i ugradnja kapitalne opreme u srce same mašinske zgrade predstavlja posebnu vrstu izazova za svakog građevinskog inženjera i statičara. S ciljem da napravimo iskorak i napravimo što bolji rezultat odlučili smo da počnemo

sa korištenjem BIM tehnologije. Ova tehnologija nam je omogućila da prije same izgradnje objekta vidimo sve kolizije u različitim fazama projekta i na vrijeme donešemo bolje odluke. Na ovaj način lakše smo upravljali troškovima, vremenom, te primijenjenim materijalima. Zahvaljujući primjeni nove tehnologije i našoj spremnosti da učimo i uložimo mnogo ličnog truda dobili smo odlične ocjene od strane supervizora“, rekla je Ana Mijić, rukovodilac sektora za gradevinu Elnosa Banjaluka.

SISTEM UPRAVLJANJA ELEKTRANOM

Smatra se da je instalacija sistema upravljanja elektranom najvažniji dio inženjeringu u projektu izgradnje elektrane. U svojoj suštini, on je mozak elektrane koji upravlja radom turbine i svim sistemima za njen ispravan, pouzdan i bezbjedan rad. U okviru izgradnje MHE Jablanica naše ekipe prvi put su samostalno izvezle ovaj dio posla.

Ova zahtjevna faza radova podrazumijeva projektovanje ormara upravljanja (zajedno sa ormarom generatorskog prekidača i ormarom sopstvene potrošnje te ostalim elementima), izradu ormara, njihovo testiranje u proizvodnom pogonu, ugradnju u elektranu, povezivanje svih neophodnih signala, „suva“ i „mokra“ testiranja i na kraju samo puštanje u rad.

„U ovakvom poduhvatu zaista veoma zahtjevan bio je sam početak. Sama faza projektovanja sistema upravljanja i kompletne elektrofazе trajala je tri mjeseca. Svako rješenje koje smo pronalazili pokazivalo je svoje prednosti i mane tako da nije bilo jednostavno odlučiti se za to koja oprema i koji koncept nam najviše odgovaraju. Kada je ta etapa okončana, stvari su tekle lakše“, rekao je Slaven Pavlović, vodeći inženjer u Elnos Grupi.

Ključna oprema sistema upravljanja koju smo ugradili u MHE Jablanica sastoji se iz sljedećih komponenata: PLC (programmable logic controller), HMI (Human Machine Interface), sinhronizator i zaštitni uredaj generatora, regulator pobude generatora i ostala pomoćna oprema koja čini jedan ormara upravljanja agregatom. PLC je centralni element koji upravlja i turbinom, i generatorom, i kompletom opremom unutar elektrane.

„Izgraditi samostalno upravljački algoritam i strategiju upravljanja nije jednostavan zadatak. Bilo je neophodno obezbijediti odgovarajući koncept sistema koji može učiniti da sve funkcioniše na efikasan, pouzdan i bezbjedan način“, rekao je Pavlović.

Važno je napomenuti da smo u vrlo kratkom roku, nakon završene faze projektovanja,

izvršili izradu potrebnih ormara kao i njihovo fabričko testiranje (FAT - Fabrical Acceptance Test). Ovaj posao naše ekipe realizovale su u našim EMR radionicama uhvativši se ukoštač sa zadacima kakve realizuje malo ko na ovdašnjem tržištu.

„Ožičenje unutar navedenih ormara prilično je složeno. U ormare je implementirano veoma mnogo ulaza i izlaza (koji završavaju na PLC-u) i više hardverskih zaštitu koje služe kao rezerva u slučaju kvara na PLC-u ili nekom od drugih kritičnih elemenata sistema. Mislim da možemo biti ponosni na rješenje i proizvod koji smo napravili“, rekao je Pavlović.

ELEKTROMAŠINSKA I HIDROMEHANIČKA FAZA

Izgradnja hidroelektrana uвijek predstavlja multidisciplinarni inženjerski izazov, a naše ekipe bile su zadužene i za realizaciju kompletne elektromašinske i hidromehaničke faze radova na MHE Jablanica.

Ova etapa, između ostalog, podrazumijeva ugradnju hidromehaničke opreme na vodozahvatima, energetskih i ormara zaštite i upravljanja u mašinskoj zgradi, instalaciju SN postrojenja, transformatora te svih potrebnih energetskih i komandno-signalnih kablova i, naravno, ugradnju „srca“ same elektrane – turbine i generatora.

Duško Čabrilović, vodeći inženjer u Elnos Grupi, ističe da je na ovom projektu radio mladi tim stručnjaka kompanije koji već ima dragocjeno iskustvo u ovoj oblasti te da je ovaj projekat za njih značajan iskorak.

„U okviru ovog projekta na sebe smo preuzeli izmjene projektnog rješenja, a zatim smo sami harmonizovali građevinsku, elektro i mašinsku fazu. Iskustvo koje smo godinama unazad sakupljali na prethodnim projektima značajno nam je pomoglo da uspješno realizujemo projekat izgradnje ove male hidroelektrane“, rekao je Čabrilović.

EN Small hydro-power plant Jablanica was born in Donje Vardište, in the vicinity of Višegrad, on the river it got the name after. Being remotely controllable power plant of derivation type, power of 1 MW, it was built in order to produce four GWh of electrical power annually.

Our engineering teams saw construction of the SHPP Jablanica as an opportunity for new breakthrough in realization of higher-level “turn-key” projects. Using latest technologies, building a hydro-power plant for the first time with own capacities, they performed construction phase of works and realized complex stages of planning, designing and managing the plant.

In the mid-October, SHPP Jablanica started its operating dairy, and here is our story on how we shaped one of the future directions of developing the Elnos Group engineering through construction of this hydro-power plant.

DIGITAL CONTROL OF CONSTRUCTION PROJECT

Realization of construction phase of works in SHPP Jablanica in own organization was a high-complexity task. Redirecting river flow, construction of 8.5 meters high dam and two water intakes ... all these had been tasks on which our teams showed top level of professionalism. Siming, our partner company from Foča, constructed a 4.5 km long pipeline during this phase.

However, task for "A plus" was performance of complex phase for construction of engine building, where demanding mechanical equipment should fit in its complex geometry. This task asked for new and efficient solutions and Elnos constructors found them in using digital platform – BIM (Building Information Modeling). What BIM actually is?

BIM is a new term describing way that all the participants in facility construction can understand use of digital 3D model. This platform relies on a series of data collected through joint designing before, during, and after construction of the facility. BIM contains information on project entered by all its participants,

who can update important data and monitor its development on their tablets and telephones in any moment.

Through application of this technology, civil engineering goes through digital revolution, and Elnos is a part of it.

"Designing constructive phase of mechanical building and installation of equipment in the heart of mechanical building are a special kind of challenge for each civil engineer and structural engineer. In the aim of breakthrough and achieving the best possible result, we decided to start with using BIM technology. This technology provided us with possibility to identify all collisions before the construction of the facility itself in different project phases and to make the best decisions timely. In this way, it was easier for us to manage costs, time and applied materials. Thanks to application of this technology and our readiness to learn and invest a lot of personal effort, we got excellent reviews from the Supervisor", stated Ana Mijić, head of the Construction Sector in Elnos Banja Luka.

POWER PLANT MANAGEMENT SYSTEM

Installation of the power plant control system is considered to be the most important part of engineering in the project of plant construction. Essentially, the system is the brain of the plant controlling the turbine operation and operation

of all systems for plant's proper, reliable and safe work. In the frame of constructing SHPP Jablanica, our teams performed this part of work on their own for the first time.

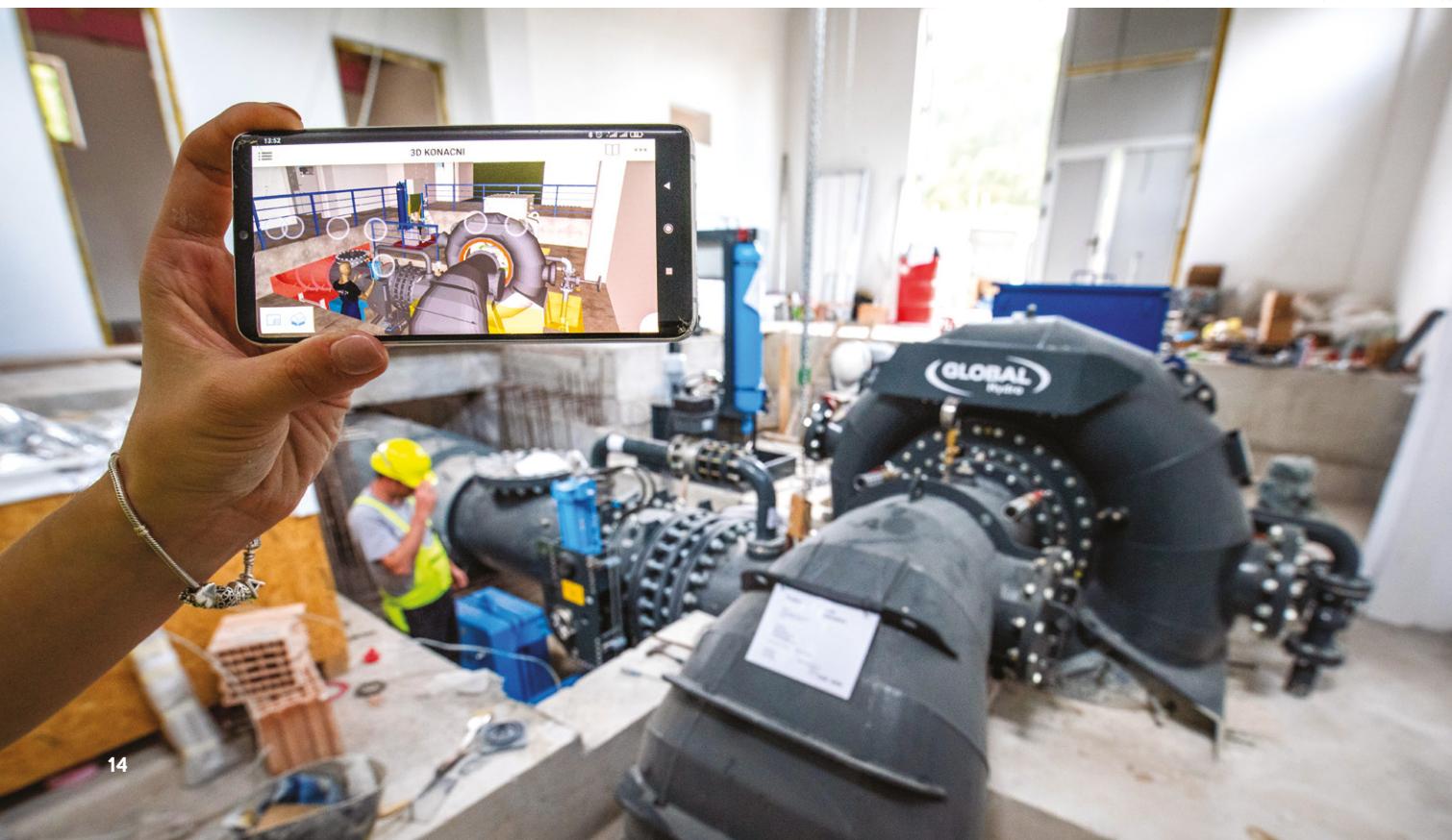
This demanding phase of works includes designing control cabinets (along with cabinet for generator switch and cabinet for own consumption and other elements), construction of cabinets, their testing in production plant, installation in the power plant, connecting all necessary signals, "dry" and "wet" tests, as well as its commission at the end.

"Beginning was very demanding in this endeavor. Designing control system and entire electrical phase has lasted for three months. Each solution we found indicated its pros and cons so it was not easy to decide what equipment and concept would be the most suitable for us. Once this stage completed, it was easier", stated Slaven Pavlović, Senior project engineer in Elnos Group.

Key control system equipment we are installing consists of the following components: PLC, (programmable logical controller), HMI (Human Machine Interface), synchronization and protective device of the generator, regulator of generator incentive and other accessory equipment, which is one cabinet of generator control. PLC is the central element also controlling turbine generator and entire equipment within the power plant.

"It is not easy to create independent controlling

Gradjevinska faza realizovana uz primjenu BIM tehnologije Civil engineering phase completed applying BIM technology





Naši inženjeri na djelu Our engineers in action

algorithm and controlling strategy. We had to provide appropriate concept of the system to make sure everything functioned in an efficient, reliable and safe way", stated Pavlović.

It is important to mention that we made necessary cabinets as well as their FAT – Factory Acceptance Test in a very short period after designing phase. Our teams performed these works in our EM workshops dealing with tasks only a few perform in the local market.

"Wiring inside mentioned cabinets is pretty complex. Significant number of connections were implemented in cabinets (which end on PLC) and multiple hardware protections operating as backup in case of failure PLC or some of other critical system elements. I believe we can be proud of solution and product we crea-

ted", stated Pavlović.

ELECTROMECHANICAL AND HYDROMECHANICAL PHASE

Construction of hydro-power plants always is multidisciplinary engineering challenge, and our teams also were in charge of realization of entire electromechanical and hydromechanical phase of works on small hydro power plant Jablanica.

This stage, among other activities, includes installation of hydromechanical equipment on water intakes, energy cabinets, cabinets for protection and control in engine building, installation of midle voltage plant, transformers and all the necessary energy and command-signal

cables, as well as installation of the "heart" of the plant itself – turbine and generator.

Duško Čabriło, Senior project engineer in Elnos Group, states that a young team of company experts worked on this project; this teams has already had precious experience in this field and this project is a significant step forward for them.

"In the frame of this project, we undertook design solution changes and, afterwards, we harmonized civil engineering, electrical and mechanical phase ourselves. Experience we collected in earlier years on previous projects helped us significantly to perform project of this small hydro-power plant successfully", stated Čabriło.

Brojke

Figures



8,5
m
visina brane
dam height



1.500
m²
betona ugradeno u
branu
concrete built-in in dam



3.000
m³
betona ugradeno u sve
objekte
concrete built-in in all
facilities



120
t
armiranog čelika ugra-
đeno u sve objekte
reinforced steel built-in
in all facilities



18.000
m³
korisna zapremina
akumulacionog jezera
usable space of accumula-
tion lake



950
kW
snaga Francis turbine
power of Francis turbine



Tesla's first in Serbia – MHHP "Pod gradom" in Užice

Novi zeleni kilovati potekli IZ STARIH MHE ZAPADNE SRBIJE

NEW GREEN KILOWATTS RUNNING FROM OLD MHPPs IN WEST SERBIA

VELIKA REKONSTRUKCIJA SEDAM STARIH MHE zapadne Srbije donijela je najmanje 50 novih godina života mini-hidroelektranama koje su bile prepuštene zubu vremena. Timovi Elnos Grupe u proteklih šest godina uspješno su savladali niz kompleksnih zadataka u okviru postupka modernizacije starih hidroelektrana ove regije da bi se danas našli na kraju uspješne misije koja je donijela nove, zlata vrijedne zelene kilovate Srbiji.

A BIG RECONSTRUCTION OF SEVEN OLD MHPPs in West Serbia provided at least 50 new years of life for mini-hydro power plants exposed to ravages of time. In the last six years, Elnos Group teams have successfully overcome a series of complex tasks within modernization of old hydro power plants in this region. Today teams are at the end of a successful mission that resulted in new, golden green kilowatts for Serbia.

SR Modernizacija elektroenergetskih objekata, koji su stari i po više od 100 godina, bila je veliki ispit za našu kompaniju i izazov koji je podrazumijevao kompleksne radove na svim nivoima. U istinske bisere tehnike ugrađivani su najsvremenija sofisticirana oprema, softveri i najkvalitetniji materijali. Ovo je bio projekt koji je donosio izazove na svakom koraku.

U okviru velikog i zahtjevnog procesa realizovali smo poslove ugradnje savremene opreme u stare pogone: MHE Seljašnica kod Prijepolja, Kratovska reka kod Pribroja, Radaljska banja kod Malog Zvornika, Moravica u Ivanjici, užičkih MHE Turica i Pod gradom te MHE Raška u Novom Pazaru.

Realizacijom postupka modernizacije povećani su kapacitet i stepen pouzdanosti rada starih MHE, a one će zajedno Elektroprivredi

Srbije donijeti značajno povećanje broja kWh dobijenih iz obnovljivih izvora energije. Kompletan postrojenja starih mini-hidroelektrana su u potpunosti modernizovana, automatizovana, te uskoro ulaze u testnu etapu daljinskog upravljanja.

Rad na svakoj MHE bio je zahtjevan i tražio je posebnu pripremu kako projektanata tako i izvođača. Trebalo je mnogo strpljenja i vremena da bi se kvalitetno realizovao postupak projektovanja, kako bi se kasnije iznašlo optimalno rješenje za ugradnju opreme u svaku MHE.

Da je u pitanju bio veliki i izazovan posao, potvrđuje i naš inženjer Nenad Mićić, koji je bio direktno uključen u cijeli proces revitalizacije. Kako on objašnjava, zadatak konzorcijuma na čijem je čelu bila Elnos Srbija, u najširem kontekstu podrazumijevao je poslove proizvodnje, ispitivanja, isporuke, ugradnje elektromašinske opreme i puštanja mini-hidroelektrana u rad.

Istakao je da su najkompleksniji bili radovi montaže turbina i generatora na svim MHE te dodoa da su se ekipe suočile sa najzahtjevnijim zadacima za vrijeme revitalizacije MHE Raška, posljednje MHE obuhvaćene velikim poduhvatom.

„Najveći izazov je svakako bila modernizacija MHE Raška, koja je po gabaritima same građevine, a i po snazi agregata bila najzahtjevnija. Važno je napomenuti da vodu koju ova MHE koristi za rad agregata grad Novi Pazar koristi kao pitku vodu. Njeni stari agregati radili su 24 sata, 365 dana godišnje, a od momenta kada više nisu pomagali remonti i servisi, pristupilo se kompletnoj rekonstrukciji MHE Raška. Njena revitalizacija svakako je bila finiš projekta za pamćenje. Naime, ova MHE svojim obimom nije ništa manja od nekih mnogo većih hidroelektrana. Ona je bila veliki test za nas, počev od montaže turbina, čije smo pozicije morali prilagoditi postojećem cjevovodu, povezivanja sa generatorom i preciznog podešavanja, kompletne izmjene postojećeg stanja MHE, do novog 35 kV postrojenja sa zasebnim ormarima sopstvene potrošnje za MHE i dio Elektrodistribucije. Ipak, zahvaljujući velikom trudu cijeli postupak smo uspješno priveli kraju“, rekao je Mićić.

On je na kraju istakao da su ekipe angažovane na ovom projektu pokazale najviši stepen efikasnosti i inovativnosti.

„Revitalizacija MHE je mnogo kompleksniji posao od izgradnje novih MHE, a modernizacija ovakvih postrojenja je još teži zadatak u odnosu na standardne rekonstrukcije. Upravo zato je ovaj poduhvat svima nama donio neprocjenjivo iskustvo koje se rijetko gdje može steći“, rekao je Mićić.

EN Modernization of electrical power facilities, some of which are more than 100 years old, was a big test for our company and challenge that understood complex works at all levels. State-of-art sophisticated equipment was installed in true technical pearls, as well as software and best quality materials, which was a project that had brought challenges on each step.

In the frame of big and demanding process, we performed works on installation of modern and sophisticated equipment in old plants: MHPP Seljašnica in the vicinity of Prijepolje, Kratovska reka in the vicinity of Priboj, Radaljska banja in the vicinity of Mali Zvornik, Moravica in Ivanjica, Užice MHPP Turica and Pod gradom, as well as MHPP Raška in Novi Pazar.

By realization of modernization procedures, capacities and degree of operation reliability of old MHPPs were increased, and, altogether, they will provide Elektroprivreda Serbia with significant increase in number of kWh resulting from renewable energy sources. Entire plants of old mini-hydro power plants have been fully modernized, automated, and soon they start a test phase of remote control.

Work on every MHPP was demanding and asked for special preparation of both designers and contractors. A lot of patience and time was necessary to perform a designing procedure, in order to find an optimal solution for installation of equipment in each MHPP afterwards.

Nenad Mićić, our engineer who was directly engaged in whole revitalization process, also confirms this was a big and challenging work. In his words, task for the consortium led by Elnos Serbia, in broadest sense, includes works of production, testing, delivery, installation of electrical-mechanical equipment and commissioning of mini-hydro power plants.

He stated that the most complex works had been assembly of turbines and generators on all mini-hydro power plants and added that teams had faced most demanding tasks during revitalization of MHPP Raška, the last MHPPs of the big endeavor.

“Biggest challenge certainly was modernization of MHPP Raška, which, according to size of the facility itself as well as power of generator, was the most demanding. It is important to mention that water used by this MHPP for operation of generator is also used by city Novi Pazar as drinking water. Its old generators operated 24 hours a day, 365 days a year. In the moment when upgrades and services could not help, entire reconstruction of MHPP Raška was launched. Its revitalization certainly was the finish of the project to remember. Namely, in its volume, this MHPP is not smaller than some big hydro power plants. It was a big test for us, starting with turbine assembly, whose positions had to be adjusted to the existing pipeline, connection to generator and precise setting, complete exchange of the current MHPP's state, up to new 35 kV plant with separated cabinets for own consumption for MHPP and for Power distribution utility. However, thanks to great effort, we completed entire procedure successfully”, stated Mićić.

At the end, he stated that teams engaged for this project had shown the highest level of efficiency and innovation.

“Revitalization of is more complex work than constructing new MHPPs. Modernization of these plants is even more difficult task compared to standard reconstructions. This is why this endeavor provided all of us with precious experience, which rarely could be acquired”, stated Mićić.

U stare MHE ugradena moderna oprema Modern equipment installed in old MHPPs





Marko Mijić, član Uprave Elnos Grupe za tehničke poslove Marko Mijić, Elnos Group Board Member for Technical Affairs

Budućnost je digitalna

FUTURE IS DIGITAL

MODERNE TEHNOLOGIJE svijet pretvaraju u veliko igralište savremenog inženjeringu, a biti dio te „igre“ je nešto neprocjenjivo, kaže Marko Mijić, novi član Uprave za tehničke poslove Elnos Grupe.

Mijić je u proteklih deset godina postao jedan od ključnih ljudi kompanije, a sa nama je podijelio priču o ljubavi prema pozivu, najvećim uspjesima, preprekama i ličnim izazovima.

MODERN TECHNOLOGIES turn the world into a big playground of modern engineering, and to be a part of this “game” is priceless, stated Marko Mijić, a new Member of the Elnos Group Board Member for Technical Affairs.

In the past ten years, Mijić has become one of key people in the company. He shared a story on love for profession, biggest successes, obstacles and personal challenges with us.

SR Kada ste prije deset godina počeli da radite u Elnos Grupi, kako ste zamišljali svoju budućnost?

Da li ta vizija podsjeća na ono što živate danas?

Sjećam se da je vrijeme završetka fakulteta za mene ujedno bilo period velikih odluka. Ispred mene je stajalo kratko, ali teško pitanje – da li otići ili ostati? Naime, za vrijeme studiranja aktivno sam učestvovao u istraživačkim radovima na TU Ilmenau u Njemačkoj, što mi je otvorilo mogućnost za odlazak na doktorske studije u inostranstvo. U tom trenutku to je bila vrlo primamljiva ponuda.

Ipak, zbog snažnog osjećaja povezanosti i odgovornosti prema sredini u kojoj sam rođen i odrastao, odlučio sam da gradim budućnost u rodnoj zemlji. Tako sam po završetku ETF-a, a na preporku profesora sa katedre, 2011. godine počeo raditi u Elnos Grupi. Kao i većina mladih inženjera, u kompaniju sam došao sa mnogo teoretskog znanja i poleta. U budućnosti sam sebe vidio kao eksperta koji razumije ključne pojave i tehnologije te kroz stručni i naučni rad učestvuje u planiranju i građenju savremenih elektroenergetskih objekata.

Budućnost je pred mene postavila širok spekter prioriteta, tako da je i moj rad odstupio od bavljenja isključivo strukom. Broj timova za koje sam vremenom postajao odgovoran je rastao i fokus mog posla se usmjerio na stvaranje preduslova da ti timovi ostvare maksimalan napredak i rezultat. Danas mogu reći da vizija iz prvih radnih dana podsjeća na ono što živim, a to je planiranje jednog velikog sistema koji učestvuje u razvoju, izradi rješenja, izgradnji i eksploataciji elektroenergetskih objekata.

U kojim okolnostima ste u dosadašnjoj karijeri u Elnosu najviše učili i čemu ste se najviše radovali?

Jedno je sigurno, najviše se uči na projektima na kojima investitor, nadzor i izvođač stavljuju kvalitet na prvo mjesto i za vrijeme same postavke projekta obezbijede preduslove za takav rad. To su projekti u kojima pronađenje optimalnih rješenja i perfektno planiranje postaju najvažniji dio njihovog životnog ciklusa. Najveću radost u poslu donosi mi trenutak kada nakon mnogo uloženog za jedničkog truda vidim složen objekat koji je obezbijedio sve tražene performanse.

Do sada ste na profesionalnoj mapi realizovali niz uspješnih projekata. Koji projektni izazov za Vas nosi poseban značaj i zbog čega?

Iza mene i ljudi sa kojima sam saradivao zaida je širok spekter projekata koji su sa sobom nosili niz izazova na planu dinamike, logistike obima resursa, izazovnih i specifičnih tržišta.

