



Mid-term 400 kV transmission projects

JSC “Elektromreža Srbije”

7.12.2022.

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TRANSBALKAN CORRIDOR

- OVERVIEW -

- ❖ Total length: 321 km
- ❖ Total investment: 185,4 MEUR
- ❖ **Section I** – Construction has been completed from Serbian side and energized in December 2017.
- ❖ **Section II** – Construction was started in May 2020. Works are completed in June 2022.
- ❖ **Section III** – Construction Permits were obtained in first half of 2022.
- ❖ **Section IV** – Construction Permit was obtained in October 2022.



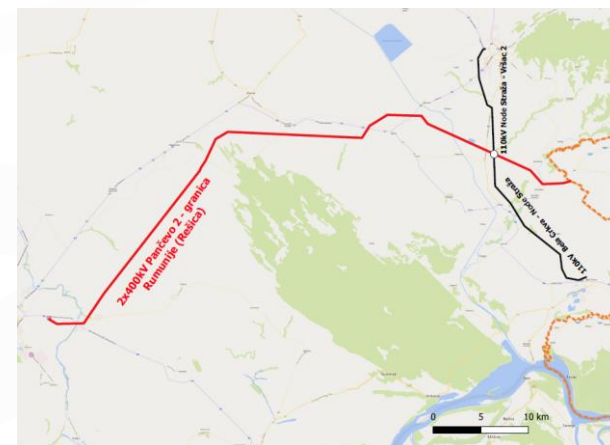
TRANSBALKAN CORRIDOR – Section I and II

❖ Section I - OHL 2x400 kV SS Pančevo 2 – Romanian border

Length - **68 km**. Investment value - **27,4 MEUR** financed from JSC EMS own funds.

Status: Construction completed from Serbian side and energized in December 2017.

Key challenges: Due to project delays on the Romanian side, one circuit of line is connected to the OHL 110kV Vršac - Bela Crkva to increase security of supply and reduce transmission losses in southern Banat region. Another circuit is energized with 400kV voltage but not loaded. Based on the information received from Transelectrica the commissioning of the project in Romania is expected at the end of 2025 (temporary solution will be ready by the end of 2023).

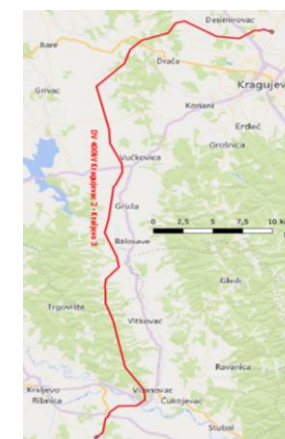


❖ Section II - OHL 400 kV Kragujevac 2 – Kraljevo 3

Length- **60 km**. Investment value – **27,5 MEUR** (WBIF grant 6.468 MEUR, KfW loan 15 MEUR and JSC EMS own funds).

Status: The commissioning is completed in June 2022.

Key challenges: Adoption procedure for spatial plan for the territory of the municipality of Knić lasted 3 years due to harmonization with local municipality plans.



TRANSBALKAN CORRIDOR – SECTION III and IV

❖ Section III – OHL 2x400 kV SS Obrenovac – SS Bajina Bašta

Length - **109 km**. Due to change in design (type of towers, safety ladders) and the volatile market of materials and services, there was an increase in the estimated total value - the new value of the project is 89,7 MEUR (approx. 50% increase).

Status: KfW Loan (up to 40 MEUR) and WBIF Grant agreements (up to 12,8 MEUR) were signed in December 2020. Construction Permits has been obtained. **Contracting of consulting services was signed in November 2022**. Estimated deadline for construction is 2026.

Key challenges: There was an increase in the estimated value of the project, so it is necessary to provide additional funds. JSC EMS applied for additional WBIF funds.

