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SELECTIONG 100 BEST LOCATIONS FOR THE BIGGER PHOTOVOLTAIC POWER PLANTS IN SERBIA

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Previous energy strategies for Serbia had various goals in terms of renewable energy sources with the quantification of type of power plants by type, but the national energy planning did not go to the level of determining specific locations for power plants, namely photovoltaic. This caused difficulties for the responsible ministry and public companies to decide which power plants will be connected and which not. Additionally, due to a drop in investment costs, connection requests dramatically increased. In the beginning of 2023 applications for the construction of power plants totaling 14 GW in capacity were under review at public transmission company which further caused delays and stagnation in the construction of these power plants. At the same time, electricity prices for households and industries had increased by 18 and 27% respectively. During the year 2022, only 6 MW of new power plants were realized even with granting the monthly net-metering to the industry and households, which is far below the possible and realistic dynamic of Serbia's energy transition implementation. It was announced in early 2023, with the changes in legislative towards implementing the auctions principles, that the first permits will be issued for the construction of large photovoltaic power plants on land to progress towards meeting an overall capacity goal of 2-3 GW. To guide in selecting sites that will help meet this goal, we mapped 100 suitable photovoltaic power plant locations prioritized not only by energy yield, but also to prevent possible conflicts with other activities (i.e., agriculture, protected areas and cultural heritage). The mapping was carried out using available energy yield data, and geographically specific data of importance for the construction of larger photovoltaic power plants up to 10 MW in size. The 100 locations were selected as best among a much larger number of possible ones. These 100 sites occupy less than 25 km² of land and would be enough to cover about 5% of household consumption in Serbia.

Key words: *energy planning, photovoltaic power plant, GIS, Serbia*

ODABIR 100 NAJBOLJIH LOKACIJA ZA POSTAVLJANJE VEĆIH FOTONAPONSKIH ELEKTRANA U SRBIJI

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Dosadašnje energetske strategije Srbije su imale različite ciljeve u pogledu obnovljivih izvora energije sa kvantifikacijom pojedinih tipova elektrana, ali nacionalno energetske planiranje nije išlo do nivoa određivanja konkretnih lokacija, posebno za fotonaponske elektrane. Ovo je izazvalo poteškoće nadležnom ministarstvu i javnim preduzećima jer je pad investicionih troškova ohrabrio veliki broj aplikacija za dozvole za izgradnju elektrana na pogodnim lokacijama od ukupno 14 GW, što je dodatno izazvalo zastoje i stagnaciju u izgradnji ovih elektroenergetskih objekata na zemlji. U isto vreme došlo je do poskupljenja troškova snabdevanja električnom energijom za domaćinstva 18% i 27% za privredu tokom 2022. a iste godine kroz mehanizam neto-merenja realizovano je samo oko 6 MW novih elektrana što je kao rezultat daleko ispod mogućeg, realnog nivoa i neophodne brzine sprovođenja energetske tranzicije Srbije. Početkom 2023. godine, uz izmene zakona u pravcu sprovođenja aukcija, najavljeno je da će biti izdate prve dozvole za izgradnju velikih fotonaponskih elektrana na zemljištu i ulaganja u projekte veličine nekoliko (2-3) GW. Stoga je potrebno izvršiti mapiranje i odabiranje 100 lokacija fotonaponskih elektrana kako bi se bolje razumele pogodne lokacije ne samo sa stanovišta prinosa energije, već i kako bi se predupredili eventualni konflikti sa drugim aktivnostima (poljoprivreda, zaštićena područja, kulturno nasleđe). Mapiranje je sprovedeno korišćenjem raspoloživih podataka o energetske prinosa, kao i geografski specifičnih podataka od značaja za izgradnju većih fotonaponskih elektrana do 10 MW. Odabrano je 100 najboljih lokacija među mnogo većim brojem mogućih. Količina proizvedene energije na površini koja zauzima manje od 25 km² bila bi dovoljna da pokrije oko 5% potrošnje domaćinstava u Srbiji.

Ključne reči: *energetsko planiranje, fotonaponske elektrane, GIS, Srbija*