Za mene su najveći izazov i značaj predstavljali projekti na kojima smo bili nosioci razvoja, izbora niza rješenja i konačnih performansi objekta. Prvi veliki objekat tog tipa za koji sam bio odgovoran bila je izgradnja MHE Bočac 2, u koju su ugrađena dva agregata ukupne snage 10 MW. Bio je to poduhvat u okviru kojeg smo realizovali veoma kompleksne mašinske i elektro faze radova. Iako je planiranje svakog sljedećeg „turn-key“ projekta bilo sličan izazov, MHE Bočac 2 kao prvi u nizu većih izazova na mene je ostavio najveći utisak.

Šta su, po Vašem mišljenju, najznačajniji elementi koji u perspektivi mogu biti važni za razvoj poslovanja kompanije u budućnosti?

S obzirom na to da postoji odgovarajući prostor na tržištu, kao najvažniji stub daljeg razvoja vidim ljudske potencijale i znanja koja kao kolektiv posjedujemo te našu spremnost da ih primijenimo. Menadžment se nalazi pred izazovom da obezbijedi odgovarajuće uslove, organizacione podloge i optimalno usmjerenje, s ciljem da se navedeni potencijali očuvaju, dalje razvijaju, da se obezbijedi kvalitet i nastavi produbljivati naša pozicija na tržištu. Najveći izazov pred Elnos Grupom je očuvanje kvaliteta uz ekspanziju u kojoj se trenutno nalazimo. Sada planiramo pravovremenu pripremu za budućnost koja zahtijeva više profilisanja u svim sektorima.

Digitalizacija definije razvoj elektroenergetike budućnosti. Da li je upravo ona jedan od najznačajnijih izazova pred kojim se i mi kao kompanija danas nalazimo?

Oblast elektroenergetike posljednjih godina, za razliku od prethodnih, prolazi kroz veliku tranziciju. Pokretači ove tranzicije nisu samo globalne politike i želje potrošača, već primarno nove tehnologije koje otvaraju brojne mogućnosti. Novi trendovi najviše se ogledaju kroz rastući broj načina proizvodnje energije na mjestima na kojima to ranije nije bilo moguće, zatim kroz nove načine njenog skladištenja te povećanje efikasnosti u procesima proizvodnje, distribucije i potrošnje energije. Odvijanje ovih procesa danas se može u još većoj mjeri realizovati digitalizovano, odnosno brže, efikasnije i uz korištenje velikih mogućnosti optimizacija kroz IoT, Big Data, AI i druge tehnologije. Elnos Grupu vidim kao kompaniju koja će znati da prepozna i iskoristi promjene te da održi poziciju lidera u oblasti elektroenergetike kroz još veće učešće u razvoju i realizaciji novih projekata uz primjenu novih tehnologija. Digitalizacija je jedan od najvažnijih trendova energetike budućnosti, ona je nosilac ogromnih

mogućnosti i mi je kao takvu moramo prihvati i maksimalno iskoristiti.

Elnos Grupa je primjer kompanije sa domaćom adresom koja je poznata po svom iskoraku na evropska tržišta. Šta je najznačajnije za ovakav uspjeh?

Mi smo kao kompanija dokazali da je iskorak na neka od najzahtjevnijih evropskih tržišta energetike moguć. Za takve iskorake potrebno je mnogo ulagati u znanja, kadrove, savremenu mehanizaciju i moderne tehnologije. Pored toga, neophodno je posjedovati upornost i odlučnost da bi se kvalitet poslovanja i organizacija kompanije konstantno podizali na viši nivo. Važno je istaći i to da se mi kao kompanija u svom radu nismo vodili konkurenčiom, već smo sami sebi svakodnevno postavljali visoke kriterijume. Nažalost, domaće kompanije rijetko uspijevaju da naprave značajniji izlazak na inostrana tržišta i nadam se da ćemo ih svojim primjerom ohrabriti na nove iskorake.

Šta smatrate presudno važnim za građenje uspješne karijere? Koji je Vaš lični poslovni moto?

Mislim da uspješnu karijeru pokreće strast za novim znanjima i savladavanjem izazova. Takva želja sa sobom donosi opredijeljenost ka cjeloživotnom učenju, disciplini i kontinuiranom radu. Neophodno je imati snažan fokus na prave vrijednosti i ostati im dosljedan čak i ako ih tržište i okruženje ponekad obezvrijede, što zahtijeva mnogo istrajnosti. Tokom razvoja karijere važno je biti u zdravom društvenom okruženju, u kojem postoji kontinuirana želja da naše danas bude bolje sutra i da svako od nas bude svjestan svoje uloge na tom putu kroz insistiranje na vrijednostima integriteta, poštovanja, iskrenosti, povjerenja, timskog rada, kvaliteta, kontinuiranog učenja, napredovanja i u konačnici naše pozitivne svrhe.

Šta je najljepše u inženjerskom poslu?

Najljepši dio inženjerskog posla je u prevaziлаženju izazova na putu razumijevanja i savladavanju prirodnih pojava. Znatiželja i osjećaj svrhe koji nas pokreću svakodnevno daju posebnu ljepotu našem poslu. Tehnološke inovacije i njihova primjena današnji svijet pretvara u jedno veliko igralište za inženjere, a biti dio te igre je nešto neprocjenjivo.

Da li smatrate da ste u odnosu prema poslu više timski igrač ili individualac?

Godinama sam se bavio karateom kao individualnim sportom, a u sportu i za vrijeme školovanja sam kao individualac ostvarivao odlične

rezultate. Ipak, kada je posao u pitanju, vidim se kao timski igrač. Uživam u razmjeni mišljenja i ideja i uvijek podržavam različitosti i drugačije pristupe. Volim da dijelim znanje i svjedočim malim i velikim pobjadama mojih saradnika. Uvijek me posebno raduje rad sa motivisanim timovima i upravo je pozitivna timska energija zaslužna za to što je veliki broj zahtjevnih projekata iza nas u lijepom sjećanju.

EN When you started working for Elnos Group ten years ago, what was your vision of your future?

Does it remind of what you are living nowadays?

I remember that the time of completing the faculty was also a period of big decisions for me at the same time. I was faced with short, yet difficult question – should I stay or should I go? Namely, during studies, I actively participated in research teams in TU Ilmenau in Germany, which provided me with possibility to go for postgraduate studies abroad. In that moment, that was a very attractive offer.

However, due to strong feeling of connection and responsibility to the environment I was born and grew up in, I decided to build future in the country I was born in. So, after I completed Faculty of Electrical Engineering, recommended by the Head of Department, in 2011 I started working in Elnos Group. Just like many young engineers, I entered the company with a lot of theoretical knowledge and enthusiasm. In future, I saw myself as an expert understanding key phenomena and technologies as well as the one taking part in planning and building modern electrical power facilities through scientific work.

Future faced me with a wide spectrum of prio-

rities, so that my work also deviated from dealing with my profession primarily. Number of teams, which I became responsible for in time, grew and focus of my work was directed to creating preconditions these teams should acquire maximum improvement and results. Today, I can say the vision from the beginning working days reminds me of what I am living, and this is planning a big system participating in development, creating solutions, construction and exploitation of electrical power facilities.

What were circumstances you learned the most from so far and what was the thing you were most looking for in your career in Elnos?

One is sure: you learn the most working on the projects where Investor, Engineer and Contractor put quality in the first place and even in the setting up project itself, they provide pre-conditions for such a performance. Those are projects where finding optimal solutions and perfect planning become the most important part of their lifecycle. Biggest joy in work lies in the moment when, after a lot of joint effort invested, I see a complex facility providing all demanded features.

So far you have performed a series of successful projects on professional map. What project challenge has a special importance for you and why?

There is a wide spectrum of projects carrying a series of challenges on plan of time schedule, logistics, scope of resources, challenging and specific markets behind me and people I used to work with. For me, biggest challenge and significance were projects in which we had been leaders of development, selection of series of solutions and final characteristics of the facility. First facility of such a type, that I was responsible for, was construction of MHPP Bočac 2, where two generators of total power amounting to 10 MW had been installed. It was an endeavor when we performed very complex works of mechanical and electrical phase. Although planning of each following "turn-key" project was similar challenge, MHPP Bočac 2, being the first in a series of bigger challenges, was the most impressive for me.

In your opinion, what are the most important elements that, in perspective, could be important for development of company's business operations in future?

Considering the fact there is an appropriate space for that at the market, I believe the most important point of further development are human capacities and knowledge, which we own as a company as well as our readiness to

CAREER

Mijić joined the company in order to work on development and research of RES projects. After the initial period, he started realization of a series of projects in the field of industry, infrastructure, substations and hydro-power plants.

In time, acquiring new knowledge and experience, he was getting a series of responsibilities: first at the position of Head of the team for Elnos BL power plants, then deputy of DOO, later as Elnos BL DOO and finally as a Member of the Management Board of the Elnos Group.

apply them. Management is facing a challenge to provide appropriate conditions, organizational bases and optimal directions in the aim to preserve aforementioned capacities, to develop them further, to provide quality and continue strengthening our position at the market. Biggest challenge the Elnos Group is facing is preservation of quality with expansion we are currently at. Now, we plan timely preparation for future, which demands more profiling in all sectors.

Digitalization defines development of electrical power in future. Is it one of the most significant challenges we, as a company, are facing?

In the past years, electrical power field, in difference to previous ones, goes through a big transition. Initiators of this transition are not only global politics and consumers' wishes, but primarily modern technologies opening numerous possibilities. New trends mostly reflect in growing number of ways to produce power in places where this was not possible before, as well as in new ways of its storage and efficiency growth in processes of production, distribution and consumption of energy. Nowadays, these processes can be performed digitally in a bigger measure, i.e. faster, more efficiently and by using optimization possibilities through IoT, Big Data, AI and other technologies. I see Elnos Group as a company that would recognize and apply changes as well as to maintain leader's position in the field of electrical power through more participation in development and realization of new projects along with application of new technologies. Digitalization is one of

KARIJERA

Mijić se kompaniji priključio kako bi radio na razvoju i istraživanju OIE projekata, da bi nakon početnog perioda započeo realizaciju niza projekata iz oblasti industrije, infrastrukture i trafostanica i hidroelektrana. Vremenom je, usvajajući nova znanja i iskustva, dobijao niz novih odgovornosti, prvo kao rukovodilac tima za elektrane Elnosa BL, zatim kao zamjenik tehničkog direktora, potom kao tehnički direktor Elnosa BL i na kraju kao član Uprave za tehničke poslove Elnos Grupe.

the most important trends of future electrical power. It is a carrier of huge possibilities, and we need to accept it as it is and use it as much as possible.

Elnos Group is an example of a company with national address being recognized by each step forward to European markets.

What is the most significant for such a success?

As a company, we proved that step forward to some of the most demanding European energy markets is possible. In order to make such steps forward, we need to invest a lot in knowledge, staff, modern mechanization and modern technologies. Apart from this, we need to have persistence and decisiveness in order to put quality of business operations and company organization on a higher level. It is also important to mention that we, as a company, did not follow competition in our work, but we set high criteria for ourselves on daily basis. Unfortunately, national companies rarely manage to make more significant step forward to international markets

and we hope that we shall encourage them to make their steps by our example.

What do you think is crucial for building successful career? What is your personal moto?

I believe that successful career is driven by passion for new knowledge and overcoming challenges. Such a wish carries devotion for whole-life learning, discipline and continuous work. We need to have a strong focus on the right values and be true to them even if market and environment sometimes devalue them, which demands a lot of persistence. In career development, it is important to be in healthy social environment, where there is a continuous wish to make today a better tomorrow, and that each of us is aware of one's role on this road through insisting on values of integrity, fairness, honesty, trust, teamwork, quality, continuous learning, improvement and, finally, our positive purpose.

What is most beautiful in engineering work?

Most beautiful part of engineering work is

overcoming challenges on the way to understanding overcoming natural phenomena. Curiosity and sense of purpose, which drive us on daily basis, give a special beauty to our work. Modern technologies turn the world into a big playground of modern engineering, and to be a part of this game is priceless.

Do you see yourself in work more as individual or a team player?

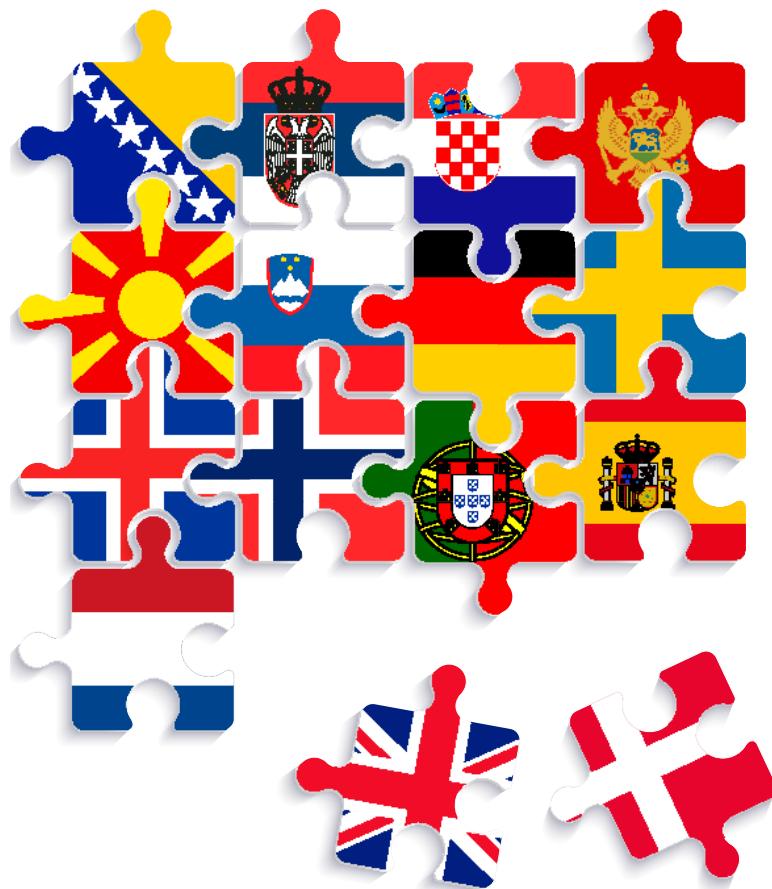
I did karate for years, as an individual sport, and I achieved excellent individual results in the sport as well as in school during my education. However, when talking about business, I see myself as a team player. I enjoy in brainstorming opinion and ideas and always am supporting differences and different approaches. I like to share knowledge and be a witness of small and big victories of my associates. I am always eager to work with motivated teams and positive team energy exactly is the reason for a big number of demanding projects, which we gladly remember.

Znatiželja i osjećaj svrhe daju posebnu ljepotu inženjerskom poslu Curiosity and sense of purpose give a special note to engineering as a profession



Godina obilježena NOVIM TRŽIŠTIMA

YEAR MARKED BY NEW MARKETS



ELNOS GRUPA POSLJEDNJIH GODINA bilježi značajan internacionalni razvoj. I ove godine otvorili smo vrata dva veoma važna nova tržišta: Velike Britanije i Danske. Cilj nam je da nastavimo uspjeh na stranim tržištima, formiramo nove članice Grupe, a iznad svega da pružimo visok kvalitet usluga našim partnerima širom Evrope i svijeta.

IN RECENT YEARS, ELNOS GROUP has marked significant international development. This year, too, we have opened the doors of two very important markets: Great Britain and Denmark. It is our aim to continue working successfully on foreign markets, establish new Group member companies, and above all, to provide a high level of services to our partners throughout Europe and worldwide.

SR Nova tržišta i rad na izazovnim i kompleksnim projektima postaju formula koja Elnos Grupu čini liderom u sektoru elektroenergetike. Na mapu naše grupacije nedavno smo dodali Veliku Britaniju i Dansku.

NOVA ČLANICA SA SJEDIŠTEM U LONDONU

EMEL Power d.o.o., sa sjedištem u Londonu, spoj je dva dokazana biznisa, britanske kompanije Emico i Elnos Grupe, poznatih po izvođenju i isporuci složenih željezničkih i energetskih instalacija i elektroenergetskih projekata širom Evrope. Dejvid Peroton, direktor strategije Grupe u Emico Limitedu, kaže: „Vjerujemo da će ovaj savez dvije velike kompanije donijeti veću ponudu na šira tržišta i da će koristi od iste imati i kompanije i klijenti širom Evrope. EMEL Power će uvijek nastojati da stvori partnerstvo s klijentima, da traži dodatnu vrijednost i radi na postizanju boljih rezultata i dugovječnosti obavljenih poslova.“

Pred novoformiranom kompanijom EMEL Power je i prvi veoma značajan projekt. Riječ je o učešću u projektu High Speed 2 (HS2), koji je nova mreža željezničkih pruga za ultrabreze vozove koji će povezivati London, Birmingham, Istočni Midlends, Lids i Manchester. U okviru projekta HS2, EMEL Power zadužen je za isporuku i instalaciju distributivnih trafostanica za transformaciju i distribuciju električne energije za napajanje gradilišta na izgradnji ove željezničke pruge. Ovo je jedan od najvećih infrastrukturnih projekata u Velikoj Britaniji ikad. Njegova realizacija je počela prošle godine i planirano je da traje najkasnije do 2040. Ugovorili smo poslove na tri lokacije za ukupno 41 distributivnu trafostanicu. Pripreme za realizaciju prvog ugovora, planiranog tokom prvog kvartala naredne godine, su u punom jeku, a i u budućnosti očekujemo značajno učešće na ovom projektu.

IDEMO U DANSKU!

Poslovni putevi odveli su nas u još jednu zemlju vikinga – Dansku. U najmanjoj nordijskoj zemlji i jedom od najmirnijih društava na svijetu, gradićemo 400 kV dalekovod dužine 150 km. Ovo tržište nam je značajno, jer smo izlaskom na njega dodatno zaokružili nordijsko tržište.

„Naš prvi projekat u Danskoj biće izgradnja 400 kV dvosistemskih dalekovoda Endrup-Idrolund i Endrup–njemačka granica. Početak radova planiran je za novembar 2022, a naš prioritet u narednoj godini biće priprema projekta, kao i formiranje kompanije kako bismo uspostavili kvalitetne relacije sa nadležnim institucijama i upoznali se sa funkcionisanjem poslovnog, pravnog i energetskog sistema dan-

skog tržišta“, rekao je Saša Milošević, rukovodilac Sektora prodaje za dalekovode.

Novo tržište donosi nove izazove. Danci kontinuirano šire i obnavljaju elektroenergetsku infrastrukturu kako bi održali visok nivo sigurnosti snabdijevanja i osigurali efikasnu integraciju obnovljive energije u sistem. „Ovaj projekt je od izuzetnog značaja za njihovo i njemačko tržište i mi se radujemo novim iskustvima i radu sa novim dizajnerskim stubovima u ekološki osjetljivim zonama. Ovo je sjajna prilika da potvrdimo snažnu reputaciju i u ovoj skandinavskoj zemlji“, zaključio je Miroslav Tuvić, član Uprave Elnos Grupe.

EN New markets and work on challenging and complex projects become formula that makes Elnos Group a leader in the sector of electrical engineering. Great Britain and Denmark have recently been added to our Group map.

NEW COMPANY MEMBER WITH HEAD SEAT IN LONDON

EMEL Power Ltd., having Head Seat in London, is a joint of two proven businesses – British company Emico and Elnos Group, known for performance and delivery of complex railway and power installations and power engineering projects throughout Europe. David Perrotton, Director of the Group strategy in Emico Limited, says: “We believe that this alliance of two great companies will bring a greater offering into wider markets and will benefit both companies and clients across Europe. EMEL Power Ltd will always seek to create a partnership with clients, to look for added value and work towards achieving better outcomes and longevity of repeat business.”

Newly established company, EMEL Power, has the first project before it. It is participation in the project titled High Speed 2 (HS2), which is a new network of railways for ultrafast trains linking London, Birmingham, East Midlands, Leeds and Manchester. Within project HS2, EMEL Power has been assigned to deliver

and install distributive substations to provide power supply for the site during construction of the railway. This is one of the largest infrastructure projects in Great Britain ever. Realization of the project started last year and it is expected to be completed by 2040 at latest. We have contracts for total 41 distributive substation. Preparations for realization of this contract, scheduled for the first quarter of next year, are in full swing. We expect significant participation in this project in future.

LET'S GO TO DENMARK!

Business roads took us to another Viking country – Denmark. In the smallest Nordic country, and one of the most peaceful societies in the world, we shall build a 150 km long 400 kV transmission line.

This market is important for us since entering it additionally confirmed our presence in Nordic market .

“Our first project in Denmark shall be construction of 400 kV double-circuit transmission line Endrup-Idrolund and Endrup – German border. Beginning of the works is planned for November 2022, and our priority in the upcoming year shall be project preparation as well as establishment of company in order to establish good quality relations with competent institutions and get to know functioning of business, legal and power system of Danish market”, stated Saša Milošević, Head of Sales Sector for transmission lines.

New market brings new challenges. Denmark continuously expands and renews electrical power infrastructure in order to maintain a high level of supply security and provide efficient integration of renewable energy in system. “This project is of great importance for their and German market and we are looking forward to new experiences and work with new types of towers in ecologically sensitive zones. This is a great opportunity to affirm strong reputation in this Scandinavian country, too”, concluded Miroslav Tuvić, Board Member of Elnos Group.

Elnos Grupa je dio poduhvata High Speed 2 (HS2) Elnos Group is a part of High Speed 2 (HS2) endeavour





Zgrada Elnos Srbije u Beogradu | Elnos Serbia building in Belgrade

DVIJE DECENIJE ELNOS SRBIJE | TWO DECADES OF ELNOS SERBIA

ONI SU EKSPERTI savremenog inženjeringu

THEY ARE EXPERTS OF MODERN ENGINEERING

ELNOS GRUPA U OVOJ GODINI obilježava dvadeseti rođendan Elnos Srbije – članice koja je svojim predanim radom i modernim pristupom postala prepoznatljiva kao jedan od glavnih aktera energetske tranzicije ove zemlje. U godini jubileja Elnos Srbija nastavila je da korača odvažno realizujući misiju puta obnovljive budućnosti zemlje i poduhvate energetskog spajanja regije.

THIS YEAR, ELNOS GROUP celebrates twentieth birthday of Elnos Serbia – a member company that became recognizable by its devoted work and modern approach as one of the main actors of energy transition of this country. In the jubilee year, Elnos Serbia boldly continues taking bold steps in forming strong power connections in the region and achieving its mission on the road of country's renewable future.

SR | ROĐENI POD OIE ZVIJEZDOM

Današnju poziciju među ekspertske kompanijama u oblasti elektroenergetike naša članica sa beogradskom adresom gradila je predano realizujući mnogobrojne projekte rekonstrukcije, modernizacije i izgradnje objekata do 400 kV. Inovativnošću, efikasnošću i visokim profesionalizmom timovi Elnos Srbije dokazali su da su eksperti savremenog inženjeringu.

Iza kompanije su dvije decenije odličnih rezultata sabranih u nizu ogromnog broja projekata, a posebno mjesto među njima zauzimaju uspjesi širokog spektra realizovani u OIE segmentu. Tako je u posljednjih nekoliko godina u oblasti hidroenergije Elnos Srbija realizovala kapitalni projekat modernizacije HE Zvornik i revitalizaciju sedam mini-hidroelektrana zapadne Srbije, u oblasti termoenergije njene ekipe su bile dio prvog „zelenog“ projekta u oblasti rудarstva u Srbiji,

izgradnji Odlagača 12.000. Svojevrsnu krunu rada u oblasti OIE timovima Elnos Srbije donijelo je učešće u izgradnji najvećeg vjetroparka na zapadnom Balkanu Čibuk 1 (158 MW), a ove godine nastavili su da potvrđuju svoju eksper-tizu u ovom segmentu kao dio operative koja gradi vjetropark Krivača (103 MW).

Realizujući „zelene“ projekte, timovi Elnos Srbije saradivali su sa svjetskim liderima, dono-seći tako najmoderneija tehnička rješenja i inova-cije u Srbiju.

„Projektujući i gradeći objekte od strateš-kog značaja, izgradili smo sebe kao kompaniju koja posluje u skladu sa najsvremenijim principima domaćeg i evropskog tržišta. Danas smo prepoznati kao respektabilan partner i u Srbiji, i širom Evrope. Put do takvog statusa uvijek je težak, zahtijeva vrijeme, strpljenje, znanje, mnogo energije i pošten pri-stup kako prema sebi tako i prema partne-rima. Nastavićemo držati naš fokus na obnov-ljivim izvorima, jer je naš cilj da na tom polju budemo lider u znanju, stručnosti i implemen-taciji novih projekata“, rekao je Zoran Kukobat, direktor Elnos Srbije.

DREAM TIM ZA KONTAKTNE MREŽE

Poseban pečat poslovanju kompanije daje dio inženjeringu specijalizovan za izgradnju i rekonstrukciju kontaktnih mreža, koji je u pro-tekoj deceniji izgradio i rekonstruisao elektroenergetske sisteme na stotinama kilometra saobraćajnica širom zemlje. U segmentu infrastrukture za saobraćaj Elnos Srbija je jedna od rijetkih u regionu koja projekte iz oblasti kontaktnih mreža može realizovati po sistemu „ključ u ruke“. I za vrijeme najstriktnijih pande-mijskih uslova tokom prošle godine tim je nastavio realizaciju izuzetno značajnih projekata. Među njima se posebno ističu aktuelna revi-talizacija željezničke pruge na dionici Jajinci-Mala Krsna, koja je dio izgradnje međunarodno važnog željezničkog Koridora 10 kroz Srbiju, te projekti rekonstrukcije tramvajske kontaktne mreže na Savskom trgu i Zelenom bulевaru u prijestonici zemlje.