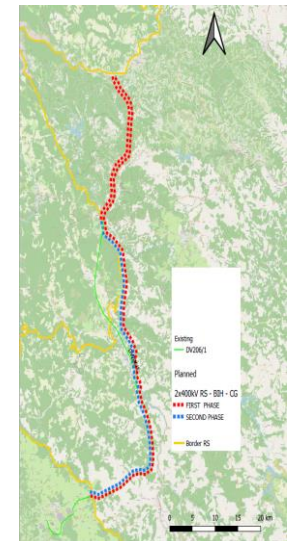
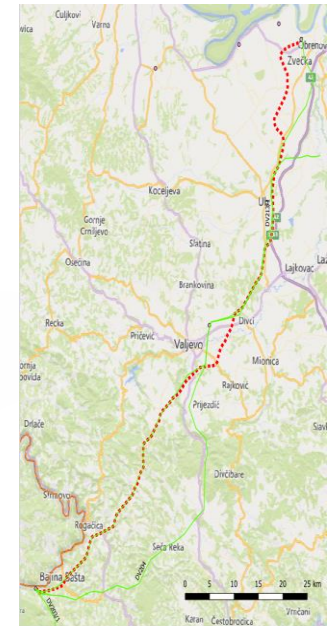
Due to the use of existing 220 kV transmission line corridors, which are located in zones with increased sensitivity, there was a need to design three conductors per phase in those zones for the sake of noise reduction and it will be necessary to carry out the works according to the detailed predetermined schedule.

❖ Section IV – OHL 2x400 kV SS Bajina Bašta – border with CG – border with BiH

Length - **84 km**. Estimated investment value – **40,8 MEUR**.

Status: Letter of grant approval (8.5 MEUR) was obtained in September 2022. The signing of the KfW Loan and WBIF Grant agreements is expected by the end of 2022. Solving of property legal affairs was started in September 2022. Construction Permits has been obtained. Design for Construction - 80% finished. Estimated deadline for construction is 2027.

Key challenges: Preliminary power flow analysis for the connection of future PHPP Bistrica (700 MW), showed that it might be necessary to carry out equipping of both line circuits along whole route. Potential increase in the prices of materials and works, and in the scope of project may demand additional funds. This will be analyzed during project implementation, before contracting of services, works and materials.



EMS JSC 400 kV INTERCONNECTION PROJECTS

❖ Mid-term transmission 400 kV projects (by 2030)

North CSE Corridor: Construction of new SS 400/110 kV Beograd 50 with 400 and 110 kV alignment and OHL 2x400 kV SS Beograd 50 – WPP Čibuk 1 with doubling of existing OHL 400 kV Djerdap 1 (RS) – Portile De Fier (RO)

Pannonian corridor: OHL 2x400 kV SS Subotica 3(RS) – SS Sandorfalva (HU), OHL 2x400 kV SS Sombor – SS Novi Sad 3 and OHL 2x400 kV SS Beograd 50 (RS) – SS Sremska Mitrovica 2

Central- Balkan corridor – I section: New S/Y 400 kV Pozarevac and OHL 2x400 kV S/S Jagodina 4 – S/Y Pozarevac

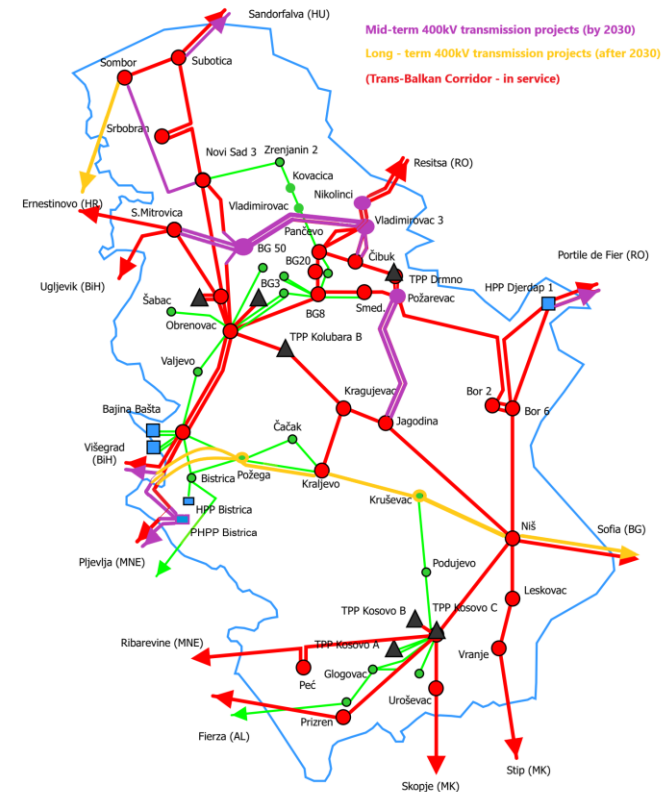
❖ Long-term transmission 400 kV projects (after 2030)

Central- Balkan corridor

Beside, HVDC cable between Italy and Montenegro, Trans-Balkan Corridor is tightly connected to the project Central-Balkan Corridor will enable transmission of energy from east to west on the border between Bulgaria through Serbia and further to Bosnia and Herzegovina and to Montenegro.