ZAPOSLENI SU BUDUĆNOST KOMPANIJE

Elnos Srbija jedan je od dva najveća resursna centra Grupe, čija najveća snaga leži u stručno-sti i zalaganju njenih 147 zaposlenih. „U svim segmentima poslovanja imamo vrhunske pro-fesionalce. Naši kadrovi su spoj iskustva i mla-dosti i sasvim sigurno pokretač ka novim odličnim rezultatima kompanije u budućnosti“, ista-kao je Kukobat.

EN BORN UNDER RES STAR

Today's position among expert companies in the field of power engineering, our member com-pany with Belgrade address has built devotedly performing many projects of reconstruction, modernization and construction of facilities up to 400 kV. Through innovation, efficiency and high professionalism, Elnos Serbia teams proved they are experts of modern engineering.

Two decades of excellent results are behind this company, reflected in a sequence of nume-rous projects, among which special place is held by wide spectrum of successfully performed activities in RES segment. Hence, in the past several years, in the field of hydropower, Elnos Serbia performed capital project of modernizing HPP Zvornik and revitalization of seven mini hydro-power plants of West Serbia. In the field of thermal power, its teams were a part of the first “green” project in the field of mining in Serbia, construction of Spreader 12.000. Kind of crown for the work in the field of RES for Elnos Serbia teams was participation in construction of the biggest Wind Park in West Balkan Čibuk 1 (158 MW). This year, these teams continued to affirm their expertise in this segment as a part of operational teams working on Wind ParkKri-vača (103 MW).

Through performance of “green” projects, Elnos Serbia teams cooperated with all world leaders hence bringing the most modern tech-nical solutions and innovations to Serbia.

“Through designing and building facilities of strategic importance, we built ourselves as a company having business operations in line with the most modern principles of national and European market. Nowadays, people recognize us as respectable partner in Serbia and through-out Europe. Road to such a status always is difficult, demands time, patience, knowledge, a

lot of energy and fair approach both to yourself and your partners. We shall continue to be focu-sed on renewable sources, since it is our goal in that field is to be a leader in knowledge, skill and implementation of new projects”, stated Zoran Kukobat, Elnos Serbia Director.

DREAM TEAM FOR CONTACT NETWORKS

Engineers specialized for construction and reconstruction of contact networks give a spe-cial note to business operations of our com-pany. During past decade, these engineers con-structed and reconstructed electrical power systems on hundreds of kilometers of roads throughout the country. In the segment of trafic infrastructure, Elnos Serbia is one of rare in the region to perform projects in the field of contact networks per “turn-key” principle. Even during the most restrictive pandemic condi-tions in the previous year, team continued reali-zation of extremely significant projects. Among them, a special place goes to current revita-lization of railway section Jajinci–Mala Krsna, which is a part of constructing internation-ally important railway Corridor 10 through Serbia, as well as projects of reconstructing tram con-tact network on Savski trg and Zeleni bulevar in the country capital.

EMPLOYEES ARE THE FUTURE OF THE COMPANY

Elnos Serbia is one of two Group's biggest resource centers, whose biggest force lies in skill and efforts of its 147 employees. “We have top professionals in all business opera-tions segments. Our staff are a combination of experience and youth. As such, our personnel is most surely what drives our company to new excellent results in future.

Zaposleni su nosioci razvoja kompanije Employees are bearers of progress of the company



Sve nas je više! There are more of us!

Elnos Grupa zapošljava više od **600 radnika**

Elnos Group employs more than 600 people



SR Timovi vrijednih i stručnih ljudi najmoćnija su snaga Elnos Grupe. Od početka ove godine osnažili smo naše timove sa još 117 novih kolega. Na kraju ove godine broj zaposlenih na nivou Grupacije premašio je 600, što je novi lični rekord kompanije, na koji smo ponosni. Kadrovski osnaženi, još spremnije dočekujemo izazove nove poslovne godine.

EN Teams of hardworking and professional people are the strongest power of Elnos Group. Since the beginning of this year, we have strengthened our teams with additional 117 new colleagues. At the end of this year, number of employees at the Group level exceeded 600, which is a new company record we are proud of. With new staff onboard, we are more ready to meet challenges in new business year.

Kvalitet je prioritet Quality is priority



PET ISO STANDARDA

Successful recertifications

SR Poslovanje Elnos Grupe u skladu je s najboljim svjetskim korporativnim praksama. Naša kompanija ispunjava zahtjeve i unapređuje poslovanje u skladu sa pet međunarodnih standarda: ISO 9001, ISO 14001, ISO 45001, ISO 27001 i ISO 50001.

EN Elnos Group business operations are in line with the best world corporation practices. Our company meet requirements and improves business in accordance with five international standards: ISO 9001, ISO 14001, ISO 45001, ISO 27001 and ISO 50001.

Nova priznanja New acknowledgement

Među tri najbolja velika preduzeća

Among top three large companies

SR Zahvaljujući nizu uspješnih iskoraka u poslovanju ostvarenih u najizazovnijoj poslovnoj godini do sada, Privredna komora Republike Srpske je Elnos BL proglašila za jednu od tri najbolje kompanije u kategoriji velikih privrednih društava. Ovo prestižno priznanje dodatno

nas motiviše da na domaćem i evropskom tržištu nastavimo postizati još bolje rezultate.

EN Thanks to series of successful steps forward in business operations achieved in the most challenging business year so far, Republic of Srpska Chamber of Com-

merce acknowledged Elnos BL as one of three best companies in the category of large companies. This prestigious acknowledgement motivates us additionally to continue having even better results at national and European market.



Kraj velike investicije End of big investment

Otvoren veliki prodajni centar u Istočnom Sarajevu

Big sales center opened in East Sarajevo

SR Dobro poslovanje je najljepše krunisati novom investicijom i upravo zato smo ponosni na to što smo u ovoj godini kupcima otvorili vrata modernog poslovnog centra u Istočnom Sarajevu. Naš novi prodajni centar prostire se na 750 metara kvadratnih prodajno-skladišnog

prostora na lokaciji u Istočnoj Ilidži i već na početku rada bilježi veliko interesovanje novih kupaca.

EN Good business is best crowned with a new investment and that is why we are proud to have opened the doors of our modern sales

center in East Sarajevo to our customers this year. Our new sales center covers about 750 square meters of selling-storage space located in East Ilidža and, at very start, it records a big interest from new customers.



Bezbjednost prije svega Safety first

NAGRADA ZA ZAŠTITU NA RADU

Award for safety at work

SR Udrženje inženjera zaštite i zdravlja na radu nagradilo je Elnos BL posebnim priznanjem za afirmaciju u oblasti zaštite i zdravlja na radu. U godini kada privreda i dalje funkcioniše po pravilima koja diktiraju uslovi pandemije, ovo priznanje

za našu kompaniju ima još veći značaj.

EN Association of Occupational Health and Safety Engineers awarded Elnos BL with a special acknowledgement for affirmation in this domain of engineering

as a profession. In the year when the economy continues to function according to the rules dictated by the conditions of the pandemic, this recognition is even more important for our company.

Izvrsni među najboljima Excellent among the best

PLATINASTI BONITET ZA ELNOS BL

Platinum creditworthiness for Elnos BL

SR Visoki standardi kvaliteta i stabilnosti finansijskog poslovanja kompanije Elnos BL ove godine su nagrađeni platinastim sertifikatom bonitetne izvrsnosti. Ovaj sertifikat je najviša ocjena vrijednosti poslovanja, ekonomskog kvaliteta i izvrsnosti kompanije. Priznanje najvišeg ranga, koje dodjeljuje poznata evropska sertifikacijska kuća Bisnode, svrstalo je našu kompaniju u odabranu kategoriju 2,5 odsto najuspješnijih privrednih društava u BiH.

EN This year, high quality standards and stability of financial business operations of Elnos BL company were given platinum certificate of creditworthiness excellence. This certificate is the highest mark for business operations value, economic quality and company's excellence. Award of the highest rank, which is given by Bisnode, a renowned European certification company, has placed our company in the category of 2.5 percent of the most successful companies in BiH.



DA NISU INŽENJERI

bili bi ljekari, kuvari i manekeni

IF THEY WERE NOT ENGINEERS,
THEY WOULD BE DOCTORS, CHEFS AND MODELS

Oni slave deset godina rada u Elnos Grupi i tim povodom odgovarali su na pitanja koja nisu „iz struke“. Upoznajte drugo lice naših jubilaraca...

They celebrate ten years in Elnos Group and on this occasion, they answered the questions not referring to “profession”. Meet the different side of our jubilarians...

ŽARKO
RONČEVIĆ

direktor prodaje
Elnosa Srbija
Sales director
in Elnos Serbia



Omiljeni film? Zašto?

„Dobar, loš, zao!“ Odlični su priča, muzika, tenzija, zapleti...
Jednostavno neponovljiv film!

Kada ste poželjeli da odaberete svoj poziv?

Još dok sam bio malo dijete, zanimalo me kako se proizvodi struja i gdje su ta postrojenja koja je proizvode. Odrastao sam na Kosovu i Metohiji, u blizini TE Kosovo, što je sigurno dodatno pojačalo moju značajelju.

Da niste inženjer, šta biste bili?

Ne znam, možda kuvar... Volim da kuvam, a volim i da uživam u hrani.

Koliko država ste dosad proputovali? Koji je najljepši grad koji ste posjetili?

Proputovao sam srednju, južnu i istočnu Evropu, a Prag je za mene ubjedljivo najljepši grad!

Znate li da li neka poznata osoba dijeli s Vama datum rođenja? Ako znate, da li biste nam rekli koja?

Interesantno je da sam rođen 8. marta, na dan kada sve dame slave, a tada slavim i ja zajedno s njima! Inače, pokojni reper Dalibor Andonov

Gru takođe je rođen na isti datum.

Vaša omiljena knjiga je? Zašto?

Volim stripove! Alan Ford je strip u kojem i dan-danas uživam.

When did you first wish to become an engineer?

Back when I was just a little child, I became interested in how electrical power was made and I wanted to know where the plants producing the power were. I grew up in Kosovo and Metohija, in the vicinity of TPP Kosovo, which increased my wish for sure.

If you were not an engineer, what would you be?

I do not know, maybe chef... I like cooking and I like to enjoy in food.

How many countries have you visited so far? What is the most beautiful city you visited?

I have been through Central, South and East Europe, and Prague is by far the most beautiful city for me!

Do you know if some famous person was born on the same day as you were? If so, would you tell us who it is?

It is interesting I was born on March 8, on the day all ladies celebrate, and this is the day I celebrate together with them as well!

Rapper Dalibor Andonov Gru was also born on this day.

What is your favorite book? Why?

I like comics! Alan Ford is a comic book I enjoy in even today.

Omiljeni film? Zašto?

„Dobar, loš, zao“! Odlični su priča, muzika, tenzija, zapleti...

Jednostavno neponovljiv film!

Šta smatrate svojim najvećim poslovnim uspjehom i zašto?

Osmijeh mojih kolega i koleginica u svakodnevnoj poslovnoj i privatnoj komunikaciji smatram svojim najvećim uspjehom!

Šta najviše volite da radite u slobodno vrijeme?**Imate li hobи?**

Slobodnog vremena skoro da nemam, a sve slobodno vrijeme van posla provodim sa svojom porodicom.

Ukoliko ga nađem, volim da odigram neku igricu.

Da li ste se aktivno bavili sportom i koji je Vaš najdraži sport?

U vrijeme dok sam išao u srednju školu i na fakultet, aktivno sam se bavio odbojkom, a sada pratim fudbal, jer imam naslednika koji se aktivno bavi ovim sportom.

Favorite film? Why?

“The Good, the Bad and the Ugly”! They have excellent story, music, tension, plots... Simply, it is a unique film!

What do you see as your biggest business success and why?

I think that smiles on the faces of my colleagues in our everyday business and private communication is my greatest business success!

What do you like to do most in your free time?**Do you have a hobby?**

I almost have no spare time. I spend all the time I have after work with my family. If any time is left, I like to spend it playing a game.

Have you been active in sports and what is your favorite sport?

While attending secondary school and university, I was active in volleyball, and now I follow football since I have a successor active this sport.

**MILOŠ
PANDILOVIĆ**

tehnički direktor

Elnosa Srbija

Director of Operations
in Elnos Serbia



**Da niste inženjer, šta
biste bili?**
*Bio bih maneken, jer
sam visok, plav, zgodan. :-)*

Kada ste poželjeli da odaberete svoj poziv?

Od kada sam shvatio, postao svjestan, šta rade moji roditelji.

Da niste inženjer, šta biste bili?

Bio bih maneken, jer sam visok, plav, zgodan.

Koliko država ste dosad proputovali?**Koјi je najljepši grad koji ste posjetili?**

Posjetio sam više od 25 zemalja, a među gradovima koje sam posjetio izdvojio bih Lisabon, Berlin i Sankt Peterburg.

Znate li da li neka poznata osoba dijeli s Vama datum rođenja?**Ako znate, da li biste nam rekli koja?**

Stvarno ne znam.

Vaša omiljena knjiga je? Zašto?

Možda mi nije omiljena, ali mi prva pada na pamet knjiga „Lovac na zmajeve“.

Omiljeni film? Zašto?

Film „Snatch“.

Šta smatrate svojim najvećim poslovnim uspjehom i zašto?

Uspješnu realizaciju rekonstrukcije HE Zvornik.

Šta najviše volite da radite u slobodno vrijeme? Imate li hobи?

Rekreativno se bavim sportom, tenisom i košarkom.

Da li ste se aktivno bavili sportom i koji je Vaš najdraži sport?

Da, trenirao sam košarku u mlađim kategorijama, ona je moj omiljeni sport.

When did you first wish to become an engineer?

Ever since I realized what my parents' profession is.

If you were not an engineer, what would you be?

I would be a model since I am tall, blond and handsome.

How many countries have you visited so far?**What is the most beautiful city you visited?**

I have visited more than 25 countries, and out of those I visited, I would single out Lisbon, Berlin and Sankt Petersburg.

Do you know if some famous person was born on the same day as you were?**If so, would you tell us who it is?**

I really have no idea.

What is your favorite book? Why?

Maybe it is not a favorite one, but it is the first one coming to my mind: "The Kite Runner".

Favorite film? Why?

Film "Snatch".

What do you see as your biggest business success and why?

Successful reconstruction of HPP Zvornik.

What do you like to do most in your free time? Do you have a hobby?

In my free time, I do sport, tennis and basketball.

Have you been active in sports and what is your favorite sport?

Yes, I used to be active in basketball in younger categories and it is my favorite sport.

MARKO MIJIĆ

član Uprave za tehničke poslove Elnos Grupe

Elnos Group Board
Member for Technical Affairs

Šta najviše volite da radite u slobodno vrijeme? Imate li hobij?

Volim trčanje, trening u parku i planinarenje, a posljednjih nekoliko godina posebno zadovoljstvo mi donosi restauracija oldtajmer motocikala.

Kada ste poželjeli da odaberete svoj poziv?

Pri prvom susreту sa elektromagnetikom.
Da niste inženjer, šta biste bili?

Oduvijek sam volio istraživački i naučni rad, obožavam da učim, istražujem i zaključujem. Iskreno, zamalo sam završio na medicini.

Koliko država ste dosad proputovali? Koji je najljepši grad koji ste posjetili?

Mnogo sam putovao kao student, a kasnije mi je, pored turističkih, posao donio i mnogo poslovnih putovanja. Od gradova koje sam posjetio izdvojio bih Madrid. On je na mene ostavio poseban utisak.

Znate li da li neka poznata osoba dijeli s Vama datum rođenja? Ako znate, da li biste nam rekli koja?

Ne, prvi put sam to guglao kada sam pročitao ovo pitanje.
Vaša omiljena knjiga je? Zašto?

Nije mi lako izdvojiti omiljenu knjigu, posljednja koju sam pročitao je „WorkRules“ Lasla Boka. U pitanju je knjiga o zanimljivim iskustvima razvijanja Guglovljih kadrova.

Omiljeni film? Zašto?

Obožavam filmove, ali ne mogu reći da imam omiljeni. Mislim da nisam propustio nijedan film sa IMDb Top 100 liste. Najdraže su mi avanture, akcije i naučna fantastika.

Šta smatrate svojim najvećim poslovnim uspjehom i zašto?

Najveći poslovni uspjeh je doživjeti potpuno povjerenje, energiju, euforiju i opredijeljenost tima saradnika na putu ka zajedničkom cilju. Tada i najteži projekti ostaju u lijepom sjećanju, a takvih trenutaka bilo je mnogo.

Šta najviše volite da radite u slobodno vrijeme? Imate li hobij?

Volim trčanje, trening u parku i planinarenje, a posljednjih nekoliko godina posebno zadovoljstvo mi donosi restauracija oldtajmer motocikala.

Da li ste se aktivno bavili sportom i koji je Vaš najdraži sport?

U djetinjstvu sam volio borilačke vještine. Trenirao sam karate nekih šest godina.

When did you first wish to become an engineer?

When I faced electromagnetics for the first time.

If you were not an engineer, what would you be?

I have always been fond of research and scientific work, I love to learn, research and make conclusions. Frankly, I almost ended up in medicine.

How many countries have you visited so far? What is the most beautiful city you visited?

I travelled a lot as a student. Afterwards, in addition to tourist travels, I was travelling for business a lot. Out of towns I have been to, I would single out Madrid. It left a special impression on me.

Do you know if some famous person was born on the same day as you were? If so, would you tell us who it is?

No, I Googled it for the first time when I read this question.

What is your favorite book? Why?

It is not easy for me to select a favorite book, but latest I read was "WorkRules" by Laszlo Bock. This is a book on interesting experiences in developing Google staff.

Favorite film? Why?

I adore films, but I cannot say I have a favorite one. I believe I did not miss any of IMDb Top 100 list. I like adventures, action and science fiction the most.

What do you see as your biggest business success and why?

The biggest business success is to experience full trust, energy, euphoria and devotion of the team of associates on the way to our joint goal. That is when the most difficult projects remain in nice memory and there were many moments of this kind.

What do you like to do most in your free time? Do you have a hobby?

I like running, training in the park and mountaineering. In the last few years, reconstruction of old timer motorcycles brings me special satisfaction.

Have you been active in sports and what is your favorite sport?

As a child, I loved martial arts. I have been in karate for about six years.



NENAD VUKOMANOVIC

tehnički direktor

Elnos Nordica

Director of Operations in
Elnos Nordic



Kada ste poželjeli da odaberete svoj poziv?

Ne previše rano, krajem osnovne škole. Ipak, mislim da sam od malih nogu znao da će odabratи tehnički poziv, jer sam oduvijek nešto rastavljaо, a ponekadа i sastavljaо.

Da niste inženjer, šta biste bili?

Teško je reći...

Koliko država ste dosad proputovali? Koji je najljepši grad koji ste posjetili?

Osim ex-YU država, putovao sam širom Evrope. Među gradovima bih uvjek prednost dao istorijski prepoznatljivim u odnosu na one „modernije“. To, na primjer, svrstava Kotor u sam vrh.

Znate li da li neka poznata osoba dijeli s Vama datum rođenja?

Ako znate, da li biste nam rekli koja?

Kralj Milan Obrenović, pisac Dobrica Erić i glumac Vojin Ćetković.

Vaša omiljena knjiga je? Zašto?

Mnogo ih je, ali bih umjesto knjige izdvojio piscu Branka Čopiću, s kojim dijelim korijene iz podgrmečkog sela Hašani.

Omiljeni film? Zašto?

Mnogo ih je. Volim domaće filmove.

Šta smatrate svojim najvećim poslovnim uspjehom i zašto?

Svaki moj dosadašnji uspjeh je uspjeh i tima s kojim sam radio. Moram istaći da mi je posebno dragо što sam imao priliku da vodim Diviziju za trafostanice tokom nekoliko godina kada smo završili nekoliko

značajnih poduhvata.

Šta najviše volite da radite u slobodno vrijeme? Imate li hobи?

Slobodno vrijeme posvećujem porodici i prijateljima. A aktivnost koju bih najbliže mogao nazvati svojim hobijem je rekreativna vožnja bicikla.

Da li ste se aktivno bavili sportom i koji je Vaš najdraži sport?

Ne, samo usput.

When did you first wish to become an engineer?

Not so early, at the end of elementary school. Still, I believe I knew, ever since I was little, that I would choose a technical profession. Because I always liked to dismantle things. I would even reassemble them sometimes.

If you were not an engineer, what would you be?

It is hard to say...

How many countries have you visited so far? What is the most beautiful city you visited?

Save from ex-YU countries, I travelled throughout Europe. When talking about cities, I would always give advantage to historically recognizable cities, than to those "more modern". This would, for example, put Kotor on top of my list.

Do you know if some famous person was born on the same day as you were? If so, would you tell us who it is?

King Milan Obrenović, author Dobrica Erić and actor Vojin Ćetković.

What is your favorite book? Why?

There are many books I like, but instead of book I would like to single out an author, Branko Čopić, with whom I have common origin in village Hašani in the foot of Grmeč Mountain.

Favorite film? Why?

There are many. I like national movies.

What do you see as your biggest business success and why?

Each success of mine so far is also a success of the team I worked with. I have to say I am especially glad I had a chance to lead Substation division for several years when we completed several significant endeavors.

What do you like to do most in your free time? Do you have a hobby?

I devote my free time to family and friends. Activity I could most closely call my hobby is biking.

Have you been active in sports and what is your favorite sport?

I have never been active in any sport.

I only play sports occasionally.

Šta smatrate svojim najvećim poslovnim uspjehom i zašto?

Svaki moj dosadašnji uspjeh je uspjeh i tima s kojim sam radio. Moram istaći da mi je posebno dragо što sam imao priliku da vodim Diviziju za trafostanice tokom nekoliko godina kada smo završili nekoliko značajnih poduhvata.

Kod kuće, ŠIROM EVROPE

AT HOME, ACROSS THE EUROPE

OD ISLANDA DO S. MAKEDONIJE

*Elnos Grupe grade dalekovode
za vrijeme koje tek dolazi.*

FROM ICELAND TO N. MACEDONIA,

*Elnos Group teams build transmission
lines for the times to come.*

SR DALEKOVODI NOVE GENERACIJE NA ISLANDU

Duze od šest godina naša kompanija potvrđuje najviši stepen radne stručnosti u najnepristupačnijim predjelima Islanda. Upravo u Zemlji vatre i leda naše ekipe veliki broj puta do sada pobijedile su najsurovije predjеле i klimu te realizovale projekte najvišeg stepena zahtjevnosti.

Ove godine na Islandu su napravile novi iskorak podižući više od 180 kilometara najsavremenijih dalekovoda nove generacije i to u okviru dva velika projekta na sjeveru i istoku zemlje.

IZGRADNJA 220 kV DALEKOVODA KRÖFLULÍNA 3 I HÓLASANDSLÍNA 3

Prvi poduhvat je ujedno najveći projekt Elnosa u oblasti dalekovoda na Islandu. U pitanju je izgradnja 122 kilometra novog 220 kV dalekovoda Kröflulína 3 u okviru kojeg smo podigli 328 stubova. Paralelno sa krajem ovog poduhvata, u martu su naše ekipe počele radove na izgradnji drugog dalekovoda nove generacije na Islandu. Riječ je o dalekovodu 220 kV Hólasandslína 3, u okviru kojeg na trasi dugoj 60 kilometara podizemo 184 dalekovodna stuba.



Izgradili smo 122 km dalekovoda nove generacije na Islandu We constructed 122 km of new generation transmission line on Iceland

Na oba projekta naše ekipe bile su zadužene za realizaciju poslova montaže i podizanja stubova dalekovoda nove generacije te montažu provodnika. Trase su izuzetno zahtjevne i nepredvidive, tipično islandske, a uz to obuhvataju doline koje su zaštićena ekološka i poljoprivredna područja.

Dalekovodi nove generacije pravi su iskorak u izgradnji elektroprenosnih mreža novog doba. Novu generaciju dalekovoda od starih prije svega razlikuju njihova izdržljivost i dizajn, odnosno performanse, zahvaljujući kojima mogu da izdrže najteže vremenske uslove

sjevernih zemalja. Njihove konstrukcije nisu upadljive u prirodnom okruženju, što je dizajn kojem moderna energetika teži.

Ovo je tehnologija koju je Island dugo razvijao. Zadatak montaže ovakvih stubova nije lak, jer se ovi dalekovodi pod udarima vjetra i leda blago savijaju. Ovo znači da se montaža svakog stuba treba realizovati uz podršku mehanizacije. Taj trud se dugoročno isplati, jer ovi stubovi uspješno odolijevaju ekstremnim uslovima.

Stubovi su cjevastog tipa i njihova visina seže do 31 metar, a svaki stub je toliko moćan da mijenja

pet postojećih drvenih stubova koji su na ovim trasama postavljeni prije više od 40 godina.

PIŠEMO NOVE PODVIGE U ŠVEDSKOJ

Širom Švedske, tokom ove godine naši timovi za dalekovode našli su se u prvom planu najznačajnijih i najizazovnijih energetskih projekata u ovoj nordijskoj zemlji.

Najkompleksniji i najzahtjevniji zadatak našeg tima bila je **izgradnja 400 kV dalekovoda Hurva–Sege**. Realizujući ovaj poduhvat,



Izgradnja 400 kV DV Långbjörn–Storfinnforse Construction of 400 kV TL Långbjörn–Storfinnforse

naše ekipe za nešto više od godinu dana, na dionici dugoj 42 kilometra, demontirale su stari i izgradile novi dalekovod, koji svojom trasom u potpunosti zaobilazi gradić Södra Sandby, što je bio jedan od osnovnih ciljeva ovog projekta.

Na trasi dalekovoda Hurva-Sege postavljeno je 138 stubova, a među njima se posebnom gaba-ritnošću izdvajaju tipski stubovi, poznati pod nazivom stubbe, koji teže po 55 tona i visoki su 55 metara. Na vrhuncu radova na ovom projektu radilo je čak 70 naših montera.

Snažan trend izgradnje sve većeg broja vjetroparkova u Švedskoj iziskuje potrebe za stvaranjem snažnije elektroenergetske mreže. Zbog ovakvog rastućeg trenda na sjeveru ove zemlje gradi se **novi 400 kV dalekovod Långbjörn–Storfinnforse**.

Novi dalekovod, na kome nastavljamo radove 2022., imaće značajnu ulogu povezivanja novih vjetroparkova iz ovog dijela zemlje na elektroenergetsku mrežu.

Ukupna dužina nove dalekovodne trase iznosi 35,7 kilometara, a na njoj je 129 stubova. Naši radnici još jednom su pokazali veliko umijeće rada pod pritiskom, jer su se na dva dijela trase radovi odvijali po striktno utvrđenom planu za vrijeme perioda mrežnih isključenja.

Naše ekipe u Švedskoj ove zime odličnom dinamikom nastavljaju realizaciju projekta izgradnje novog **130 kV dalekovoda Falköping–Tidaholm**.

Dalekovod se gradi jugozapadno od grada Västerås. Ukupna dužina dalekovodne trase iznosi 20 kilometara, a timovi Elnosa angažovani na ovom projektu imaju zadatak da podignu 80 stubova, izvedu elektromontažne radove i instaliraju OPGW. Novi 130 kV dalekovod Falköping–Tidaholm mijenja staru dotrajalu dalekovodnu vezu koju su prije početka izgradnje novog dalekovoda naše ekipe uklonile.

NOVI ISKORACI U NJEMAČKOJ

Nakon što smo 2020. godine uspješno iskoristili priliku da u Njemačkoj, zemlji koja godinama unazad kotira kao najsnažnija privreda

EU, potvrdimo svoja znanja, ove godine smo napravili još značajnije iskorake u ovoj zemlji.

Jedan od njih realizovali smo u gradu Hildenu, u neposrednoj blizini Düsseldorfa. Tu su naše ekipe bile angažovane na **rekonstrukciji 220/380 kV dalekovoda Eiberg–Opladen**. Dalekovod Eiberg–Opladen ima šest sistema: dva 380 kV, dva 220 kV i dva 110 kV sistema. Naše ekipe su realizovale rekonstrukciju jednog 380 kV i jednog 220 kV sistema. Uspješnim izvođenjem ovog projekta naše ekipe realizovale su veoma značajno podmlaćivanje vitalnih dijelova dalekovoda starih tri decenije.

Bio je ovo poduhvat koji su ekipe angažovane na njemu zapamtile po veoma nepredvidivim vremenskim okolnostima, odnosno smjenjivanju tri godišnja doba u jednom danu, te posebnim uslovima iz zaštite životne sredine koje je trebalo ispuniti.

ENERGETSKI KORIDORI U SRBIJI I SLOVENIJI

Trend izgradnje međunarodnih energetskih koridora vodi Evropu u eru nove i moderne energetske sigurnosti. Spajajući energetske potencijale država, ovi koridori postaju nove vene energetskog krvotoka Evrope.

Elnos Grupa je ove godine dio realizacije dva velika energetska koridora – izgradnje transbalkanskog elektroenergetskog koridora, koji će 400 kV dalekovodnom linijom povezati istočnu i zapadnu Evropu, i projekta Cirkovce–Pince, čijom će realizacijom biti stvorena prva visokonaponska veza između Mađarske i Slovenije.

TRANSBALKANSKI ENERGETSKI KORIDOR KROZ SRBIJU

Izgradnja dijela ovog velikog koridora kroz Srbiju naše ekipe ove godine odvela je u srce Šumadije. Preko lokacija 56 kilometara livada i brežuljaka ovog kraja gradi se 400 kV dalekovod TS Kragujevac 2–TS Kraljevo 3, koji je dio prve faze izgradnje transbalkanskog energetskog koridora kroz Srbiju.

Biti dio ovog poduhvata za naše timove bio je jedan višeslojan zadatak. Naime, sveobuhvatni poslovi koji su nam povjereni uposlili su ekipe gradevinskog i dalekovodnog sektora Elnos Srbije na dalekovodnoj dionici dugoj 16 kilometara, gdje izvodimo radove na izradi temelja, podizanju konstrukcija te elektromontažne radove. Stubovi koji se montiraju su čelično-rešetkasti tipa Y, a njihova ukupna težina iznosi 2.156 tona.

Ovo je projekt u okviru kojeg izvodimo instalaciju: faznih provodnika, zaštitnog užeta, staklenih izolatora, ovjesne opreme i OPGW-a. Dodatno nam je povjerena i nabavka faznog provodnika i zaštitnog užeta za cijelu trasu dalekovoda, čija ukupna dužina iznosi 59,3 kilometra i na kojoj će biti podignuta 174 stuba.

Naša članica s adresom u Beogradu posebno je ponosna na to što na cijeloj dalekovodnoj trasi realizujemo kontrole mjera zaštite životne sredine i mjera bezbjednosti i zdravlja na radu.

PODUHVAT CIRKOVCE–PINCE

Timovi ENS-a, slovenačke članice Elnos Grupe, uspješno i ove godine izvode radove na izgradnji 400 kV dalekovoda Cirkovce–Pince (80 km), koji predstavlja jedan od najznačajnijih poduhvata u modernoj energetskoj istoriji Slovenije. Riječ je o projektu od evropskog značaja, čiji je cilj uspostavljanje prve visokonaponske veze između Slovenije i Mađarske.

Ove godine oni su nastavili montažu i podizanje stubova na dalekovodu Cirkovce–Pince u okviru koje montiraju više od 1.400 tona čeličnih konstrukcija. Visina stubova koje podižu seže i preko 50 metara.

Zanimljiva činjenica je da će ekipe ENS-a u okviru ovog projekta instalirati čak 2.600 metara sistema za bezbjedno penjanje na stubove, što je veličina koja skoro dostiže vrh Triglav-a, najviše slovenačke planine.

Velikim projektom Cirkovce–Pince obuhvaćeni su i radovi na izmještanju 220 kV dalekovoda Cirkovce–Žerjavinec, čiji su dio takođe ekipe ENS-a. Ovaj projekat realizuje se kako bi bio napravljen prostor za priključenje 400 kV dalekovoda u 400/110 kV tafostanicu Cirkovce, inače početnu tačku 400 kV dalekovoda.

Stručni timovi ENS-a kroz dosadašnju realizaciju projekta Cirkovce–Pince potvrdili su da su majstori multitaskinga i da su sposobni kvalitetno da izvedu širok spektar različitih radova koji zahtijeva raznolikost stručnog znanja i sposobnost brzog prilagođavanja.

U SLUŽBI INFRASTRUKTURE U S. MAKEDONIJI

Odgovoriti na izazove velikih infrastrukturnih projekata uvejek je bio zadatak posebnog nivoa

kompleksnosti, a ove godine sa jednim ovako složenim zadatkom suočili su se naši timovi iz S. Makedonije.

Izgradnja saobraćajne dionice auto-puta A3 strateški je važan infrastrukturni poduhvat u Zemlji sunca. Dionica ovog auto-puta, od Štipa do Kočana, na dva mesta se ukršta sa 110 kV dalekovodom, zbog čega je jedan njegov dio trebao izmjestiti.

Upravo ovaj zadatak povjeren je našim ekipama iz S. Makedonije.

Vrijedni timovi naše članice s adresom u Skoplju uspješno su realizovali radove demonstraze dva postojeća i montažu šest novih zateznih dalekovodnih stubova. U okviru ovog radnog zadatka oni su gotovo u potpunosti samostalno realizovali i kompletну gradevinsku fazu radova, što je u ovim okolnostima bio veliki izazov, jer je dalekovod graden na poroznom području poznatom po uzgoju riže.

EN TRANSMISSION LINES OF NEW GENERATION IN ICELAND

For more than six years, our company has affirmed the highest level of work professionalism in the most inaccessible parts of Iceland. In the Land of fire and ice, our teams have won the most rigorous regions and climates numerous times so far and performed projects of the highest standard of demand.

This year, teams made a step forward on Iceland by erecting more than 180 kilometers of

the state-of-art transmission lines of new generations within two big projects on North and East of the country.

CONSTRUCTION OF 220 KV TRANSMISSION LINES KRÖFLULÍNA 3 AND HÓLASANDSLÍNA 3

First endeavor is the biggest Elnos project in the field of transmission lines in Iceland at the same time. This is construction of 122 kilometers of new 220 kV transmission line Kröflulína 3, where we erected 328 towers. Simultaneously with the end of this endeavor, in March, our teams started working on construction of the second transmission line of new generation in Iceland. This is 220 kV transmission line Hólasandslína 3, where we are erecting 184 transmission line towers on the route 60 kilometers long.

In both projects, our teams were in charge of performing works on assembly and erecting new generation transmission line towers as well as installation of conductors. Routes are extremely demanding and unpredictable, typical Icelandic, and they include valleys that are protected eco-logic and agricultural areas.

New generation transmission lines are a true step forward in constructing electric power transmission networks of new age. In the first place, new generation of transmission lines are different compared to the old ones by their durability and design, i.e. features, thanks to which they can resist to the most severe weather condi-

tions of northern countries. Their constructions are not conspicuous in nature, which is a design modern energetics are striving to.

This technology has been developed by Iceland for a long time. It is not easy to assemble these towers since these transmission lines bend gently when hit by wind and ice. This means that assembly of each tower is performed and supported by mechanization. This effort brings long-term benefits since these towers successfully defy extreme conditions.

These are tubular towers, and their height goes up to 31 meter. Each tower is so powerful that it replaces five existing wooden towers set more than 40 years ago. We will continuee works on Hólasandslína 3 next year.

WE RECORD NEW ENDEAVORS IN SWEDEN

Throughout Sweden, during this year, our transmission lines teams were in forefront of the most important and most challenging energy projects in this Nordic country.

The most complex and most demanding task of our team was **construction of 400 kV transmission line Hurva-Sege**. In performance of this project, for a bit over a year, on route 42 kilometers long, our teams dissembled old and built new transmission line, which bypasses a small town Södra Sandby on its route completely and this was one of the main goals of the project.





There were 138 towers set on the route of Hurva-Sege transmission line, and tower known under the name stubbe are the towers setting aside from the others by its size, weighing 55 tons and 55 meters high each. At the peak of the works performance, there were as many as 70 of our linemen working.

Strong trend of building as many wind parks as possible in Sweden asks for needs to create stronger electrical power networks. Due to this growing trend, a **new 400 kV transmission line Långbjörn-Storfinnforsen** is being built at North part of the country.

New transmission line, on which we will continue works in 2022, shall have a significant role in connecting new wind parks from this part of the country to electrical power network.

Total length of this transmission line route is 35.7 kilometers, and it has 129 towers. Once again, our employees showed a great skill of working under pressure since works were performed per strictly defined plan during periods of network outages in two parts of the route.

This winter, our teams in Sweden continue realization of project of constructing a new **130 kV transmission line Falköping-Tidaholm** by excellent dynamics.

Transmission line is being built South-West from town Västerås. Total length of transmission line route amounts to 20 kilometers, and Elnos teams engaged on this project are tasked with erecting 80 towers, performing electrical assembly works and installing OPGW. New 130 kV transmission line Falköping-Tidaholm replaces old and worn-out transmission line connection, which was removed by our teams before constructing the new transmission line.

NEW STEPS FORWARD IN GERMANY

After we successfully used an opportunity to affirm our knowledge in 2020 in Germany, a country holding the place of the strongest economy in the EU for years now, this year we made even more important steps forward in this country.

One of them was performed in Hilden town, in the vicinity of Düsseldorf. There, our teams were engaged on **reconstruction of 220/380 kV transmission line Eiberg-Opladen**. Transmission line Eiberg-Opladen has six systems: two 380 kV, two 220 kV and two 110 kV systems. Our teams reconstructed two of them, one 380 kV and one 220 kV system. By successful performance of this project, our teams performed very significant rejuvenating of vital parts of transmission lines three decades old.

This was endeavor remembered by our teams by very unpredictable weather conditions, i.e. changing three seasons in a day, as well as special conditions in environmental protection, which were supposed to be met.

ELECTRICITY CORRIDORS IN SERBIA AND SLOVENIA

Trend of constructing international electricity corridors takes Europe to a new era and modern energy safety. Connecting energetic capacities of states, these corridors become new veins of European energy blood flow.

This year, Elnos Group is a part of realizing two big energy corridors – construction of Trans-Balkan electrical power corridor, which is to connect East and West Europe by 400 kV transmission line, and project titled Cirkovce–Pince, whose realization shall create the first high-voltage connection between Hungary and Slovenia.

TRANS-BALKAN ELECTRICITY CORRIDOR THROUGH SERBIA

Construction of a part of this big corridor through Serbia took our teams to the heart of Šumadija this year. Across locations over 56 kilometers of meadows and hills of this region, 400 kV transmission line SS Kragujevac 2–SS Kraljevo 3 is being built and it is a part of the first phase of Trans-Balkan electricity corridor through Serbia.

It was a multi-layer task for our teams to be a part of this endeavor. Namely, comprehensive works entrusted to us engaged teams from construction and transmission line departments of Elnos Serbia for transmission line route 16 kilometers long, where we perform works on construction of foundations, erecting structures and electrical assembly works. Towers being installed are steel-lattice towers type Y, and their total weight amounts to 2,156 tons.

This is a project where we install the following: phase conductors, protective rope, glass insulators, fittings and OPGW. Additionally, we were entrusted with supply of phase conductors and protective rope for entire transmission line route, whose total length amounts to 59.3 kilometers, and which will have 174 towers set.

Our member company with the address in Belgrade is especially proud of the fact we perform controls of environmental protective measures, and health and safety measures of protection at work on entire transmission line route.

ENDEAVOR CIRKOVCE–PINCE

This year, teams of ENS, Elnos Group Slovenian member company, successfully perform works on construction of 400 kV transmission line Cirkovce–Pince (80 km), which represents one of the most important endeavors in modern energetic Slovenian history. This is project of European significance, whose aim is establishing the first high-voltage connection between Slovenia and Hungary.

This year, they continued assembly and erecting towers of the transmission line Cirkovce–Pince, where they assemble more than 1,400 tons of steel structures. Height of towers being erected goes over 50 meters.

Interesting fact is that ENS teams shall install as many as 2,600 meters of the system for safe climbing on towers within this project, which is the height almost reaching the height of Triglav, the highest Slovenian mountain.

Big project Cirkovce–Pince also covers works on relocating 220 kV transmission line Cirkovce–Žerjavinec, and ENS teams are its part again. This project is being performed in order to make space for connecting 400 kV transmission line to 400/110 kV substation Cirkovce, being the start point of 400 kV transmission line.

Through so-far realization of the project Cirkovce–Pince, ENS professional teams affirmed they were masters of multitasking and that they were capable of performing a wide spectrum of various works demanding versatile skill knowledge and ability of fast adaptation.

SERVING STRUCTURE IN N. MACEDONIA

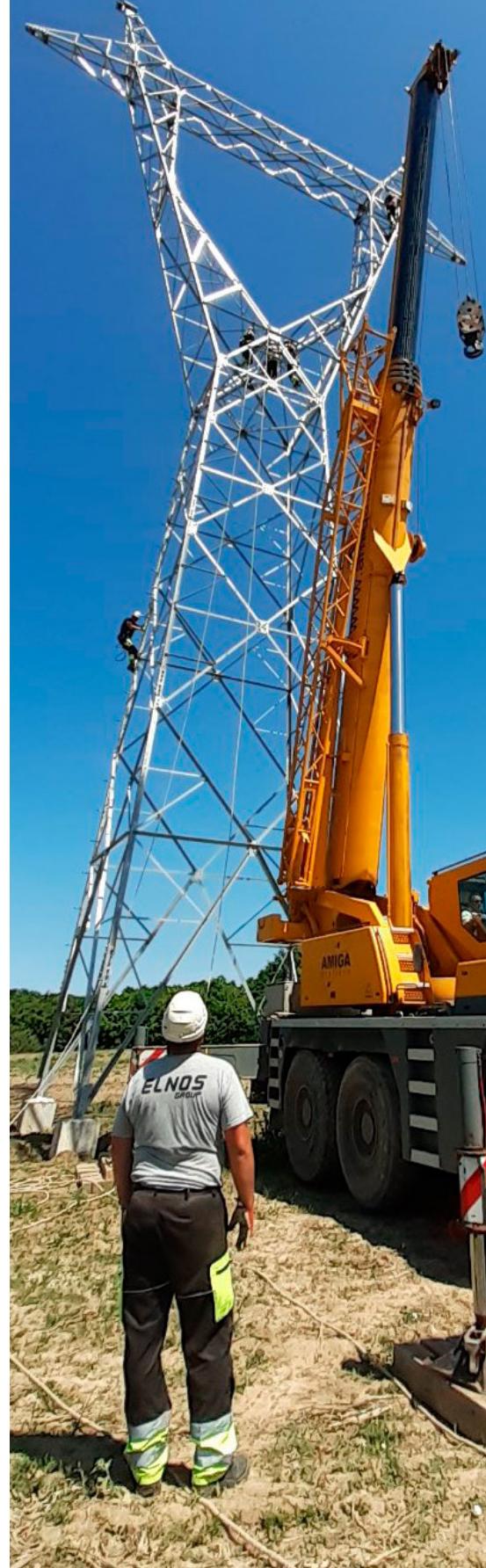
It has always been a task of special complexity level to respond to challenges of big infrastructural projects, and, this year, our teams from N. Macedonia faced such a complex task as well.

Construction of traffic route of A3 highway strategically is important infrastructural endeavor in Land of sun. Route of this highway, from Štip to Kočani, crosses 110 kV transmission line in two places, due to which one of its parts should have been relocated.

This task was entrusted with our teams in N. Macedonia.

Hardworking teams of our member company with an address in Skopje, successfully performed disassembling of two existing and assembling of six new tension transmission line towers. Within this task, they almost independently performed entire civil work phase, which, under given circumstances, was a big challenge since transmission line was built on porous area known for rice cultivation.

400 kV DV TS Kragujevac-TS Kraljevo 3
400 kV TL SS Kragujevac-SS Kraljevo 3





Trasa novog 400 kV DV Hurva-Sege je duga 42 km
Route of new 400 kV TL Hurva-Sege is 42 km long

Misija / Mission Hurva-Sege

NA KRAJU (NE)MOGUĆEG ZADATKA U ŠVEDSKOJ

AT THE END OF (IM)POSSIBLE TASK IN SWEDEN

KADA 70 RADNIKA na istom mjestu radi na jednom terenu, sav žamor u jednom trenutku podsjeća na veliku košnicu. Upravo tako je izgledao teren za vrijeme vrhunca radova na izgradnji 400 kV dalekovoda Hurva-Sege u južnoj Švedskoj.

WHEN 70 EMPLOYEES works at the same location on the same site, all the murmur resembles a big beehive at some point. This is how the terrain site looked like during the peak of works in constructing 400 kV transmission line Hurva-Sege in South Sweden.

SR Izgradnja dalekovoda Hurva-Sege, u pokrajini Skåne, bila je najznačajniji i najkompleksniji zadatak Elnos Grupe u ovoj godini, koji je istovremeno okarakterisan kao jedan od najznačajnijih energetskih projekata u Švedskoj ove godine.

Misija naših ekipa, koja je trajala nešto više od godinu dana, bila je da stari 400 kV dalekovod, koji je bio na isteku svog radnog vijeka, bude zamijenjen dalekovodom koji će na svojoj trasi u potpunosti zaobilaziti gradić Södra Sandby.

Trasa novog dalekovoda podignuta je između trafostanica Hurva i Sege. Ona prelazi preko poznate švedske žitnice, duga je 42 kilometra i na njoj je podignuto 138 stubova. Naši timovi bili su zaduženi za izvođenje kompleksnih radova demontaže starog dalekovoda, podizanja novih stubova i na kraju za sve elektromontažne poslove.

Za vrijeme izgradnje ovog dalekovoda naše ekipе montirale su i podizale čak osam različitih

vrsta stubova. Ipak, među njima su se svojom gabaritnošću i izgledom posebno razlikovali tipski stubovi, poznati pod nazivom stubbe. Ovi stubovi teže po 55 tona i visoki su 55 metara.

„Ovi stubovi su gabaritniji od klasičnih i u svojoj osnovi zauzimaju veću površinu. Na trasi smo podizali takozvane heavy i light stubbe, a podigli smo ih ukupno osam. Obično se postavljaju na pozicijama velikih skretanja dalekovoda, jer je takvo njihovo pozicioniranje dugoročni garant sigurnosti i stabilnosti prenosa energije na cijelom dalekovodu“, rekao je Dejan Indić, inženjer Elnos Grupe angažovan na ovom projektu.

DINAMIKA PROJEKTA

Radovi na ovom projektu zahuktali su se već u oktobru prošle godine, a vrhunac, koji smo kratko opisali na samom početku priče, postignut je za vrijeme dva dvomjesečna perioda izključenja s mreže. U tim periodima radile

su ukupno tri ekipе koje su zajedno brojale 70 ljudi. Izvodeći cjelodnevne rade, ovi timovi uspješno su završili lavovski posao.

„Za potrebe izvođenja ovog projekta osigurana su dva perioda izključenja postojećeg 400 kV dalekovoda, i to od aprila do juna i od avgusta do oktobra. U tim periodima realizovali smo najkompleksniji dio radova. Na terenu su radile tri ekipе paralelno. Prva je demontirala postojeći dalekovod, druga ekipа je montirala i podizala nove stubove, dok je treća izvodila kompletne elektromontažne rade“, rekao je Indić.

Velikog uspjeha u radu na ovom projektu ne bi bilo da manjoj armiji naših ljudi na terenu nije pružena podrška mehanizacije, koja se sastojala od kamiona, kranova i skylift korpi. Odlična i efikasna kombinacija ljudstva i tehnikе bila je snažan vjetar u leđa za dobar tempo odvijanja projekta.

Za realizaciju radova dobili smo pohvale investitora, kompanije Svenska kraftnät.

„Kao i uvijek, bilo je zadovoljstvo raditi sa vašim momcima. Zahvalite im na sjajno obavljenom poslu i trudu koji su uložili kako bi ovaj projekt bio uspješan“, rekao je Krister Karlsson, projekt-menadžer kompanije Svenska kraftnät za poduhvat Hurva-Sege. Na ovom projektu smo takođe potvrdili dugogodišnju uspješnu saradnju sa kompanijom Linjemontage iz Švedske.

ZNAČAJ I USLOVI PROJEKTA

Izgradnja dalekovoda Hurva-Sege je novi garant stabilnosti mreže na jugu Švedske. Regija Skåne dobila je moderan dalekovod koji sada u potpunosti zaobilazi grad Södra Sandby, što je jedan od osnovnih standarda koje moderni kvalitet života postavlja pred savremenu energetiku.

„Grad Södra Sandby godinama unazad je rastao i dalekovodi koji su ranije bili na njegovoj periferiji završili su u gradskim zonama, što se u ovoj zemlji ne toleriše. Osnovna zamisao prije početka rekonstrukcije bila je da se zaobiđe ovaj grad. Realizaciju projekta pratio je i niz posebnih uslova iz oblasti zaštite životne sredine. Za vrijeme izvođenja radova morale su se poštovati veoma striktne mjere bezbjednosti kako bi biljni i životinjski svijet, ali i posebni reljefi ovog podneblja, sve vrijeme trajanja projekta bili zaštićeni. Bilo je vrlo zahtjevno ispunjavati sve ove stroge uslove zaštite pri izvođe-

nju radova u izuzetno kratkim rokovima, ali sa zadovoljstvom možemo istaći da smo na kraju sve standarde u potpunosti ispoštivali“, istakao je Indić.

DO RADNE MOTIVACIJE UZ BILJAR I PIKADO

Iako su projekat radili u otežanim vremenjskim uslovima, na stranom jezičkom području i daleko od svojih porodica, brojni naši radnici angažovani na projektu izgradnje dalekovoda Hurva-Sege s puno pozitivne energije veoma efikasno su obavljali sve kompleksne poslove.

Timski duh za vrijeme izvođenja projekta bio je na zavidnom nivou. Radnici su svoje slobodno vrijeme ispunili nizom zanimljivih aktivnosti, što je dodatno doprinijelo njihovom kvalitetu života za vrijeme boravka u Švedskoj.

„Nakon povratka sa terena uvijek smo zajedno večerali, a poslije toga je slijedilo vrijeme za druženje i razgovor. U slobodno vrijeme rado smo igrali karte, biljar, pikado i stoni tenis. Nastojali smo i da svako veče kontaktiramo s porodicama i prijateljima. To nam je mnogo značilo i održavalo je radnu motivaciju“, kaže Slaviša Broćeta, rukovodilac gradilišta Elnosa na ovom projektu.