- I. Doubling of existing OHL 400 kV S/S Niš (RS) – S/S Sofia (BG)
- II. OHL 2x400 kV S/S Niš 2 – S/S Kruševac 1 – S/S Kraljevo 3
- III. OHL 2x400 kV SS Kraljevo 3 – SwS Požega – Višegrad
- IV. SwS 400 kV Požega

OHL 400 kV between Serbia and Croatia



North CSE CORRIDOR

S/S 400/110 kV Belgrade 50, OHL 400 kV in South Banat and OHL 400 kV Serbia-Romania STATUS as of October 2022

- ❖ North Continental South East (CSE) Corridor project consists of the following:
 - ✓ Investment 1: S/S 400/110 kV Belgrade 50 (2x300 MVA)
 - ✓ Investment 2: OHL 400 kV S/S Belgrade 50 – SwY Cibuk 1 (109,5 km 400 kV and 38 km of 110 kV lines)
 - ✓ Investment 3: Upgrade of existing OHL 400 kV Serbia (HPP Djerdap 1) – Romania (Portile de Fier) to double circuit OHL (2 km)

- ❖ Purpose:
 - ✓ enable energy evacuation from new and existing wind farms in the area of South Banat amounting up to 3 GW
 - ✓ Increase NTC for about 500 MW (facilitate energy transits from and to the Romanian power system)
 - ✓ Increase security of electricity supply in the region of Belgrade and Srem

- ❖ JSC EMS applied for WBIF technical assistance within the 25th round of WBIF technical assistance in the amount of EUR 700,000 for the preparation of a Feasibility Study with an Environmental and Social Impact Assessment Study. The donation was approved and in October 2021 the preparation of the Study began. All technical documentation is finished and approved by JCS EMS. Urban design was rejected, causing the delay in the issuing of the location conditions for the S/S and OHL.

- ❖ The estimated value of the whole project North CSE Corridor is around 82 MEUR.

- ❖ For Investments 1 and 2, so called “*Beogrid2025*” (estimated overall budget is around 80 MEUR), the Government of the Republic of Serbia adopted decision labeling it the project of National interest. According to this decision, costs for these two investments will be covered from the budget of the Republic of Serbia. Deadline for construction of these investments is 2026.

PANNONIAN CORRIDOR

- ❖ Pannonian Corridor project consists of the following:
 - ✓ OHL 2x400 kV interconnection between Serbia and Hungary (equipping of one circuit)
 - ✓ OHL 2x400 kV S/S Sombor 3 – S/S Novi Sad 3 (equipping of one circuit)
 - ✓ OHL 2x400 kV S/S Belgrade 50 – S/S Sremska Mitrovica 2

- ❖ Purpose:
 - ✓ Enable energy evacuation from new RES in the area of Backa
 - ✓ Increase security of electricity supply in the region of Backa and Srem
 - ✓ Increase NTC for at least 600 MW (facilitate energy transits from the Hungarian power system)

- ❖ The estimated value of the whole project is around 108 MEUR.

- ❖ At the moment the bilateral study between MAVIR and EMS has entered the final stage of drafting. The completion is expected by the end of 2022

- ❖ Pannonian corridor will be included in the JSC EMS' investment plan 2023-2025

- ❖ Deadline for first two investments is 2028 and the deadline for third investment is 2030.

OHL 2x400 kV S/S Jagodina 4 – S/Y Pozarevac

- ❖ This project includes the following investments:
 - ✓ New S/Y 400 kV Pozarevac with the appropriate alignment of 400 kV lines
 - ✓ OHL 2x400 kV S/S Jagodina 4 – S/Y Pozarevac
- ❖ Purpose:
 - ✓ Enable energy evacuation from new RES in the area of Banat and Kostolac
 - ✓ Increase security of electricity supply in the Central Serbia
 - ✓ Establishing the connection between the cross-regional corridors for energy transmission
- ❖ The estimated value of the whole project is around 49 MEUR.
- ❖ The project is included in the ENTSO-E TYNDP 2022 as part of the cluster named Central Balkan Corridor.
- ❖ This project will be included in the JSC EMS' investment plan 2023-2025
- ❖ Deadline for the project is 2028.



THANK YOU!