EN Construction of transmission line Hurva-Sege, in province Skåne, was the most significant and most complex task of Elnos Group in

this year, which, at the same time, was described as one of the most significant energy projects in Sweden this year.

Our teams' mission, which lasted just over a year, was to replace the old 400 kV transmission line, which was at the end of its lifecycle, by a transmission line that would bypass a small town Södra Sandby on its route completely.

Route of the new transmission line goes between substations Hurva and Sege. It goes over a well-known Swedish granary; it is 42 kilometers long and 138 towers were erected. Our teams were in charge of performing complex works on dissembling the old line, erecting new towers and, at the end, for all electrical assembly works.

During construction of this transmission line, our teams assembled and erected even eight different types of towers. However, towers called stubbe were characteristically different from the rest in size and appearance. These towers weigh 55 tons and are 55 meters each.

“These towers are bigger in size from the classic towers and take more surface in its base. We erected so called heavy and light stubbe on the route, and we erected eight of them in total. These towers usually are installed at positions of big turns for transmission lines, since such an installation for their positioning is a long-term guarantee for safety and stability of power



Ekipa su podizale osam vrsta stubova Teams erected eight types of towers





Timski duh na zavidnom nivou Team spirit on an admirable level

transfer on entire transmission line", stated Dejan Indić, Elnos Group Engineer engaged on this project.

PROJECT DYNAMICS

Works on this project heated up in October last year, and peak, which we briefly had described at the very beginning of the story, was achieved in two two-month outage periods. In those periods, three teams in total of 70 employees were operating. Performing works, these teams successfully completed a giant work.

"There were two outage periods of the existing 400 kV transmission line for needs of performing this project, one from April to June and the other from August to October. During these periods, we performed the most complex part of works. There were three teams working simultaneously on the site. First teams disassembled the existing transmission line. Second team assembled and erected new towers, whereas the third team performed all electrical assembly works", stated Indić.

Big success of a small army of our employees would lack if they were not supported by mechanization on site. Mechanization consisted of trucks, cranes and skylift buckets. Excellent and efficient combination of staff and technics were a strong push for good tempo in project performance.

Investor, company Svenska kraftnät, complemented out work performance.

"As always, it was pleasure to work with your guys. We would like you to thank them for amazing work performed as well as effort invested in order to achieve success on this project", stated Christer Karlsson, Project Manager for endeavor Hurva–Sege from the company Svenska kraftnät. On this project, we have also affirmed long-term successful cooperation with Linjemontage company from Sweden.

PROJECT SIGNIFICANCE AND CONDITIONS

Construction of transmission line Hurva–Sege is a new guarantee of stability of the network in South Sweden. Province Skåne got a modern transmission line, which, now, completely bypasses town Södra Sandby, which is one of basic standards a modern lifestyle sets before modern electrical engineering.

"For years now, town Södra Sandby grew and transmission line that were in its outskirts before ended up in town zones, which is not tolerable in this country. Before reconstructed started, basic idea was to bypass this town. Project realization was accompanied by a series of conditions in the field of environmental protection. During works performance, there were very strict safety measures to obey in order for flora and fauna, as well as special

reliefs of this region, to be protected throughout the project performance. It was very demanding to meet all these strict protecting conditions during project performance in extremely short deadlines. But we are pleased to state that, at the end, we completely obeyed all the standards", stated Indić.

WORK MOTIVATION WITH POOL AND DARTS

Our numerous employees engaged for this project of constructing transmission line Hurva–Sege very efficiently performed all complex works with a lot of positive energy although they performed the works in aggravated weather conditions, on foreign language region and far away from their families.

Team spirit during project performance was at high level. Employees spent their leisure time with a series of interesting activities, which additionally contributed their lifestyle quality while being in Sweden.

"After coming back from field, we always used to have supper together, and time for company and mingling followed. In our free time, we liked to play cards, pool, darts and table tennis. We tried to stay in touch with our family and friends every night. This meant a lot to us and kept us motivated for work", stated Slaviša Broćeta, Elnos Site Manager for this project.

Na mjestu gdje je rođena IKEA

At IKEA's birthplace



Na zadatku rekonstrukcije TS 130/50/10 kV Älmhult On a mission to reconstruct SS 130/50/10 kV Älmhult

U PROTEKLOJ DECENIJI Elnos

Grupa na tržištu Švedske izgradila je i rekonstruisala desetinu trafostanica koje su danas čuvari energetske stabilnosti ove zemlje. Ove godine, u saradnji sa Siemens Energy AB kao glavnim ugovaračem, bili smo privilegovani da realizujemo poduhvat velike rekonstrukcije trafostanice koja energijom napaja „IKEA grad“.

IN THE LAST DECADE, the Elnos Group built and reconstructed tens of substations at Swedish market, and these are guardians of energy stability of this country. This year, in cooperation with main contractor Siemens Energy AB, we were privileged to realize endeavor of big reconstruction of a substation powering “IKEA city”.

SR Elnos Grupa imala je zadatak da realizuje elektromontažne radevine na rekonstrukciji 130/50/10 kV trafostanice Älmhult, koja napaja istoimeni mali grad na jugu Švedske, a koji je mnogima poznat kao samo srce IKEA korporacije. Naime, u ovom gradu prije više od 60 godina osnovan je najpoznatiji švedski brend, a danas u njemu gotovo svi radno sposobni stanovnici rade za ovu kompaniju.

Danas IKEA u ovoj opštini posjeduje nekoliko fabrika, transportnih terminala, laboratorija, hotel i muzej i gotovo svi objekti u njemu napajaju se iz trafostanice Älmhult, elektroenergetskog objekta koji datira iz sedamdesetih godina prošlog vijeka.

Rastuće energetske potrebe grada koji napaja, uz potrebu stvaranja veće stabilnosti elektroenergetskog sistema oko njega, značile su samo jedno – da je došlo vrijeme za veoma ozbiljan poduhvat rekonstrukcije trafostanice Älmhult.

SEDEM ETAPA

Rekonstrukcija trafostanice Älmhult obuhvatila je kompletну zamjenu 130 kV, 50 kV i 10 kV postrojenja i montažu dva nova energetska 130/10 kV transformatora.

Trafostanica Älmhult ima ukupno šest 130 kV polja (dva dalekovodna i četiri trafo polja), sedam 50 kV polja (pet dalekovodnih i dva trafo polja) i 30 čelija 10 kV.

Postupak rekonstrukcije realizovan je u cijeloj trafostanici i odvijao se prema striktno definisanom planu podijeljenom u sedam etapa i roku od godinu dana. U okviru rekonstrukcije sve elektromontažne radove, s izuzetkom građevinskih, realizovale su snage Elnos Grupe. Ujedno, ovo je nastavak uspješnog niza projekata izgradnje i rekonstrukcije trafostanica koje radimo u partnerstvu sa Siemens Energy AB iz Švedske.

Naše ekipe izvršile su kompletan posao zamjene čeličnih nosača, elektroopreme na vanjskim 130 kV i 50 kV postrojenjima, kao i 10 kV opreme unutar zgrade, zamjenu ormara zaštite i upravljanja te ormara podrazvoda i mjerena. Timovi Elnosa realizovali su i zamjenu postojećih i polaganja novih kablova, izradu 10 kV kablovske glave, kao i polaganja NN kablova.

Realizacija ovog projekta sa sobom je donjela niz izazova, a jedan od njih je rad u precizno definisanim i mnogobrojnim fazama isključenja dijelova elektrodistributivne mreže.

„Svakodnevna komunikacija sa izvođačima građevinskih radova i dispečerskim centrom sa kojim se koordiniše vrijeme isključenja, a potom i pridržavanje precizno propisanih mjera zaštite na radu u blizini napona bili su veliki izazov za vrijeme izvođenja rekonstrukcije“, rekao je Đorđe Trbić, poslovoda Elnos Grupe.

Rekonstrukcija trafostanice Älmhult realizovana je uz poštovanje najvećih mjera sigurnosti, kako u oblasti zaštite na radu, tako i na planu zaštite životne sredine.

„Svi naši radnici zbog potrebe realizacije ovog projekta prošli su posebne sigurnosne obuke nakon kojih je dodatno povećan stepen radne pažnje tokom realizacije radova“, rekao je Trbić.

Poduhvat rekonstrukcije trafostanice Älmhult naše ekipe uspješno su završile od novembra 2020. do istog mjeseca naredne godine.

EN The Elnos Group was tasked with installation works in reconstruction of 130/50/10 kV Älmhult substation, powering a small town of the

same name at the Swedish South, known to many as heart of IKEA corporation. Namely, the best-known Swedish brand was established in this city more than 60 years ago, and today this company employs almost entire population of working age.

Nowadays IKEA owns several factories, transport terminals, laboratories, a hotel and museum in this municipality and almost all of these facilities are powered by Älmhult substation, electrical power facility originating from seventies of the last century.

Increasing energy needs of the city being powered, along with need to create better stability of electrical power system around it, meant only one thing – that it is high time for a very serious endeavor of reconstructing Älmhult substation.

SEVEN STAGES

Reconstruction of Älmhult substation covered entire replacement of 130 kV, 50 kV and 10 kV plants as well as assembly of two new 130/10 kV power transformers.

Älmhult substation has six 130 kV bays in total (two transmission lines and four substation bays), seven 50 kV bays (five transmission lines and two substation bays) as well as 30 pieces of 10 kV cells.

Reconstruction procedure was performed in entire substation and was implemented in strictly defined plan divided in seven stages and one-year deadline. The Elnos Group teams performed all installation works within the reconstruction, except civil works. At the same time, this is con-

tinuance of a series of projects of substation construction and reconstruction performed in cooperation with Siemens Energy AB Sweden.

Our teams did entire work in replacing steel supports, electrical equipment of external 130 kV and 50 kV plants, 10 kV equipment in the building, as well as replacement of cabinets for protection and control as well as cabinets for subdistribution and measurement. Elnos teams also replaced existing and laid new cables, made 10 kV cable terminations, and also laid LV cables.

Realization of this project brought a series of challenges and one of them was work in precisely defined and multiple outages of electrical power distribution network.

“Day-to-day communication with construction works contractors and control center, which coordinates outage, as well as sticking to precisely prescribed measures of protection at work in the vicinity of live parts, were a big challenge during reconstruction”, stated Đorđe Trbić, the Elnos Group Site manager.

Reconstruction of Älmhult substation was performed with obeying the highest levels of security, both in the protection at work and environmental protection.

“For realization of this project, all our employees had gone through special safety trainings after which the level of attention was additionally increased during work”, stated Trbić.

Substation Älmhult reconstruction endeavor was successfully completed by our teams from November 2020 till the same month next year.

Radilo se u etapama striktno definisanih isključenja
Works were performed in phases of strictly defined power outages





Rekonstrukcija 15 trafostanica u Crnoj Gori

VRIJEME JE ZA VELIKO FINALE

Reconstruction of 15 substations in Montenegro
IT'S TIME FOR GRAND FINALE

BILA JE OVO KLJUČNA GODINA za poduhvat rekonstrukcije 15 velikih trafostanica u Crnoj Gori. Radeći brzo i efikasno, naši timovi su na okrutnom, ali dobro poznatom terenu ove zemlje uspješno realizovali ogroman dio posla i stigli do velikog finiša projekta – trafostanica Podgorica 1, Podgorica 2 i Pljevlja 2.

THIS WAS A CRUCIAL YEAR for project of reconstructing 15 big substations in Montenegro. Working fast and efficiently, our teams successfully performed a huge part of work and made it to grand final phase of the project – substation Podgorica 1, Podgorica 2 and Pljevlja 2 on harsh but well-known terrain of this country.



TS 400/110 kV Podgorica 2 - jedno od najvećih energetskih čvorista Crne Gore
SS 400/110 kV Podgorica 2 – one of the largest power nodes in Montenegro



DRAGAN PERUNOVIĆ

projekt menadžer CGES-a
CGES Project Manager

„Uprkos već svima dobro poznatoj situaciji sa pandemijom te zahtjevnom poslu paralelnog rada na više decenija starim postrojenjima, radnici Elnosa, realizujući poslove pokazuju zavidan nivo znanja, profesionalizma, posvećenosti i poštovanja propisanih mjera zaštite na radu. U okviru ovog projekta oni su potvrdili ranije stečenu reputaciju kompanije koja je pouzdan partner, pri čemu bih posebno istakao da tu mislim na izvođenje elektromontažnih radova na dalekovodima i trafostanicama prenosne mreže Crne Gore“.

„In spite the well-known circumstances caused by pandemic, as well as demanding operation in simultaneous work on decades-old plants, Elnos employees, show envious level of knowledge, professionalism, devotion and respecting defined measures of safety at work through performance of tasks. In the frame of this project, they confirmed earlier acquired reputation of the company being a reliable partner, where I would like to specially mention performance of electrical assembly works on transmission lines and substations of the transmission network in Montenegro“.

SR Dionica izgradnje transbalkanskog elektroenergetskog koridora kroz Crnu Gori jedan je od najvećih energetskih poduhvata u ovoj zemlji, a u okviru ovog kompleksnog projekta naša kompanija dvije godine unazad realizuje rekonstrukciju 15 trafostanica koje su važna energetska čvorista ove države.

Poslovi dodijeljeni našim ekipama obuhvataju zamjenu visokonaponske opreme, rekonstrukciju sistema relejne zaštite i upravljanja, rekonstrukciju sistema sopstvene potrošnje te integraciju SCADA sistema u trafostanicama. Ugovor se realizuje po principu „ključ u ruke“, a u partnerstvu sa Siemensom Austrija i Siemensom Srbija.

Prema preliminarnim brojkama, naše ekipice do završetka velike rekonstrukcije trafostanica širom ove zemlje ugraditi više od 300 kilometara kablova, 200 novih ormara zaštite i upravljanja i 150 visokonaponskih aparatova.

Rekonstrukcija trafostanica u Crnoj Gori je poduhvat koji svojom kompleksnošću naše radnike svakodnevno stavlja pred testove umještosti i izdržljivosti. Naši timovi radne zadatke izvode u više trafostanica paralelno, u etapama strogo definisanih isključenja, kao i dok su pogoni pod naponom. Ipak, kompleksnost

svakodnevnih zadataka nije omela dobru dinamiku odvijanja radova na terenu.

LJETNA SEZONA DIKTIRA TEMPO

U Crnoj Gori vrijeme se dijeli na period prije i poslije ljetne sezone. Ovakva podjela godine uslovjava izvođenje najvećeg broja projekata u zemlji i, globalno posmatrano, diktira disanje njene privrede. Na isti način su podijeljeni i poslovi koje je ove godine realizovala naša ekipa na one koji su se odvijali prije i početkom ljeta.

Tako su do početka ljetne sezone naše ekipice okončale radove na svim projektom predviđenim 110/35 kV trafostanicama u Baru, Ulcinju, Tivtu, Herceg Novom i Budvi.

Među crnogorskim trafostanicama na Primorju najzahtjevniji posao naše ekipice imale su za vrijeme izvođenja rekonstrukcije trafostanice Budva. Ovaj elektroenergetski objekat jedno je od najbitnijih energetskih čvorista na Primorju. Njegovu modernizaciju trebalo je okončati u kratkom roku, do početka ljeta, što nije bio nimalo lak zadatak.

„Bilo je veoma dinamično i zahtjevno izvođiti radove u trafostanici Budva. U ovoj trafostanici morali smo da promijenimo kompletno 110 kV postrojenje, a osim elektromontažnih,

TRANSBALKANSKI KORIDOR U CRNOJ GORI

Ovaj projekat je dio veće inicijative iz Agende povezivanja – transbalkanskog koridora, koji će dalekovodnom linijom snage 400 kV povezati Rumuniju, Srbiju, Bosnu i Hercegovinu i Crnu Goru, dok će posredstvom HVDC interkonekcije MONITA ove zemlje u perspektivi, od 2022. godine, biti energetski povezane sa Italijom.

TRANS-BALKAN CORRIDOR IN MONTENEGRO

This project is a part of bigger initiative from the Connectivity Agenda – Trans-Balkan Corridor, which will connect Romania, Serbia, Bosnia and Herzegovina and Montenegro by 400 kV transmission line, whereas, through MONITA HVDC interconnection, in perspective, these countries will be connected through electrical power with Italy from 2022.

realizovali smo i obimne građevinske radove. S ciljem da poslove završimo u što kraćem roku, odobrena su nam isključenja u dva polja paralelno. Zahvaljujući tome, uspjeli smo ubrzati tempo, a modernizovanu stanicu pustili smo u rad pred početak ljetne sezone. Ekipa angažvana na radu u ovoj trafostanici bila je sjajna, jer je u veoma složenim uslovima sve radove u trafostanici Budva završila bez problema i prema definisanom planu”, rekao je Goran Đurasović, inženjer Elnos Grupe.

S početkom ljetne sezone 2021. naši timovi svoju aktivnost premjestili su u zaleđe i počeli angažman na 110/35 kV trafostanici Berane i 400/220/110 kV trafostanici Pljevlja 2, te 400/110/35 kV trafostanici Ribarevina.

FINIŠ PROJEKTA REZERVISAN ZA NAJVEĆE OBJEKTE

Trafostanice 220/110/35 kV Podgorica 1, 400/110 kV Podgorica 2 i 400/220/110 kV Pljevlja 2 najveće su energetska čvorišta u Crnoj Gori.

„Rad na ovim trafostanicama je najobimniji i najkompleksniji zbog njihove veličine i snage, naponskog nivoa, broja bitnih izvoda koji izlaze

iz ovih trafostanica te interkonektivnih dalekovoda koji povezuju crnogorski elektroenergetski sistem sa susjednim elektroenergetskim sistemima. Svaka trafostanica je specifična i posebna. Tako, na primjer, u Pljevljima termoelektrana direktno plasira energiju u trafostanicu Pljevlja 2. U trafostanici Podgorica 2 nalazi se najznačajniji rasplet 110 kV dalekovoda sa transformacijom 400/110 kV, a trafostanica Podgorica 1 je 220 kV i 110 kV čvorište sa 35 kV izvodima koji napajaju glavni grad zemlje. Ove tri trafostanice najveće su u zemljama i imaju bitnu ulogu u funkcionsanju crnogorskog elektroenergetskog sistema”, rekao je Đurasović.

Kompleksne radove na njihovoj rekonstrukciji naši timovi su počeli, a kompletan poduhvat, prema planu, trebalo bi da bude okončan do oktobra 2022. godine.

TIMOVI ZA DESETKU

Dobar tim je najveći garant uspješne realizacije svakog zadatka, a splet i organizacija poslova koje Elnos Grupa realizuje u okviru poduhvata rekonstrukcije trafostanica širom Crne Gore zahtijevali su najbolje ekipu.

Sama činjenica da je dio postrojenja pod naponom i u pogonu za vrijeme izvođenja radnih zadataka znatno povećava stepen opasnosti po ljudske živote. Pored toga, u elektroenergetici uvijek je veliki izazov uklapati rad novih sistema u trafostanicama sa postojećim.

Naši ljudi na terenu svakodnevno moraju da primjenjuju niz mjera na gradilištu i da rade po veoma strogim pravilima izvođenja radova u blizini napona.

„Imati dobru elektromontersku ekipu koja izvodi radove suštinski je najvažnija stvar u ovom poslu. To su ljudi koji na terenu rješavaju stvari. Oni su ti koji se svaki dan susreću sa svim zahtjevnim okolnostima i opasnostima koje ovakav posao nosi sa sobom. Svi članovi ekipa koje rade na terenu sjajni su profesionalci najvišeg ranga, dok su rukovodnici radova koji vode ove epipe stručnjaci koji uvijek daju prijedlog rješenja za svaki problem koji iskršne na licu mješta. Zahvaljujući njima, ovaj projekt napreduje tako dobro”, rekao je Dragan Jurošević, rukovodilac ZUM tima u Resursnom centru Elnos Grupe u Banjaluci.

EN Section of constructing Trans-Balkan Electricity Corridor through Montenegro is one of the biggest electrical power endeavors in this country. Within this project, our company has been performing reconstruction of 15 substations, being very important for electrical power node of this country for the last two years.





Uklapanje nove i stare opreme je uvijek poseban izazov Fitting new and old equipment is always a specific challenge

Tasks assigned to our teams include replacement of high-voltage equipment, reconstruction of the relay system for protection and control, reconstruction of system for own consumption as well as integration of SCADA system in substations. This is a "turn-key" project in partnership with Siemens Austria and Siemens Serbia.

According to preliminary figures, by the end of big reconstruction of substations throughout this country, our teams shall have laid 300 kilometers of cables, 200 new cabinets for protection and control and 150 high-voltage devices.

Reconstruction of substations in Montenegro is an endeavor that puts our employees on daily tests of skill and endurance by its complexity. Our teams perform their tasks in multiple substations simultaneously in strictly defined outages as well as during plants being charged.

However, complexity of everyday tasks did not disturb good dynamics of performing tasks on file.

SUMMER SEASON DICTATES DYNAMICS

In Montenegro, time is divided to periods before and after summer season. This kind of year division conditions performance of the biggest number of projects in the country and, globally, dictates breathing of its economy. Likewise, works performed by our team this year have been divided on those performed before summer and those performed at the beginning of the summer.

So, by the beginning of summer season, our teams completed works on all 110/35 kV substations in Bar, Ulcinj, Tivat, Herceg Novi and Budva.

Among Montenegrin substations in Coastal Area, the most demanding work for our teams was reconstruction of Budva substation. This electrical power facility is one of the most important energy nodes in Coastal Area. Its modernization should be completed in short deadline, by beginning of summer, which was not an easy task at all.

"It was very dynamic and demanding to perform works in Budva substation. We had to change entire 110 kV plant in this substation, and apart from electrical assembling works we also performed comprehensive civil construction works. In the aim to finish the works as soon as possible, we were allowed to have outages in two bays simultaneously. Thanks to that, we managed to speed up tempo, and we commissioned a modern substation just before the summer season. The team engaged for works in this substation was great since they completed all the works in the Budva substation in very difficult operating conditions with no problems and according to defined plan", stated Goran Đurasović, the Elnos Group Engineer.

At the beginning of 2021 summer season, our teams moved its activity to hinterland and started engagement on 110/35 kV Berane substation and 400/220/110 kV Pljevlja 2 substation, as well as 400/110/35 kV Ribarevina substation.

PROJECT FINISH LINE RESERVED FOR THE BIGGEST FACILITIES

Substations 220/110/35 kV Podgorica 1, 400/110 kV Podgorica 2 and 400/220/110 kV Pljevlja 2 are the biggest electrical nodes in Montenegro. "Work on these substations is the most comprehensive and most complex due to their strength and power, voltage level, number of important connections out of these substations and interconnective transmission lines connecting Montenegrin electrical power system with adjacent electrical power systems. Each substation is specific and special. So, for example, in Pljevlja, thermal power plant distributes power to Pljevlja 2 substation directly. In Podgorica 2 substation, there is the most significant 110 kV transmission line node with 400/110 kV transformation, and substation Podgorica 1 is 220 kV and 110 kV node with 35 kV outputs powering the capital of the country. These three substations are the biggest in the country and have an important role in operation of Montenegrin electrical power system", stated Đurasović.

Our teams started complex works on their reconstruction and entire endeavor, according to plan, should complete by October 2022.

"A" TEAMS

Good team is the best guarantee for successful realization of each task, hence combination and organization of works that Elnos Group performs within reconstruction of substations throughout Montenegro demanded the best teams.

Fact that a part of plant is charged and running during tasks performance significantly increases level of danger for human lives. Apart from this, in electrical engineering, it is always a big challenge to fit the work of new systems with the existing ones in substations.

On daily basis, our field employees have to apply a series of measures at the site and to work in accordance with very strict rules of task performance in the charge vicinity.

"Essentially, the most important thing in this job is to have a good electrical assembly team to perform tasks. Those are people dealing with issues on field. Those are people facing all demanding circumstances and dangers every day, resulting from this type of work. All teams' members working in the field are the highest-level professionals, whereas Managers of these teams are experts always providing a proposal for solving every problem occurring at the very spot. Thanks to them, this project progresses so well", stated Dragan Jurošević, Head of Control and protection team at the Resource Center of the Elnos Group in Banja Luka.



Transformator (400 MVA) teži 270 t Transformer (400 MVA) weighs 270 t

MONTAŽA DIVOVSKOG TRANSFORMATORA

ASSEMBLY OF GIANT TRANSFORMER

BIO JE TO JEDINSTVEN PODUHVAT ZA PAMĆENJE. Naše ekipe uspješno su realizovale montažu 400/220 kV transformatora (400 MVA) za trafostanicu 400/220 kV Kraljevo 3, koji teži nevjerojatnih 270 tona.

IT WAS A UNIQUE ENDEAVOR TO REMEMBER. Our teams successfully performed assembly of 400/220 kV transformer (400 MVA) for 400/220 kV Kraljevo 3 substation, which weighs incredible 270 tons.

„Demontirati i montirati ovako veliki i vrijedan transformator je podvig preciznosti, posvećenosti i tačnosti. Njegovom uspješnom realizacijom opravdali smo veliko povjerenje investitora Elektromreže Srbije, koja je prvi put ovakav posao povjerila timovima koji nisu dio njene firme“, istakao je Mladen Miletić, rukovodilac dvizije za TS u Elnosu Srbija.

TEST STRPLJENJA I UMJEŠNOSTI

Montaža transformatora (400 MVA) bila je naj-kompleksniji dio zadatka povjerenog timovima naše kompanije u okviru rekonstrukcije trafostanice 400/220 kV Kraljevo 3.

Veliki transformator prije devet godina montiran je na privremenu lokaciju u blizini trafostanice

Kraljevo 3, ali nikada nije pušten u funkciju. Vrijeme njegovog „čekanja“ na početak rada je odzvnilo sa početkom rekonstrukcije i proširenja trafostanice Kraljevo 3.

Samom postupku demontaže transformatora prethodila je detaljna faza ispitivanja svih važnih parametara, kao što su ispitivanje električnog izolacionog sistema namotaja, snimanja frekventnih odziva namotaja metodom SFRA i sl. Svi parametri ispitivanja transformatora izmjereni na početku demontaže nakon montiranja moraju se podudarati, jer je to dokaz da je transformator kroz cijeli postupak prošao neoštećen.

Demontaža je počela u julu. S ciljem što boljeg praćenja postupka na transformator je montiran

šok-rekorder, uredaj koji bilježi svako intenzivnije pomjeranje. Naime, bezbjednosni uslovi dozvoljavali su minimalno trzanje transformatora za vrijeme izvođenja izmještanja i demontaže.

„Sa transformatora smo demontirali elemente kao što su konzervator, 400 kV provodni izolatori i 220 kV provodni izolatori, te izvršili izlivanje 18 tona ulja iz njega. U avgustu smo, uz pomoć hidraulične dizalice i željezničkih pravoga, uspješno realizovali njegovo prvo pomjeranje i spuštanje“, rekao je Miletić.

Druge pomjeranje transformatora bilo je mnogo zahtjevnije za izvođenje, a realizovano je u oktobru.

„Naime, za drugo pomjeranje bilo je potrebno dodatno izgraditi potporni zid za spuštanje transformatora zbog visinske razlike u nivoima u 220 kV poljima i 400 kV poljima. Ni ovaj dodatni zadatak nije bio prepreka za krajnje tačnu realizaciju ovog postupka“, rekao je Miletić.

ENERGETSKI KORIDOR KROZ SRBIJU

Kapitalna rekonstrukcija i nadogradnja trafostanice Kraljevo 3, nadogradnja trafostanice Kragujevac 2 i izgradnja novog 400 kV dalekovoda između ova dva elektroenergetska objekta su projekti koji spadaju u poduhvat izgradnje transbalkanskog energetskog koridora kroz Srbiju. Elnos Grupa dio je realizacije sva tri projekta.

Kada je u pitanju rekonstrukcija i nadogradnja trafostanice Kraljevo 3, ekipe Elnosa, pored montaže transformatora, realizuju elektromontažne radove u 400 i 220 kV poljima.

Naime, u trafostanici Kraljevo 3 dograđuje se cijelo 400 kV postrojenje. Naponski nivo ove trafostanice, koji je do sada bio 220/110 kV, nakon rekonstrukcije i nadogradnje biće povećan na 400/220 kV.

Našim timovima su, pored montaže energetskog transformatora, povjereni radovi na montaži poprečnih i primarnih veza i sabirnica u 400 kV i 220 kV polju, zatim dio montaže VN opreme te nabavka opreme za telekomunikacione mreže u TS Kraljevo 3.

Elnos Grupa mjesecima unazad, zajedno sa ostalom operativom, realizuje sveobuhvatne radove na izgradnji 400 kV dalekovoda TS Kragujevac 2-TS Kraljevo 3 te učestvuje u određenim etapama nadogradnje trafostanice Kragujevac 2.

EN “It is an accuracy, devotion and punctuality feat to disassemble and assemble such a big and valuable transformer. Through its successful realization we justified the Investor's confidence Elektromreže Srbije, since this is the first time such a job was entrusted to the teams

not originating from the company itself”, emphasized Mladen Miletić, Head of Substation division in Elnos Serbia.

TEST OF PATIENCE AND SKILL

Assembly of the transformer (400 MVA) was the most complex part of the task entrusted to our company's teams within reconstruction of 400/220 kV Kraljevo 3 substation.

Big transformer was assembled nine years ago at the temporary location in the vicinity of Kraljevo 3 substation but was never commissioned. “Pending” time for its commission was ended by start of the reconstruction and extension of the Kraljevo 3 substation.

Procedure of transformer disassembly was preceded by phase of detailed testing of all the important parameters, such as testing electrical coil insulation system, recording frequency coil response through SFRA method etc. All parameters for transformer testing measured at the beginning of disassembly must correspond, since this is the proof that the transformer went undamaged through procedure.

Disassembly started in July. In the aim of better monitoring of the procedure, shock recorder was assembled in the transformer, that is a device recording each intensive movement. Namely, safety conditions allowed minimal transformer's pull during relocation and disassembly.

“Elements such as conservator, 400 kV bushing and 220 kV bushings were disassembled from transformer and 18 tons of oil poured was out of it. In August, with help from hydraulic crane and railway sleepers, we successfully moved it for the first time”, stated Miletić.

Second transformer's movement was more demanding and was performed in October.

“Namely, in order to perform the second movement, we had to build a supporting wall additionally in order to lower the transformer due to height difference in levels in 220 kV and 400 kV bays. Not even this additional task was an obstacle for extremely precise performance of this procedure”, stated Miletić.

ELECTRICITY CORRIDOR THROUGH SERBIA

Capital reconstruction and upgrade of Kraljevo 3 substation, upgrade of Kragujevac 2 substation and construction of a new 400 kV transmission line between these two electrical energy facilities are projects falling into group of endeavors of constructing Trans-Balkan Electricity Corridor through Serbia. The Elnos Group is a part of performing all three projects.

When talking about reconstruction and upgrade of Kraljevo 3 substation, apart from assembly of transformer, Elnos teams also perform electrical assembly works in 400 and 220 kV bays.

Namely, entire 400 kV plant is being upgraded in Kraljevo 3 substation. Voltage level of this substation, which has been 220/110 kV so far, shall be increased to 400/220 kV after reconstruction and upgrade.

Apart from assembling energy transformer, our teams were also entrusted with assembling primary links of busbars in 400 kV in 220 kV bay, as well as a part of disassembling HV equipment and purchase of equipment for telecommunication network in SS Kraljevo 3.

Going back months, Elnos Group, along with other operations, performs comprehensive works on constructing 400 kV transmission line SS Kragujevac 2-SS Kraljevo 3, and also takes part in certain stages of upgrading Kragujevac 2 substation.



ELEKTRIFIKACIJA DA, ALI NE U MOM DVORIŠTU

GOING ELECTRIC,
BUT NOT IN MY
BACKYARD

SUOČENA SA STANDARDOM MODERNOG KVALITETA života koji nosi moto „Ne u mom dvorištu“, savremena energetika teži ka što većoj primjeni elektroenergetskih rješenja koja se bolje uklapaju u okolinu. Ove godine timovi ENS Slovenije započeli su radove na priključenju nove 110/20 kV trafostanice Škofja Loka sa GIS visokonaponskim postrojenjem, koja pripada ovoj kategoriji savremenih postrojenja.

FACED WITH STANDARD OF MODERN LIFE QUALITY HAVE A motto “Not in my backyard”, modern electrical engineering thrives for application of electrical engineering solutions, which fit environment better. This year, ENS Slovenia teams started works on connecting new 110/20 kV Škofja Loka substation with GIS high-voltage plant belonging to this category of modern plants.



SR Nova trafostanica sa GIS postrojenjem gradi se pored istoimene stare trafostanice, koja je puštena u rad prije 40 godina i napajala mali srednjovjekovni grad u centralnom dijelu Slovenije.

Održavanje stare trafostanice postalo je prezahtjevno, a energetske potrebe malog i živopisnog grada Škofja Loka od slovenačke elektroenergetske mreže zahtijevale su viši stepen sigurnosti napajanja. Rješenje se nametnulo samo – stara trafostanica Škofja Loka u perspektivi će se ugasiti, a njenu funkciju u potpunosti će preuzeti nova trafostanica sa GIS postrojenjem.

RADOVI ENS-A

Timovima naše slovenačke članice u okviru ovog projekta povjereni su radovi na rekonstrukciji rasplate 110/20 kV dalekovoda na ulazu u trafostanicu i priključenju trafostanice na elektroenergetsku mrežu.

Tokom ljeta ekipe su uspješno realizovale radeve rekonstrukcije na raspletu 110/20 kV dalekovoda. Ova etapa radova obuhvatala je demontažu i uklanjanje dva stara te montažu dva nova cijevna poligonalna dalekovodna stuba, montažu sistema za sigurno penjanje, zatim instalaciju provodnika, ovjesne opreme, izolatora i OPGW-a.

„Montaža i podizanje cijevnih vruće cinčanih stubova izvodi se drugačije u odnosu na uobičajene rešetkaste stubove. Naime, zanimljivo je da se ova vrsta stubova postavlja na već završene betonske temelje u kojima je ugrađeno čelično sidro na koje se postavlja prirubnica donjem segmentu stuba. Nakon ovog postupka nastavljaju se radovi podizanja stuba“, rekao je Bojan Gale, tehnički direktor ENS-a.

Etapa priključenja nove trafostanice sa GIS postrojenjem na elektroenergetsku mrežu biće realizovana krajem 2021. i tokom naredne godine.

Ekipama ENS-a u okviru ove etape povjereni su: snabdijevanje materijalom, demontažni i montažni radovi za 110 i 20 kV priključke na transformatore, radovi na priključnom vodu, zatim priključku kablova i 20 kV sabirnicu te spajanju signalnih kablova.

U okviru ove etape montaže kablovskih sistema ekipe će položiti 4.380 metara 110 kV kabla. One će montirati devet 110 kV odvodnika prenapona, devet 110 kV kablovskih glava, koje će biti montirane na poligonalne stubove, i devet kablovskih glava koje će biti montirane na GIS aparate.

Potrebno je istaći i to da će se ovaj projekt realizovati uz primjenu najviših mjera bezbjednosti, jer će za vrijeme izvođenja određenih etapa radova stara trafostanica biti u pogonu.

POSEBNE EDUKACIJE

Monteri angažovani na ovom projektu završili su edukacije za izradu vanjskih i GIS kablovskih glava na 110 kV kablovima i posjeduju posebna znanja za njihovo samostalno montiranje. Prije nego što su pristupili fazi montiranja, oni su takođe prošli posebnu sertifikaciju od strane proizvođača kablovskih glava.
Rad na GIS postrojenjima, između ostalog, zahtijeva i položen državni ispit za izvođenje radova na visokonaponskim postrojenjima koja sadrže SF₆ gas. Takav ispit do sada položilo je nekoliko ENS-ovih montera i inženjera.

EN New substation with GIS plant is being built next to the old substation of the same name, which was commissioned 40 years ago and powers a small medieval town in central part of Slovenia.

Maintenance of the old substation became too demanding and power needs of the small and picturesque town Škofja Loka asked for a higher level of powering safety from Slovenian electrical power network. Solution came by itself – old substation Škofja Loka shall be put down in perspective and new substation with GIS plant shall completely overtake operation.

ENS WORKS

Within this project, works on reconstruction of 110/20 kV transmission line outcome at the entrance to substation and connection of substation to electrical power network are tasks given to teams of our Slovenian member company.

During summer, teams successfully performed works on reconstructing 110/20 kV transmission connections. This stage of works included dissembling and removal of two old and assembling two new pipe polygonal transmission line towers, assembling system for safe climbing, installation of conductors, suspension equipment, insulator and OPGW.

“Assembling and erecting pipe hot-zinced towers is performed differently compared to common grid towers. Namely, it is interesting fact that this type of towers gets installed on previously prepared concrete foundations with steel anchor installed, and flange of the lower tower segment goes on the top of it. After this procedure, works on erecting the tower continue”, stated Bojan Gale, Director of Operations in ENS.

Phase of connecting new substation with GIS plant to electrical power network shall be

performed by the end of 2021 and during the following year.

ENS teams had the following tasks within this stage: material provision, dissembling and assembling works for 110 and 20 kV connections to transformers, works on connection duct, cable connection and 20 kV busbars as well as connection of signal cables.

Within this stage of assembling cable systems, teams shall lay 4,380 meters of 110 kV cable. They will assemble nine 110 kV surge arresters, nine 110 kV of cable endings, which shall be assembled on polygonal towers, and nine cable terminations, which shall be assembled on GIS plants.

We need to emphasize that this project, also, shall be performed with application of highest-level safety measures since, during performance of certain work phases, the old substation will be operational.

SPECIAL EDUCATIONS

Linemen engaged in this project completed educations for making external and GIS cable terminations on 110 kV cables and they have special knowledge for their independent assembling. Before starting assembly phase, they also attended special certification by cable terminations producer.

Work on GIS plants, among other, also demands passing the state exam for performance of works on high-voltage plants containing SF₆ gas. Such an exam was passed by several ENS linemen and engineers.

Timovi ENS-a na djelu ENS teams in action



BRZIM VOZOM ZA VELIKU BRITANIJU

HIGH SPEED TRAIN FOR GREAT BRITAIN

POČINJEMO PISATI STRANICE našeg prvog projekta u Velikoj Britaniji kao dio velike radne snage koja realizuje najveći infrastrukturni projekt u ovoj zemlji do sada – izgradnju željezničke pruge za ultrabrzе vozove High Speed 2 (HS2).

WE START WRITING PAGES of our first project in Great Britain as a part of a big working force performing the biggest infrastructural project in this country up to now – construction of railway for ultrafast trains High Speed 2 (HS2).

SR Najveći infrastrukturni projekt Velike Britanije ujedno je i jedan od najvećih investicionih poduhvata u Evropi. Najmodernaža željeznička mreža povezivaće London, Birmingem, Istočni Midlends, Lids i Mančester, a brzina vozova na novim ultrabrzim prugama dostižeće nevjerojatnih 400 km/h.

Hiljade radnika angažovanih na izgradnji High Speed 2 željezničke infrastrukture, čiji splet će u konačnici biti dugačak 760 km, svakodnevno pobjeđuju izazove struke tokom realizacije poduhvata čiji je svaki korak pod budnim okom britanske javnosti. Elnos Grupa je u okviru ovog impozantnog projekta dobila zadatak da obezbijedi napajanje električnom energijom za 41 lokaciju tri velika gradilišta. A evo i kako...

NAPAJANJE VELIKIH GRADILIŠTA

Elnos Grupa, u saradnji sa partnerskom britanskom kompanijom Emico, a posredstvom zajedničke firme EMEL Power u Velikoj Britaniji od januara 2022. počinje posao projektovanja, izrade, isporuke i instalacije distributivnih trafostanica za napajanje električnom energijom prvo na 14 lokacija na gradilištu Vest Rajsliп.

Dio projekta na kojem su naše ekipe angažovane podrazumijeva radove u našim proizvodnim pogonima u Beogradu, a potom na lokacijama izgradnje novih tunela na gradilištu Vest Rajsliп. Inače, High Speed 2 pruga projektovana je kako bi maksimalno izbjegla ukrštanja sa postojećim prugama i putevima, zbog čega će na njoj biti izgrađen veliki broj tunela.

Prva etapa radova naših ekipa odvijaće se u elektromontažnim radionicama Elnosa u Beogradu, gdje će timovi sukcesivno ugrađivati

elektroopremu u distributivne trafostanice, koje će biti isprojektovane u skladu sa specifičnim potrebama ovog poduhvata.

Naši timovi će ugrađivati: opremu SN napona, ormare srednjeg i niskog napona, transformatore, otpornike za uzemljenje zvjezdista i pomoćne razvode. Svaka distributivna trafostanica će biti različite snage i dimenzija i biće sastavljena od različite opreme. U pojedinima će biti instalirani samo SN ormari, a u većini će biti povezana oprema koja se sastoji od SN ormara, NN ormara i transformatora.

Jedan od osnovnih i najizazovnijih zadataka za naše timove u ovoj etapi radova biće formiranje distributivnih trafostanica, koja će biti što manjih dimenzija i ispunjavati posebno definisane i veoma striktne tehničke zahtjeve.

Prema usvojenoj dinamici radova, montaža prve distributivne trafostanice u Beogradu treba da bude završena početkom februara naredne godine, nakon čega bi trebalo da počne prva isporuka u Veliku Britaniju.

Druga etapa podrazumijeva dostavljanje i priključivanje distributivnih trafostanica na definisane lokacije na gradilištu. Nakon čega će zadatak naših ekipa biti da izvrše njihovo podešavanje, dodatno povezivanje i puštanje u rad.

Nakon ove gradilišne lokacije, naši timovi će na isti način, u okviru ovog projekta, u narednim etapama izraditi, isporučiti i priključiti 11 distributivnih trafostanica za gradilište Viktorija Roud i 16 za gradilište Atlas Roud.

„Realizacija ovog projekta je veliki poduhvat i veliki iskorak za Elnos Grupu. Naša kompanija prvi put radi na tržištu Velike Britanije, što je



Brzina vozova će sezati do 400 km/h Train speed will reach 400 km/h

samo po sebi veliki izazov. Ovaj projekat je izuzetno specifičan, a mi smo se odvažno uhvatili ukoštač sa kompleksnim poslom kakav ranije nismo imali priliku da radimo. Poseban izazov predstavljaju nam izuzetno kratki rokovi. Preciznije govoreći, za izvođenje prve etape radnih zadataka Elnos ima svega četiri mjeseca, a u tom vremenu ćemo se morati prilagodavati nizu veoma promjenjivih tehničkih zahtjeva ovog vrlo dinamičnog projekta", rekao je Mladenko Đaković, vodeći inženjer Elnosa BL.

U SLUŽBI PROJEKTA

Naša postrojenja napajaće gradilišne mašine uključujući i mašine poznate kao velike bušilice tunela – popularno nazvane krtice. Za napajanje jedne od krtica, koja će biti dugačka 100 metara, naša kompanija će izraditi distributivnu trafostanicu snage 8 MW.

EN Biggest infrastructural project of Great Britain also is currently one of the biggest investment endeavors in Europe. Most modern railway network shall connect London, Birmingham, East Midlands, Leeds and Manchester, and speed of trains on these ultrafast rails shall reach unbelievable 400 km/h.

Thousands of employees engaged in construction of High Speed 2 railway infrastructure, whose combination shall finally be 760 km long, win professional challenges during realization of the endeavor, and each their step is under British public's watchful eye on daily basis. In the frame of this colossal project, Elnos Group is tasked with powering 41 locations on three giant sites. And here is how...

POWERING GIANT SITES

Elnos Group, cooperating with partner British company Emico, and through joint company EMEL Power in Great Britain, since January 2022 starts activities of designing, production, delivery and installation of distribution station for powering 14 locations on West Ruislip site.

A part of the project our teams are engaged for includes works in our production plants in Belgrade, and on locations of constructing new tunnels on West Ruislip site afterwards. Normally, High Speed 2 railway is designed so that crossings with existing rails and roads get avoided in maximum, due to which it will have many tunnels constructed.

First stage of works for our teams shall go on in electrical assembly Elnos workshops in Belgrade, where, successively, they will install electrical equipment in various distribution station, which shall be designed in line with specific needs of this endeavor.

Our teams shall install: MV equipment, medium and high voltage cabinets, transformers, resistors for earthing of transformers and ancillary distribution. Each distribution station shall be of different power and size and shall consist of different equipment. In some of them, there will be only MV cabinets installed, and in most, there will be linked equipment consisting of MV cabinets, LV cabinets and transformers.

One of the basic and most challenging tasks for our teams at this stage of works shall be formation of distribution station, which shall be as small as possible and shall meet specially defined and very strict technical demands.

According to adopted work dynamics, assembly of the first distribution station in Belgrade should be completed by early February next year, after which the first delivery to Great Britain should start.

Second stage includes delivery and connection of distribution stations to defined locations on the site. After this, our teams will have a task to set them, connect them additionally and commission them.

After this construction location, in the same way, within this project, our teams shall make deliver and connect 11 substations for construction site Victoria Road and 16 for construction site Atlas Road in the upcoming project stages.

"Realization of this project is a big endeavor and a big step forward for Elnos Group. Our company works on the Great Britain's market for the first time, which is challenge itself. This project is very specific, and we boldly grapple with complex work we have never got a chance for before. Special challenge for us are extremely short deadlines. More precisely, Elnos has only four months for performing first phase tasks, and in this period, we need to adjust a series of very changeable technical requirements of this very dynamic project", stated Mladenko Đaković, Elnos BL Senior project engineer.

IN THE SERVICE OF THE PROJECT

Our plants shall power construction mechanization including machines known as big tunnel drills (Tunnel boring machine) – well-known as moles. For powering one of moles, which shall be 100 meters long, our company shall make 8 MW distribution station.



TE Stanari (300 MW) TPP Stanari (300 MW)

STRUČNJACI ZA „KLJUČ U RUKE“

“TURN-KEY” EXPERTS

IZGRADILI SMO MODERNU 6/35 kV trafostanicu Rudnik, što je novi korak ka budućoj energetskoj nezavisnosti rudnika Raškovac i termoelektrane Stanari.

WE BUILT A MODERN 6/35 kV Rudnik substation, which is a new step towards future energy independence of the Mine Raškovac and Thermal Power Plant Stanari.

SR Ekipe Elnosa za dva mjeseca uspješno su realizovale projekat izgradnje savremene 6/35 kV trafostanice Rudnik po sistemu „ključ u ruke“ za potrebe rudnika Raškovac, koji je žila kućavica EFT Rudnik i Termoelektrana Stanari.

Izgradnjom ove trafostanice kompanija EFT Rudnik i Termoelektrana Stanari stvorila je sve preduslove za zatvaranje kruga samostalnog sistema proizvodnje električne energije, što u perspektivi treba da dovede do prekida napajanja ovog giganta sa elektroenergetske mreže Republike Srbije.

Angažman timova naše kompanije obuhvatao je poslove izrade glavnog projekta, nabavke opreme, izvođenje građevinskih i elektromontažnih radova te etape ispitivanja i puštanja trafostanice pod napon.

Petar Todorović, inženjer Elnos Grupe, istakao je da je rad na trafostanici ovog tipa podrazumijeva kompleksan vid monitoringa, upravljanja i zaštite.

„Termoelektrana Stanari ima razgranatu mrežu nadzemnih i podzemnih dalekovoda, a na terenu je bilo dosta transformatora i postrojenja,

kao i podzemnih instalacija, tako da je na građilištu bilo veoma dinamično. Bilo je zahtjevno održavati stalnu koordinaciju sa investitorom, podizvodačem i trećim licima, dok je u isto vrijeme bilo potrebno apsolutni prioritet staviti na tehničku ispravnost i funkcionalnost elektroopreme unutar trafostanice", dodao je Todorović.

On je istakao da je projekat zahtijevao poštovanje najviših standarda zaštite životne sredine i mjera zaštite na radu.

"U energetskim transformatorima je transformatorsko ulje, čije bi izljevanje bilo opasno po životnu sredinu. Kako bismo sprječili takav ishod, projektovali smo i ugradili uljni separator i cisternu dovoljne zapremine za prihvrat ulja iz oba energetska transformatora. U slučaju da dođe do curenja, ulje bi kroz cijev postavljenu pod nagibom dolazilo u uljni separator koji ga proslijedi u cisternu. Na ovaj način ispunili smo zahtjeve u pogledu očuvanja okoline", precizirao je Todorović.

Naši radnici su na ovom projektu bili angažovani nepuna dva mjeseca. Radovi koji su pretvodili početak izvođenja na terenu podrazumjevali su iskop rova, polaganje SN energetskih kablova te izradu uzemljenja.

Ovo je projekat u okviru kojeg su naši timovi položili više od 17 kilometara SN, NN i optičkih kablova. U okviru elektromontažne etape montirali su i povezali dva energetska transformatora (snage po 8 MVA), montirali su SN postrojenja te realizovali povezivanje na postojeći SCADA sistem.

Naši radovi u TS Rudnik obuhvatili su i montažu 6 kV postrojenja, koje se sastoji od šest ćelija, i montažu 35 kV postrojenja od sedam ćelija. Ovi radovi podrazumijevali su i montažu i povezivanje SN ćelija i njihovih zaštitnih mikroprocesorskih uređaja, kao i njihovo podešavanje.

Izvršena je i ugradnja ormara AC i DC razvoda i komunikacionog ormara, a dio ormara koji su ugrađeni proizveden je u Elnosovim EM radio-nicama. Timovi Elnosa ugradili su i opštu instalaciju u TE Stanari te unutrašnje i spoljašnje osvjetljenje trafostanice Rudnik.

TE STANARI

Termoelektrana Stanari je najveća pojedinačna investicija i prva privatna termoelektrana u BiH. Godišnja proizvodnja TE Stanari iznosi dva miliona MWh električne energije, a njena instalisana snaga je 300 MW.

EN In two months, Elnos teams successfully completed the project of constructing modern 6/35 kV Rudnik substation per "turn-key" principle for needs of the Mine Raškovac, which is the lifeblood of the EFT Mine and Thermal Power Plant Stanari.

By constructing this substation, Company EFT Mine and Thermal Power Plant Stanari created all pre-conditions for closing the circle of independent system for production of electrical power, which, in the future, should lead to cease of powering this giant from the electrical power network of the Republic of Srpska.

Engagement of teams from our company included works on main design, equipment purchase, performance of construction and electrical assembly works as well as stage of testing and commissioning the substation.

Petar Todorović, the Elnos Group Engineer, states that the work on this type of substation had included a complex form of monitoring, management and protection.

"Thermal Power Plant Stanari has a network system of overhead and underground transmission lines, and the field also included a number of transformers and plants, as well as underground installations, so that the site work was very dynamic. It was demanding to keep constant coordination with the Investor, producer and third parties, whereas, at the same time, we had to have technical accuracy and functionality of electrical equipment within substation as absolute priority", added Todorović.

He emphasized the project had demanded meeting the highest levels of ecological and work safety standards.

"Power transformers contain transformer oil, and spill would be dangerous for environment. In order to prevent such event, we designed and built-in oil separator and a tank with volume big enough to take the oil from both power transformers. In case of leaking, oil would go to oil separator and forwarded to tank through a pipe installed with inclination. This way, we met environmental preconditions", stated Todorović in detail.

Our employees were engaged in this project for almost two months. Works proceeding the start on the site included trench excavations, laying MV power cables and grounding.

Our teams laid down more than 17 kilometers of MV, LV and optic cables within this project. In electrical assembly phase, they assembled and connected two power transformer (8 MVA power respectively). They assembled MV plants and performed connection to the existing SCADA system.

Our works in SS Rudnik also included assembly of 6 kV plant consisting of six cells, and assembly of 35 kV plant consisting of seven cells. These works also included assembly and connecting MV cells and their protective microprocessor devices, as well as their set-up.

Installation of AC and DC distribution cabinets and communication cabinets were performed, and a part of installed cabinets had been produced in Elnos EM workshops. Elnos teams also installed general installations in the TPP Stanari as well as external and internal lighting for Rudnik substation.

TPP STANARI

Thermal Power Plant Stanari is the biggest individual investment and the first privately funded thermal power plant in BiH. TPP Stanari's annual production amounts to two million MWh of electrical power and its installed power amount to 300 MW.



Dionica Jajinci–Mala Krsna, dio Koridora 10

POVEZUJUĆI DRŽAVE, LJUDE I MJESTA

Section Jajinci–Mala Krsna, a part of Corridor 10
CONNECTING STATES, PEOPLE AND PLACES



Dionica pruge Jajinci–Mala Krsna uskoro počinje novi život New life about to begin for railway section Jajinci–Mala Krsna

KADA GRADIŠ PRUGE, postaješ dio nečeg mnogo većeg od sebe. Pruge ne povezuju samo odredišta, one pričaju priče o vezama između gradova, ljudi i država. Rekonstrukcija željezničke dionice Jajinci–Mala Krsna je živopisna priča o maloj pruzi koja postaje dio važne evropske željezničke trase.

WHEN BUILDING RAILWAYS, you become a part of something much bigger than yourself. Railways do not connect destinations only, but they tell stories on connecting cities, people and states. Reconstruction of railway section Jajinci–Mala Krsna is a picturesque story on a small railway becoming a part of an important European railway route.

 Dionica pruge Jajinci–Mala Krsna, na čijoj kompleksnoj rekonstrukciji radnici Elnos Grupe već dvije godine predano rade, sasvim sigurno je mnogo više od željezničke saobraćajnice između dva mjesta u srednjoj Srbiji. Ona je dio međunarodnog željezničkog Koridora 10, koji povezuje šest evropskih država na trasi od Austrije pa sve do Grčke.

Kao dio velikog željezničkog poduhvata na putanji kroz Srbiju, trasa Jajinci–Mala Krsna morala je ući u kapitalni postupak rekonstrukcije koji i danas traje. Njena rekonstrukcija je zadatak visokog nivoa kompleksnosti i zahtijeva veoma visok stepen strpljenja i umješnosti svih ekipa angažovanih na njemu.

Cilj rekonstrukcije je jasno definisan – izgraditi modernu željezničku infrastrukturu koja će brzinu vozova na ovoj željezničkoj dionici, dugoj 58,8 kilometara, povećati sa 50 na optimalnih 120 kilometara na čas.

POVRATAK U FORMU

Željeznička stanica Umčari je bazno mjesto na kojem počinju radni dani naših ekipa angažovanih na ovom projektu. Sa ove lokacije svakodnevno se koordinišu radovi, povlači se oprema i raspoređuju ekipa na radne zadatke.

Naši radnici na drezini, na koju su priključeni radni i pomoći vagon sa hidrauličnom platformom, mjesecima unazad prelaze kilometre pruge detaljno izvodeći niz radova na rekonstrukciji njene kontaktne mreže.

Lista zadataka koja nam je povjerena je duga. Na prvom mjestu stoe elektromontažni radovi u okviru rekonstrukcije kontaktne mreže.

„Do sada smo u potpunosti završili dodijeljene nam poslove demontaže 80 kilometara vozog voda na svim prolaznim kolosijecima te svih starih elemenata za nošenje i zatezanje kontaktne mreže na prolaznim kolosijecima i na 25 kilometara postojeće kontaktne mreže na sporednim kolosijecima. Sada aktivno izvodimo montažu novog vozog voda i ostalih elemenata“, rekao je Veljko Savić, vodeći inženjer Elnos Grupe.

Ekipe su do sada uspješno rekonstruisale 110/25/0,23 kV elektrovočnu podstanicu, a do kraja godine će okončati rekonstrukciju sva četiri 25/0,23 kV postrojenja za sekcionisanje i izgraditi svih sedam novih 25/0,23 kV stubnih trafo-stanica za napajanje uređaja za signalizaciju i grijanje skretnica.

U SUSRET KRIVINAMA I TUNELIMA

Iako većina trase pruge Jajinci–Mala Krsna prolazi ravnicaškim predjelima, konfiguracija terena je takva da pruga „iz jedne krivine prelazi u drugu“. Krivine su malog radijusa, a pristupni teren oko pruga nekada gotovo da ne postoji, što dodatno komplikuje posao naših ekipa.

Ipak, najveći izazov na projektu bila je montaža nove kontaktne mreže u tunelima Lipe i Beli potok. Ovi tuneli izgrađeni su prije Drugog svjetskog rata. Zajedno su dugi 2,5 kilometra i minimalnog su profila.

„Zadaci u tunelima su zahtijevali veliko strpljenje i oprez. Kako bi se ispoštivali uslovi standardne visine kontaktne mreže, bilo je neophodno prilagoditi opremu i povećati stepen opreza u segmentu zaštite na radu. Uz mnogo posvećenosti i opreza uspjeli smo izvršiti elektrifikaciju ovih tunela“, rekao je Savić.

Kapitalna rekonstrukcija pruge Jajinci–Mala Krsna, uprkos svim nedostacima koje su donijele „godine kovida“, biće okončana početkom 2022. godine.



Na zadatku rekonstrukcije kontaktne mreže On a mission to reconstruct contact network

EN Section Jajinci–Mala Krsna of the railway, whose complex reconstruction has been performed by employees of the Elnos Group for two years devotedly, sure is much more than railway route between two places in Central Serbia. It is a part of international railway Corridor 10, connecting six European countries on the route from Austria through to Greece.

As a part of big railway endeavor on the road through Serbia, section Jajinci–Mala Krsna had to be under procedure of capital reconstruction still going on. Its reconstruction is a task of high level of complexity and requests a high level of patience and skill by all engaged teams.

Reconstruction aim is clearly defined – build a modern railway infrastructure, which is going to increase train speed on this 58.8 kilometers-long railway section from 50 km/h to optimal 120 km/h.

BACK TO SHAPE

Railway station Umčari is a base location for start of working days for our teams engaged in this project. On daily basis, this location is where works are coordinated from, equipment is delivered from, and teams are distributed per tasks.

Our employees on draisines which operating and supporting cars are connected to by hydraulic platform, have been going for kilometers of railway in detail for months now and performing a series of reconstruction works on its overhead contact line.

List of tasks entrusted to us is a long one. In the first place, there are electrical installation works within reconstruction of overhead contact line.

“So far, we have fully completed out tasks of dissembling 80 kilometers of catenary on all transitional tracks as well as all the old elements for

carrying and stringing overhead contact line on transitional tracks and on 25 kilometers of the existing overhead contact line on side-tracks. At the moment, we are actively assembling new catenary and other elements”, stated Veljko Savić, the Elnos Group Senior project engineer.

So far, teams have successfully reconstructed 110/25/0.23 kV intermediate substation, and, by the end of year, all four 25/0.23 kV sectioning plants shall be completed and seven new 25/0.23 kV tower substations for powering signal device and heating switches.

MEETING BENDS AND TUNNELS

Although most of railway section Jajinci–Mala Krsna goes through lowlands, terrain configuration is of a such kind that the railway goes “from one bend to another”. Bends have a small radius and approaching terrain surrounding railway sometimes is almost non-existent, which additionally complicates our teams’ work.

However, the biggest challenge of the project was assembling new overhead contact line in tunnels Lipe and Beli potok. These tunnels were built before the Second World War. They are 2.5 kilometers long together and are of minimal profile.

“Tasks in the tunnels requested a lot of patience and caution. In order to meet requirements for standard height for catenary, we had to adjust the equipment and increase level in protection at work segment. We managed to electrify these tunnels with a lot of devotion and caution”, stated Savić.

In spite of all misfortunes of “Covid years”, capital reconstruction of railway Jajinci–Mala Krsna, shall be completed at the beginning of 2022.

Osnažen ZUM tim -

GARANT NOVOG NIVOA USLUGE I KVALITETA

Empowered CP team –
GUARANTEE FOR NEW LEVEL OF SERVICE AND QUALITY



ZUM tim u akciji CP team in action

PODIZANJE KVALITETA USLUGA I

NIVOA ZNANJA ključno je za pomjeranje projektnih granica. Vodeći se ovim isprobanim i uvijek tačnim receptom, na nivou Grupacije kadrovski je značajno osnažen tim za zaštitu, upravljanje i mjerjenje (ZUM tim).

INCREASING LEVEL OF SERVICE AND LEVEL OF KNOWLEDGE are crucial for moving project limits. Led by this proven and always accurate recipe, team for control and protection (CP team) has been significantly empowered in the sense of staff at the Group level.



Najvažnija etapa radova prije puštanja svakog elektroenergetskog objekta u rad
The most important work stage before commissioning any electrical power facility

■ Provjere i ispitivanja su najvažnija etapa rada prije puštanja u rad svakog elektroenergetskog objekta, a članovi ZUM tima imaju izuzetno odgovornu ulogu prije konačnog puštanja objekata u rad.

Da je u pitanju kompleksan i odgovoran posao, najbolje ilustruje činjenica da ZUM tim nakon završetka radova na svakom projektu radi završna mjerjenja i ispitivanja, odnosno realizuje zadatke kojima su obuhvaćene finalne provjere koje moraju biti uradene kako bi elektroenergetski objekti u potpunosti bili sigurni za puštanje u rad.

„Jačanjem ovog tima i naš nivo usluga podignut je na zavidan nivo i u segmentu commissioninga. Obuhvat commissioninga podrazumijeva postupak osiguranja, odnosno garanciju da su svi sistemi energetskog objekta testirani, instalirani, upravljeni i održavani u skladu sa operativnim zahtjevima krajnjeg klijenta“, rekao je Dragan Jurošević, rukovodilac ZUM tima u Resursnom centru Elnos Grupe u Banjaluci.

Najviši nivo kompetentnosti i znanja zapo-sleni u ovom timu do sada su potvrđivali godinama unazad. Njihove najnovije reference su realizacija projekta MHE Jablanica i kapitalnog remonta u TE Ugljeviku. Fokus njihovog rada ove i prethodne godine bio je veliki poduhvat rekonstrukcije 15 trafostanica u Crnoj Gori na projektu Grant.

U Srbiji je u toku realizacija projekata modernizacije TS 110/20 kV Bačka Palanka 2, TS 35/10 kV Košutnjak, te TS 110/20 kV Kikinda i Kula, kojima je obuhvaćena kompletna zamjena relejne zaštite i sopstvene potrošnje, kao i uvođenje sistema daljinskog upravljanja trafostanica. „U okviru ovog značajnog investicionog

ciklusa EPS-a i Elektro Vojvodine u navedene trafostanice ugradićemo najsavremenije ABB-ove i Siemensove mikroprocesorske uređaje i opremu za daljinsko upravljanje“, istakao je Vladimir Ilić, vodeći inženjer za ZUM tim u Resursnom centru Elnos Grupe u Beogradu.

Već je poznato da naš ZUM tim naredne godine očekuje značajan angažman u okviru projekata na 110/35/10 kV trafostanicama Banjaluka 9, Trebinje i Srebrenica.

Pored regionalnog tržišta, inženjeri i elektro-monteri koji su dio ovog tima do sada su stekli zavidno iskustvo prilikom realizacije projekata u inostranstvu, i to na trafostanicama u Švedskoj i na Islandu. U narednom periodu očekujemo značajniji angažman ovog tima na evropskom tržištu.

■ Checks and tests are the most important work stage before commissioning any electrical power facility, and members of CP team have an extremely responsible role before final commissioning of the facility.

Fact that CP team performs final measuring and tests is the best illustration of how complex and responsible business this is. This means that it performs tasks of final checks that need to be done in order for electrical power facilities to be safe for commissioning after completion of works on each project.

“By strengthening this team, at the same time, level of our service has been raised to high level in commissioning segment. Commissioning includes verification process, i.e. guarantee that all the systems of power facility have been tested, installed, controlled and maintained in line operational requests of the final client”,

stated Dragan Jurošević, Head of Control and protection team at the Resource Center of the Elnos Group in Banja Luka.

Highest level of skill and knowledge has been affirmed by employees of this team for years now. Their newest references are in realization of the project SHPP Jablanica and performing of capital upgrade in TPP Ugljevik. This and last year, focus of their work has been on reconstruction of 15 substations in Montenegro within project titled Grant.

In Serbia, realization of modernization project of SS 110/20 kV Bačka Palanka 2, SS 35/10 kV Košutnjak, SS 110/20 kV Kikinda and Kula, is ongoing. This project covers entire replacement of relay protection and own consumption, as well as introduction of substation remote control system. “In the frame of this significant investment cycle by EPS and Elektro Vojvodina, the mentioned substations will be installed with state-of-art ABB’s and Siemens’ microprocessor devices and equipment for remote control”, stated Vladimir Ilić, Senior engineer in CP team at the Resource Center within Elnos Group in Belgrade.

It is already known fact that important engagement within projects on 110/35/10 kV substations Banjaluka 9, Trebinje and Srebrenica is before our CP team next year.

So far, apart from regional market, engineers and electrical lineman, being a part of this team, acquired an enviable experience in realization of the projects abroad – on substations in Sweden and Iceland. In the upcoming period, we expect more significant engagement of this team on European market.

POSVEĆENI DEVOTED TO MARKET TRŽIŠTU

DE

PROJEKTI PROŠIRENJA MREŽE PROJECTS ON EXPANDING NETWORK

SR Realizovali smo radove na dva dalekovoda u okviru planiranog visokonaponskog dalekovoda Wahle-Mecklar u Njemačkoj. Ovi dalekovodi treba da povežu trafostanicu u Wahlu, kod Braunschweiga, sa trafostanicom Mecklar, kod Ludwigsau na naponskom nivou 380 kV.

EN We performed works on two transmission lines within planned high-voltage Wahle-Mecklar transmission line in Germany. This transmission lines should connect substation in Wahle, in the vicinity of Braunschweig, with Mecklar substation, in the vicinity of Ludwigsau at 380 kV voltage level.



SLO

NOVA DIJAGNOSTIKA NEW DIAGNOSTICS

SR Primjenom praktičnih znanja i vrhunskih tehnologija, naša slovenačka članica proširila je portfolio u djelatnosti dijagnostike u oblasti dalekovoda. Mjeranjem vibracija na 2×400 kV dalekovodu Beričevo-Okroglo ekipe ENS-a prvi put su uspješno realizovale poslove iz ove oblasti.

EN Applying practical knowledge and top technologies, our Slovenian member company expanded its portfolio in diagnostics area in the field of transmission lines. Measuring vibrations on 2×400 kV Beričevo-Okroglo transmission line, ENS teams successfully performed the works in this field for the first time.



SWE

U SLUŽBI VJETROPARKOVA SERVING WIND PARKS

SR Završili smo radove u okviru izgradnje 130/400 kV trafostanice Olingan i 420 kV trafostanice Norrtjärn u centralnom dijelu Švedske. Nove trafostanice će imati važnu ulogu u povezivanju vjetroparkova ove regije na švedsku elektroenergetsku mrežu.

EN We completed works within construction of 130/400 kV substation Olingan and 420 kV substation Norrtjärn in Central Sweden. New substations shall have an important role in connecting wind parks of this region with Swedish electrical power network.



RS

KRAJ VELIKE REKONSTRUKCIJE END OF BIG RECONSTRUCTION

SR Ovog proljeća naši timovi završili su poslove rekonstrukcije tramvajske kontaktne mreže na trasi od Vukovog spomenika do Kalemegdanske tvrđave u prestonici Srbije. Nakon rekonstrukcije, ulice obuhvaćene ovim projektom ponijele su zajednički naziv Zeleni bulevar.

EN This spring, our teams completed works on reconstruction of tram contact network on the route from Vukov spomenik to Kalemegdanska tvrđava in Serbian capital. After reconstruction, streets covered by this project got a new name: Green Boulevard.



RS

PODIGNUT STUB VISOK 110 METARA 110 METERS TALL TOWER ERECTED

SR Ekipe Elnos Srbije su, za samo šest dana u ekstremnim uslovima u vjetroparku Čibuk, montirale i podigli meteorološki stub visok 110 metara i težak 37,5 tona. Ovo je jedan od najvećih stubova koje su naše ekipe podigli do sada.

EN In only six days, in extreme conditions in the Wind Park Čibuk, Elnos Serbia teams assembled and erected 110 meters tall and 37.5 tons weighing mast. This is one of the biggest towers our teams have erected so far.



BIH

VELIKI REMONT BIG UPGRADE

SR Timovi naše kompanije ovog proljeća realizovali su dinamičan projekat u okviru kapitalnog remonta TE Ugljevik. Zamjenili su 6 kV i 0,4 kV postrojenja za dopremu uglja, otpremu šljake i pepela u centralnom Objektu 64 TE Ugljevik. Ovo je posao koji je realizovan prvi put od puštanja termoelektrane u rad.

EN This spring, our company teams performed a dynamic project within capital upgrade of the TPP Ugljevik. They replaced 6 kV and 0.4 kV plants for coal delivery, slag and ash delivery in the central Facility 64 of the TPP Ugljevik. This is the work performed for the first time since commission of the thermal power plant.



SNAGA AUTOMATIZACIJE

AUTOMATION STRENGTH

IZRAĐUJUĆI NAJMODERNIJА

RJEŠENJA u oblasti automatizacije i PLC-ova, naše elektromontažne radionice (EMR) nastavile su velikim koracima naprijed u smjeru transformacije energetskog pejzaža.

CREATING MOST MODERN

SOLUTIONS in the field of automation and PLCs, our electrical assembly workshops (EMW) continued fast forward toward transformation of energy landscapes.

SR Za nas su energetski ormari mnogo više od zbira njihovih dijelova i standardnih upravljača elektroenergetskim sistemima. Suština je u fleksibilnosti kojom se prilagođavamo specifičnim zahtjevima investitora, konstantno tražeći najbolja, najsavremenija i najekonomičnija rješenja.

Upravo zbog toga, segment automatizacije u EMR predstavlja dalji razvoj njenih proizvodnih kapaciteta, kao i diverzifikaciju u nove segmente proizvodnje. S kompletom ponudom u oblasti automatizacije i izrade PLC-ova, Elnos Grupa zadovoljava sve zahtjeve kupaca na domaćem i inostranom tržištu, za šta smo u prethodnom periodu dobili i CE znak.

Jedan od najvećih projekata za koji su u našoj radionici izrađeni ormari automatičke i upravljanja jeste i MHE Jablanica, koja je u potpunosti automatizovana i kojom se može upravljati daljinski, sa bilo kog mesta gdje je omogućen pristup internetu.

„Izrada upravljanja za MHE Jablanica bila je veoma izazovan projekt, koji je podrazumijevao odabir opreme, crtanje upravljačkih šema, programiranje PLC-a te podešavanje na terenu i puštanje u rad. Za realizaciju jednog ovakvog projekta potrebna su vrhunska inženjerska znanja. Upravljački ormari izuzetno su kvalitetni i sadrže komponente poznatih svjetskih proizvođača, poput Siemensa, Phoenix Contacta, Schneider Electrica i Rittala“, rekao je Radenko Škoro, vodeći inženjer Proizvodnje.

U ovoj godini bilježimo i rekord u izradi najvećeg industrijskog ormara po snazi do sada. Za potrebe projekta gasifikacije u Rafineriji nafte u Brodu, prvi put EMR je izradila jedan razvod snage 4.000 A. U Rafineriji, u kojoj rade novu stanicu za otpremu prirodnog gasa, koja će kompresovani gas puniti u cisterne, Elnos Grupa je uradila industrijsku trafostanicu, koja će služiti za napajanje tog novog postrojenja.

„Ovo je bio zaista krupan zalogaj i izazov koji traži iskustvo i znanje koje smo gradili godinama. Bilo je potrebno osmisiliti kako će se oprema fizički i tehnički posložiti u jednu kompaktnu i funkcionalnu cjelinu. U ovom razvodu su tone bakra, prekidača te trostrukih sabirnica velike snage koje je trebalo učvrstiti. Važan je i način na koji će se oprema spojiti, zatim distanca između nje. Sve u svemu, to je veliki poduhvat na koji smo ponosni“, rekao je Darko Krecelj, rukovodilac Proizvodnje.

Daljim razvojem i usavršavanjem segmenta automatike stvoreni su uslovi za napredak i razvoj EMR-a i u narednom periodu. Proizvodi iz naših EMR-a odavno su etablirani na domaćem, a sada nam je fokus na EU tržištu. Ovo se



EMR spremno ispunile niz zahtjeva EMW efficiently fulfilled a series of requirements

posebno odnosi na tržišta na kojima već poslujemo, poput Švedske, i na kojima želimo razviti i ovaj dio portfolija.

EN As for us, power cabinets are more than a sum of its components and standard controllers of electrical power systems. It's all about the flexibility used for adjusting to specific Investor's requirements, constantly looking for best, most modern and most economic solutions.

Due to aforesaid, automation segment in EMW represents further development of its production capacities, as well as diversification in new production segments. Having entire offer in automation field and making PLCs, Elnos Group meets all the requirements of buyers at national and international market, which we were provided CE mark in the previous period.

One of the biggest projects our workshop created automation and control cabinets for is SHPP Jablanica, which has been fully automated and remotely controllable, from any location where Internet is available.

Making control for SHPP Jablanica was a very challenging project, which understood selection of equipment, developing control schemes, programming PLC, installation at the field and commissioning. We need top engineering knowledge in order to perform one project of this kind. Control cabinets are of top quality, and they contain components of well-known world producers, such as Siemens, Phoenix

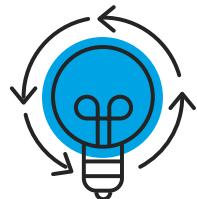
Contact, Schneider Electric and Rittal”, stated Radenko Škoro, Head Engineer of Production.

In this year, we mark a record in making the biggest industrial cabinet in power so far. For needs of the gasification project at the Oil Refinery in Brod, for the first time, EMW made a 4,000 A distribution. In the Refinery, where a new station for delivery of natural gas is constructed and which shall fill compressed gas in tanks, Elnos Group performed industrial substation to serve for powering this new plant.

“This really was a big challenge asking for experience and knowledge we have been building for years. We also had to design the way to arrange equipment physically and technically in a compact and functional whole. This distribution contains tons of copper, circuit breakers and triple busbars of a great power, which should have been fastened. The way equipment is going to be connected is very important as well as distance among them. All in all, it is a big endeavor we are proud of”, stated Darko Krecelj, Head of Production.

Further development and improvement of automation segments creates conditions for improvement and development of EMW in the upcoming period as well. Products of our EMWs have already been marketed on national market and our focus at the moment is EU market. This especially refers to markets we already operate on, such Sweden, where we would like to develop this part of portfolio as well.

Znanje i biznis:



Konferencije

CONFERENCES

ELNOS GRUPA SE OVE GODINE

uspjehno predstavila na
najprestižnijim regionalnim
konferencijama.

THIS YEAR ELNOS GROUP

successfully presented itself
business at most prestigious
regional conferences.

SR SET TREBINJE – VRIJEME JE ZA OIE DOBA

Tranzicija energetskog sektora ka obnovljivim izvorima podrazumijeva i promjenu regulative u cijelom regionu, zbog čega se mora stvoriti značajnija i efikasnija veza privrede, politike i nauke, istaknuto je na ovogodišnjem Samitu energetike SET – 2021, koji je održan u Trebinju 20. i 21. maja, pod generalnim sponzorstvom Elnos Grupe.

„Mi smo kompanija koja je još prije deset godina prepoznala činjenicu da je zaokret ka proizvodnji energije iz zelenih izvora jedini pravi smjer. Rezultat toga su stotine megawata instaliranih zelenih kapaciteta, koji, nažalost, u većini slučajeva nisu u našoj zemlji. Zato s nestrpljenjem čekamo na pokretanje velikih OIE projekata na domaćem tržištu“, istakao je Marko Mijić, član Uprave Elnos Grupe za tehničke poslove.

Učesnici Samita saglasni su s tim da je potrebno raditi na zajedničkim regionalnim projektima koji bi bili kandidovani i finansirani, bar djelimično, iz sredstava EU.



SET Trebinje
Trebinje Energy Summit

EN SET TREBINJE – IT'S TIME FOR RES

Transition of energy sector towards renewable sources also includes change of regulations in entire region, due to which we have to create more significant and efficient connection among economy, politics and science. This was stated on this year's Energy Summit SET – 2021, which was held in Trebinje on May 20 and 21, and the Elnos Group was a General Sponsor.

“We are a company that recognized, over ten years ago, that turning towards production of power from green sources is the only right direction. Result of such turn are hundreds of megawatts of installed green capacities, most of which, unfortunately, are not in our country. Hence, we are impatient to welcome big RES projects on national market”, stated Marko Mijić, Elnos Group Board Member for Technical Affairs.

Summit participants acknowledged a need for cooperation on joint regional projects that could be candidates for EU funds, with aim to secure at least partial funding.



Panel diskusija „Izazovi privredivanja u Republici Srpskoj
Panel discussion “Business Economy Challenges in Republic of Srpska”



Elnos Grupa na sajmu „SEE Mobility 2021“ u Srbiji
Elnos Group on fair “SEE Mobility 2021” in Serbia

„INVEST SRPSKA“ – U SUSRET PERSPEKTIVAMA BUDUĆNOSTI

Naša kompanija uzela je učešće na prvoj investicionoj konferenciji „Invest Srpska“, prestižnom privrednom događaju organizovanom s ciljem jačanja novih strategija investiranja u Republiku Srpsku.

Elnos Grupa predstavila se na panelu „Izazovi privredivanja u Republici Srpskoj“, na kojem je potpredsjednik Uprave Branko Torbica govorio o trendovima važnim za jačanje dinamike privrednog razvoja Srpske. „Koliko god mi, kao Grupacija, širili poslovanje, domaće tržište za nas ima poseban značaj. Elnos Grupa, sa više od 600 zaposlenih u 14 zemalja regije i EU, uspjela je da odgovori na sve izazove 2020. godine, kako u domenu zaštite zdravlja u vrijeme pandemije, tako i na planu realizacije svih projekata, te je kompanija spremna na nove investicije i nova zapošljavanja“, rekao je Torbica.

„SEE MOBILITY“ – NAJVEĆI SAJAM ŽELJEZNIČKE TEHNOLOGIJE

Elnos Grupa ove jeseni predstavila se i na najvećem regionalnom sajmu željezničke tehnologije – „SEE Mobility 2021“ u Beogradu.

Jedini sajam u ovom dijelu Evrope za željeznicu, koji se održava svake dvije godine, i ovaj

put dokazao je kako jugoistočna Evropa ima brojne aktivnosti u vezi s pitanjem željezničkih projekata, kao i kompanija koje pretenduju na dotočne projekte.

Sajam pokriva područja tehnologije puteva, željezničkog i javnog prevoza i infrastrukture te drugih srodnih oblasti.

Elnos Grupa je kao srebrni sponzor još jednom potvrdila aktivno učešće u razvoju i modernizaciji željezničke i drumske mreže tako što kontinuirano stvaramo uslove za sveobuhvatnije i efikasnije povezivanje evropske saobraćajne mreže.

EN „INVEST SRPSKA“ – MEETING FUTURE PERSPECTIVES

Our company participated in the first conference “Invest Srpska”, a prestigious economic event organized with the aim to strengthen new strategies to draw investments to the Republic of Srpska.

Elnos Group introduced itself at the panel “Investment challenges in the Republic of Srpska”, where Branko Torbica, Vice-President of the Board spoke about trends important for strengthening dynamics of Srpska economic development. “As much as we, as a Group, spread our business operations, national market has a special importance for us. Elnos

Group, with more than 600 employees in 14 regional countries and EU, managed to respond to all challenges in 2020, in both segments of health protection during pandemic, and realization of all the projects. Thus, the company is ready for new investments and employments”, stated Torbica.

“SEE MOBILITY” BIGGEST RAILWAY TECHNOLOGY FAIR

This autumn, the Elnos Group introduced itself also on the biggest regional railway technology fair – “SEE Mobility 2021” in Belgrade.

The only railway fair in this part of Europe, which is held on once every two years, this time again proved that Southeast Europe has numerous activities in domain of railway projects, as well as companies interested in respective projects.

Fair covers fields of road technologies, railway and public transport as well as infrastructure and other related areas.

Elnos Group, being a silver sponsor, once again proved its active participation in development and modernization of railway and road network by we continuously creating conditions for comprehensive and efficient connecting of European traffic network.

U ŽIŽI STRUKE I NAUKE

IN FOCUS OF PROFESSION AND SCIENCE

ELNOS GRUPA je ponosni akter i učesnik najprestižnijih stručnih savjetovanja.

ELNOS GROUP is a proud actor and participant of the prestigious professional conferences.

SR ELNOS NA TRI CIGRE SAVJETOVANJA

Elnos Grupa je bila ove godine sponzor i učesnik tri velika CIGRE savjetovanja za električne mreže, koja su održana u Srbiji, Crnoj Gori i Sloveniji.

Prestižna savjetovanja iz oblasti energetike bila su prilika da se upoznamo sa najnovijim dostignućima iz elektroenergetskog sektora. Na skupovima je predstavljen veliki broj naučnih i stručnih radova iz oblasti proizvodnje, prenosa i distribucije električne energije.

Održana savjetovanja ujedno su bila prilika da predstavnike poslovne javnosti upoznamo s aktuelnim projektima koje realizujemo, te sa činjenicom da naša grupacija zauzima sve značajniju ulogu na tržištu elektroenergetike u regiji i u Evropi.

CIRED – STRUČNJACI IZ REGIJE NA ISTOM ZADATKU

Elnos Grupa uspješno se predstavila na tradicionalnoj konferenciji o distributivnim mrežama električne energije CIRED, koja je krajem avgusta održana u Vrnjačkoj Banji, u Srbiji.

Konferencija koja okuplja istaknute stručnjake iz Srbije i regiona sa ciljem da razmjenjuju iskustva i znanja iz oblasti elektrodistributivnih mreža ima veliki uticaj na dalji razvoj i planove svih učesnika.

Elektrodistributivna mreža postaje sve složenija, a savjetovanje je bilo odlična prilika za razmjenu mnogo novih iskustava, informacija o aktuelnim projektima i stručnim radovima. Elnos Grupa bila je sponzor ove značajne konferencije, a organizovali smo i prezentaciju na

kojoj su predstavljeni neki od naših najznačajnijih projekata.

„ENERGETIKA 2021 – U SUSRET ZELENOM OPORAVKU“

Budući razvoj energetike, kao jedne od najvažnijih privrednih grana, mora biti posebno uskladen sa zahtjevima za ublažavanje klimatskih promjena, istaknuto je na 21. međunarodnom savjetovanju „Energetika 2021 – U susret zelenom oporavku“ održanom krajem juna na Zlatiboru.

Naša kompanija se u okviru ove manifestacije predstavila prezentacijom koja je izazvala veliko interesovanje prisutnih koji su znatiželjno raspravljali o trendovima moderne energetike usmjerene ka očuvanju životne sredine i stvaranju perspektiva za zdraviju budućnost.

Na trodnevnom međunarodnom savjetovanju „Energetika 2021“ prezentovano je 80 radova, a skup je okupio više od 200 predstavnika iz oblasti regionalne i evropske energetike.



Elnos Grupa na konferenciji CIGRE Srbija
Elnos Group on conference CIGRE, Serbia

„OIE SRBIJA“ – ENERGETSKA TRANZICIJA JE PRIORITET

Elnos Grupa bila je premium gold sponzor prve konferencije o obnovljivim izvorima energije „OIE Srbija 2021“, koja je polovinom septembra održana u Beogradu.

Naša kompanija je ovom podrškom pokazala svoju opredijeljenost u stvaranju što više uslova za ubrzavanje zelene energetske tranzicije.

Imajući u vidu stratešku namjeru Srbije da do 2040. godine proizvode minimalno 40 odsto električne i toplotne energije iz obnovljivih izvora, sa konferencije je poručeno da je neophodna jača mobilizacija tehnologije za čistu energiju, da bi se obezbijedili postavljeni ciljevi koji podrazumijevaju nula neto emisiju gasova.

ELNOS ON THREE CIGRE CONFERENCES

This year, Elnos Group was a sponsor and participant of three big CIGRE conferences for electrical power networks, which were held in Serbia, Montenegro and Slovenia.

Prestigious conferences in the field of electrical energy were our chance to get introduced to the latest achievements in the electrical energy sector. Numerous scientific works and professional studies in the field of production, transfer and distribution of electrical power were presented on the conferences.

Organized conferences were also our chance to introduce representatives of business public to current projects that we perform, as well as the fact that our group takes more significant part on electrical energy market both in region and Europe.



Prezentacija na CIRED-u Srbija
Presentation at CIRED Serbia



Ekipa Elnosa na savjetovanju „Energetika 2021“ Elnos Team on conference “Energy 2021”

CIRED – REGIONAL EXPERTS ON THE SAME TASK

Elnos Group successfully introduced itself at the traditional conference on electrical power distributive networks CIRED, which was held in Vrњачka Banja, Serbia at the end of August.

Conference gathering prominent experts from Serbia and region in the aim of exchanging experiences and knowledge in the field of electrical power distributive networks, has a big impact on further development and plans of all the participants.

Electrical power distributive network becomes more complex, and conference was an excellent opportunity to exchange many new experiences, information on current projects and professional work.

Elnos Group was a sponsor of this important conference, and we also organized a presentation of some of our most significant projects.

“ENERGETICS 2021 – TOWARDS A GREEN RECOVERY”

Future development of electrical engineering, being one of the most important economy branches, must especially be coordinated with requirements for mitigating climate changes. This was emphasized on 21st international conference “Energetics 2021 – Towards a Green Recovery” held on Zlatibor at the end of June.

In the frame of this event, our company introduced itself through a presentation, which caused a big interest of the participants, who eagerly discussed trends of modern electrical engineering directed towards preservation of environment and creating perspectives for healthier future.

More than 80 studies were presented on this three-day international conference titled “Energetics 2021”. The event gathered more than 200 representatives from domain of regional and European electrical engineering.

“RES SERBIA” – ENERGY TRANSITION IS A PRIORITY

Elnos Group was a premium gold sponsor of the first conference on renewable energy sources “RES Serbia 2021”, which was held in Belgrade in mid-September.

Through this support, our company showed its devotion for creating as many conditions as possible for speeding up green energy transition.

Having in mind strategic intention of Serbia to produce minimum of 40 percent of electrical and thermal power from renewable sources up to 2040, conference sent a message that there is a need for stronger mobilization of technology for clean energy in order to achieve the goals set which imply net zero emission.



Podrška konferenciji „OIE Srbija 2021“
Support to the conference “OIE Serbia 2021”



Prjem prve generacije pripravnika Welcoming new generation of interns



ENERGIJA ZNANJA

Energy of knowledge

Oni su budući pokrećici razvoja poslovanja Elnos Grupe

They are future drivers of Elnos Group business development

SR „OD TALENTA DO EKSPERTA“ – ROĐENA PRVA GENERACIJA PRIPRAVNIKA

„Od talenta do eksperta“ naziv je našeg prvog programa za pripravnike u okviru kojeg su redovi Elnosa BL postali bogatiji za sedam mlađih diplomiranih inženjera elektrotehnike. Oni će, kroz za njih posebno osmišljen program zapoštivanja, upravo u našoj kompaniji steći prvo radno iskustvo u struci.

Za vrijeme pripravničkog programa, koji traje 12 mjeseci, budući mladi stručnjaci usvojeće nova znanja te unijeti nove ideje u život kompanije kako bi u perspektivi bili važan dio njenog dugoročnog rasta i razvoja.

„Dio naše korporativne kulture usmjeren je na podršku novim idejama i pristupima tako da smo sa mnogo entuzijazma započeli naš prvi pripravnički program. On je osmišljen kao savremen spoj praktičnog i efikasnog koncepta rada. U okviru pripravničkog programa naši stručnjaci zauzeli su uloge mentora kako bi bili podrška mladim inženjerima u sticanju što kvalitetnijeg radnog iskustva“, rekao je Aleksandar Šukalo, direktor Elnosa BL.

Podržavati mlađe lude spremne da svoj život i karijeru grade u našoj zemlji jedna je od važnih misija Elnos Grupe. Naša kompanija će i u budućnosti raditi na stvaranju kvalitetnih stručnjaka, koji su od ključnog značaja za razvoj elektroenergetike.

VIŠE OD 200 SREDNJOŠKOLACA POHAĐALO NAŠE PRAKSE

U proteklih deset godina praktičnu nastavu u elektromontažnoj radionicici (EMR) naše kompanije u Banjaluci pohađalo je više od 200 srednjoškolaca Politehničke i Elektrotehničke škole. Ovako značajan odziv učenika na program mentorški vođene praktične nastave odlična je potvrda sve značajnije edukativne uloge našeg EMR-a.

„U našim radionicama učenici imaju mogućnost da svoje teoretsko znanje povežu sa praktičnim iskustvom, a mi im u okviru svakodnevnog procesa rada nastojimo pomoći da kroz vježbu ostvare što bolju praksu“, rekao je Darko Krecelj, rukovodilac proizvodnje Elnosa BL.

On je istakao da su mentori nerijetko bili zadovoljni postignućima i voljom sa kojom su polaznici ulazili u svaki novi projekat. To je za njih bio signal da ovim učenicima treba ponuditi zaposlenje u

kompaniji, tako da su oko deset odsto nekadašnjih polaznika prakse danas radnici u našoj kompaniji.

Budućnost elektromontažnih radionica najvećim dijelom leži u mladim ljudima, koji su sastavni dio ovog tima i koji svojim konstantnim usavršavanjem daju poseban pečat svakom proizvodu koji se u njima napravi. Upravo zato brojne realizovane prakse daju poseban značaj njihovom radu.

Elnos Grupa ima elektromontažne radionice (EMR) u sektoru proizvodnje u Banjaluci i Beogradu. Ovaj sektor već godinama unazad uspješno zaokružuje djelatnost proizvodnje i isporuke sistema relejne zaštite i daljinskog upravljanja te sistema sopstvene potrošnje.

INVESTIRAMO U NAUKU

S ciljem da podrži razvoj edukativne i naučno-istraživačke djelatnosti, naša kompanija poklonila je upravljačku i zaštitnu tablu laboratorijskih za relejnu zaštitu Elektrotehničkog fakulteta u Beogradu. Uz njenu pomoć budući inženjeri će na jednostavniji način moći da pristupe učenju osnova hijerarhije upravljanja i diferencijalne zaštite transformatora.



EMR Banjaluka potvrdio edukativnu ulogu EMW Banja Luka confirmed its educational role

EN "FROM TALENT TO EXPERT" – FIRST GENERATION OF INTERNS BORN

"From Talent to Expert" is the name of our first program for interns within which Elnos BL staff became richer for seven young Bachelors of Science in Electrical Engineering. They shall acquire the first professional working experience through employment program especially designed for them in our company.

During intern program, which lasts for 12 months, future young experts shall adopt new knowledge and introduce new ideas in company's life, so, in perspective, they would be an important part of its long-term growth and development.

"A part of our corporative culture is directed towards support to new ideas and approaches so, very enthusiastic, we started our first intern program. It is designed as a modern combination of practical and efficient work concept. Within intern program, our experts have mentor roles in order to be a support to young engineers in acquiring as better quality of work experience as possible", stated Alek-sandar Šukalo, Elnos BL Director.

One of the most important Elnos Group missions is to provide support for young people who are ready to build a life and career in our country. In future as well, our company shall work on creating good quality experts being crucial for development of electrical engineering.

MORE THAN 200 HIGH SCHOOL STUDENTS ATTENDED OUR PRACTICAL EDUCATION

Within past ten years, practical education in electrical assembly workshop (EMW) of our company in Banja Luka was attended by more than 200 high school students of Polytechnical and Electrical Engineering High School. Such a significant number of students attendees at the mentorship program of practical education is an excellent confirmation of ever-important educational role of our EMW.

"In our workshops, students have possibility to connect their theoretical knowledge with practical experience, and we try to help them acquire better professional practice of everyday work process through training", stated Darko Krecelj, Head of Elnos BL Production.

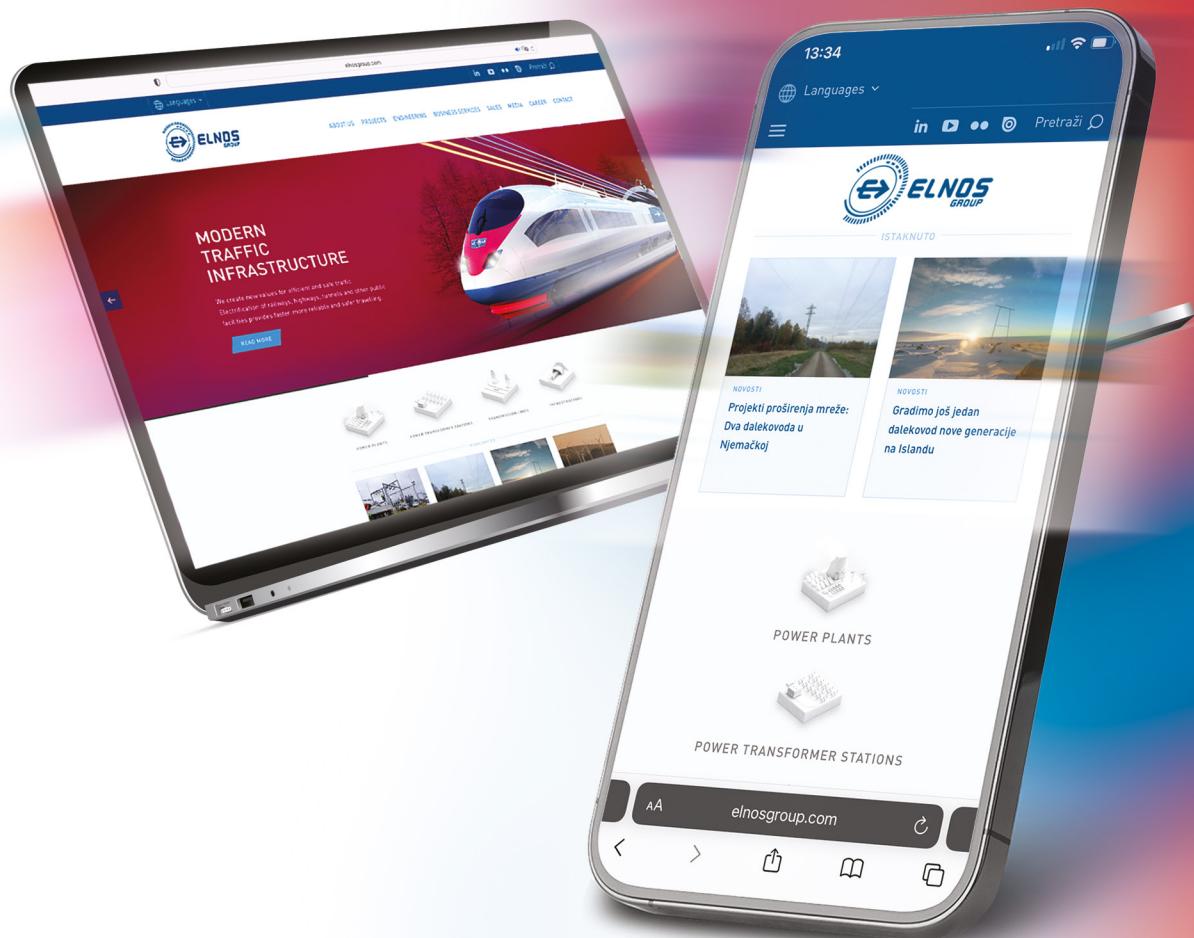
He stated that mentors were often happy with the achievements of the interns and the will they showed at the start of each project. For them it was a sign to offer employment in the company to these students, so about ten percent of former interns at the practical education are current employees in our company.

Future of electrical assembly workshops mostly is in hand of young people, who are constituent parts of this team. They give a special mark to each product made in the workshops by their constant improvement. Numerous practical trainings performed reflect the importance of the work done thereby.

Elnos Group have electrical assembly workshops (EMW) in the production sector in Banja Luka and Belgrade. For years now, this sector has been successfully performing both production and delivery of relay protection system and remote controlling as well as system for in-house consumption.

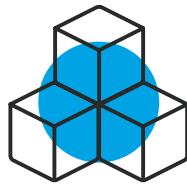
WE INVEST IN SCIENCE

In the aim of supporting development of educational and scientific-research activity, our company granted control and protective board to the laboratory for relay protection of the Electrical Engineering Faculty in Belgrade. With its help, future engineers shall be able to study basics of management hierarchy and differential protection of transformers in a simple way.



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Kreiramo najljepše

vrijednosti

CREATING THE MOST BEAUTIFUL VALUES



Elnos Grupa je ponosni sponzor Teatar Festa Elnos Group is a proud sponsor of Theatre Fest

PRIJATELJI POZORIŠNE UMJETNOSTI

Elnos Grupa tradicionalno podržava organizaciju Teatar festa „Petar Kočić“, omiljenog pozorišnog festivala Banjalučana. Tako je bilo i ove godine, kada smo bili sponzori predstave „Balkanski špijun“ Narodnog pozorišta iz Beograda, koja je, na zadovoljstvo ljubitelja pozorišta, izvedena u Narodnom pozorištu Republike Srpske. Elnos Grupa na ovaj način potvrđuje da je kompanija koja pruža podršku najvažnijim institucijama kulture i da je prijateljski usmjereni prema zajednici u kojoj djeluje.

PODRŠKA MLADOJ TENISERKI TEI

Vodeći se premisom da je ulaganje u mlade ulaganje u budućnost, Elnos Grupa pruža snažnu podršku jedanaestogodišnjoj teniserki Tei Kovačević iz Gradiške. Ova talentovana mlađa sportistkinja pokorila je ove godine Majorku, Frankfurt, Beograd, Pariz (u dvije kategorije) i Bri u Belgiji.

Elnos Grupa, kao društveno odgovorna kompanija koja njeguje poseban odnos prema sportu, podržavajući uspjehe mlađih, na najljepši mogući način promoviše i vrhunske sportske vrijednosti.

POMOĆ ZA ŽENE I DJECU ŽRTVE NASILJA

Kao kompanija koja njeguje porodične vrijednosti u kojima je bezbjednost žena i djece na prvom mjestu, Elnos Grupa je pomogla rad Sigurne kuće u Banjaluci, koja brine o žrtvama nasilja.

Predstavnice naše kompanije povodom Međunarodnog dana žena, 8. marta, posjetile su Fondaciju „Udružene žene“, koja godinama unazad upravlja Sigurnom kućom za žene i djecu žrtve nasilja u porodici u Banjaluci, i pokazale im da nisu same u svojoj borbi. Zahvalni smo svim ženama iz ove organizacije na njihovom predanom radu i istrajnosti u dugogodišnjoj misiji da naše društvo učine boljim mjestom, koje garantuje jednaka prava i sigurnost za sve.

HUMANOST NA DJELU

Elnos Grupa je još jednom pokazala solidarnost i empatiju prema zajednici. Nakon razornog zemljotresa koji je pogodio Petrinju, u Hrvatskoj, u decembru 2020. godine, odmah smo se uključili u akciju prikupljanja pomoći za ugrožene, od kojih su mnogi ostali i bez krova nad glavom. Kao društveno odgovorna kompanija, u teškim trenucima ne zaboravljamo one kojima je najteže i zato će naša ruka uvek biti pružena prema onima kojima je pomoć potrebna.

EN FRIENDS OF THEATRICAL ART

Elnos Group traditionally supports organization Theater Fest "Petar Kočić", favorite theater festival of Banja Luka citizens. This year again, we sponsored the play titled "Balkanski špijun" of the Belgrade National Theatre, which, to the pleasure of theater lovers, was performed at the National Theatre of the Republic of Srpska. In this way, the Elnos Group confirms its continuous willingness to provide support for the most important cultural institutions as well as its friendly attitude towards the community.

SUPPORT FOR TEA, A YOUNG TENNIS PLAYER

Lead by premise that investment in young people represents an investment in future, Elnos Group provides a strong support for eleven-years-old tennis player Tea Kovačević from Gradiška. This talented girl player conquered Mayorca, Frankfurt, Belgrade, Paris (in two categories) and Bree in Belgium.

Elnos Group, being socially responsible company nurturing a special relationship with sport, supporting successes made by young people, promotes top sport values in the most wonderful way.



Mlada teniserka u posjeti Elnosu
Young tennis player visiting Elnos



Pružili smo podršku „Udruženim ženama“
We gave our support to "United Women"

HELP TO WOMEN AND CHILDREN, VIOLENCE VICTIMS

As a company nurturing family values where women and children safety is at the first place, Elnos Group supported the work of the safe house in Banja Luka, a home that takes care of violence victims.

On March 8, International Women's Day, female representatives of our company visited Fund "United women", which, for years now, has been running a safe house for women and children, victims of violence in Banja Luka, to show them they are not alone in their fight. We are grateful to all the women from this organization for their devoted work and persistence

in many-years mission to make our society a better place which will guarantee equal rights for everyone.

HUMANITY AT WORK

Once again, Elnos Group showed solidarity and empathy for community. After devastating earthquake which hit Petrinja, Croatia, in December 2020, we immediately joined the fundraising action for those in need, most of which were left without their houses. Being socially responsible company, we do not forget those in need in the most difficult moments and hence our hand shall always be reaching those who need help.



Pomoć za Petrinju nakon zemljotresa Help for Petrinja after earthquake



